Towards unbounded thinking.

NGU.

SCHOOL of PHARMACY

Published International Scientific Research 2017-2022

4th edition

January 2023

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SCHOOL OF PHARMACY NEWGIZA UNIVERSITY UPPER MANAGEMENT

PROF. DR. A. SAMEH FARID
Founder and President of
Newgiza University

PROF. DR. LAMIS RAGAB
Vice President of
Newgiza University

PROF. DR. MANAL MAHER
Dean of School of Pharmacy
Newgiza University

NEWGIZA UNIVERSITY
SCHOOL of
PHARMACY

CONTENTS

NEWGIZA UNIVERSITY
SCHOOL of PHARMACY

STATEMENT OF THE DEAN OF SCHOOL OF PHARMACY - NEWGIZA UNIVERSITY

Education and scientific research became essential dimensions in economic and social developments. Scientific research and the education industry are crucial in the National Strategy for Science, Technology, and Innovation; Ministry of Higher Education and Scientific Research, Egypt, 2030.

International publishing has acquired great importance in universities ranking. Moreover, financing research projects in any organization worldwide depends mainly on the number of research papers internationally published by its researchers. Therefore, Egyptian universities encourage their scientists and researchers to publish their work in international journals.

The Newgiza School of Pharmacy was established in August 2016 in academic collaboration with University College London (UCL). Newgiza University had the vision to build a solid foundation for 21st-century learning and research to redefine the future of Egypt through the dissemination of knowledge via teaching and learning, knowledge development via scientific research activities, and application of knowledge in community service and environmental development.

Dean of school of pharmacy

Prof. Manal Maher

School of Pharmacy Vision

Create a community of interdisciplinary researchers, professors and students who foster excellence and encourage innovation. This community will spearhead academic and scientific advancement in the region and across the world by building a solid foundation for the 21st century learning.

School of Pharmacy Mission

The School of Pharmacy - Newgiza University aims to prepare graduates with competitive competencies who are able to meet the requirements of the pharmaceutical labor market locally and internationally, patient-centered, contribute to raise the health care level, relying on qualified human cadres, a distinguished international educational program, a supportive environment for innovation and scientific research, and active participation in community service while preserving social values.

School of Pharmacy Strategic Goals

1. Continuous development of the educational process, students support, and enhance competitiveness.
2. Enhancement of the institutional capacity and development of the institutional evaluation systems.
3. Development of scientific research and creating postgraduate programs.
4. Enhancement of the community role of the school and supporting graduates.

School of Pharmacy Scientific Departments and Specializations

1. Department of Clinical Pharmacy
2. Department of Chemistry
   - 2.1 Department of Organic and Pharmaceutical Chemistry
   - 2.2 Department of Pharmacognosy
   - 2.3 Department of Analytical Chemistry
3. Department of Biology
   - 3.1 Department of Pharmacology and Toxicology
   - 3.2 Department of Microbiology and Immunology
   - 3.3 Department of Biochemistry
4. Department of Pharmaceutics and Industrial Pharmacy.

SCHOOL OF PHARMACY SCIENTIFIC RESEARCH POLICIES

1. Develop the capabilities of the teaching staff and assistants in scientific research and publishing.
2. Raise the teaching staff and assistants' awareness of the principles and ethics of scientific research.
3. Provide support to assist researchers in carrying out distinguished research.
4. Integrate with college policies in education, community service, and environmental development.
5. Encourage applied, joint research, and research collaborations across NGU medical sector's schools that serve community needs.
6. Establish and develop partnerships and agreements with universities and international institutions in scientific research.
7. Organize scientific conferences and symposia.
8. Prepare a research themes proposal by the heads and members of each scientific department in line with the suggested research directions.
9. Review the research points proposed by the departments, arranging them according to priorities and facilities, and ensuring:
   - 9.1 The plan is flexible to match the future requirements and variables.
   - 9.2 It affords a fruitful integration between all the school departments, and the team's work culture is taken into consideration.
10. Establish a mechanism for implementing, following up, and updating the research plan themes of the scientific departments of the college.
11. Approve the final version of the scientific research plan from the scientific department councils and the School Council.

SCHOOL OF PHARMACY RESEARCH DIRECTIONS

Research Direction 1. Common diseases in the Egyptian society concerning aetiology, diagnosis, and management (pharmacotherapeutic & non-pharmacotherapeutic) of spreading and chronic diseases.

1.1 Cancer.
1.2 Hepatic diseases.
1.3 Metabolic disorders (Obesity and Diabetes).
1.4 Cardiovascular diseases (Hypertension).
1.5 Renal diseases.
1.6 Gastrointestinal diseases.
1.7 Infectious diseases.
1.8 Central nervous system and neurodegenerative diseases.
1.9 Musculoskeletal and autoimmune disorders.
1.10 Neurologic and psychiatric disorders.
1.11 Critical care.

Research Direction 2. Therapeutic Drug Monitoring (TDM) and disease outcome.

2.1 Therapeutic Drug Monitoring.
2.2 Drug interactions.

Research Direction 3. Personalized and precision medicines.

3.1 **Pharmacogenomics.**
3.1.1 Impact on disease outcome.
3.1.2 Impact on toxicity occurrence.
3.2 **Nutrigenomics.**
3.2.1 Impact on clinical outcome.
3.2.2 Impact on toxicity modulation.

Research Direction 4. Drug discovery.

4.1 Evaluate new common spreading and chronic disease treatments and minimise possible adverse reactions.
4.2 Biopharmaceuticals (Biosimilars, Bioinformatics, Gene therapy, and recombinant DNA).
4.3 Clinical nutrition and nutraceuticals.
4.4 Herbal medicines and tissue culture.
4.5 Antibiotics resistance.
4.6 Standardization of drugs.

Research Direction 5. Drug delivery and pharmaceutical formulations and disease outcome.

5.1 Formulate and evaluate nano-drug delivery systems.
5.2 Development and fabrication of Advanced Drug Delivery.
5.3 Targeted Drug Delivery Systems.
5.4 Biopharmaceutics and Pharmacokinetics optimization.
5.5 Patient centric formulations.

Research Direction 6. Economic aspects.

6.1 Strategic Industries.
6.1.1 Agriculture wastes as sources of cellulose and green chemicals.
6.1.2 Nanotechnology Applications in the Pharmaceutical Industry.
6.1.3 Pharmaceutical Process Scale-Up.
6.2 Pharmacoeconomics.
6.2.1 Drug use evaluation.
6.2.2 Service implementation.
6.3 Water resources.
6.3.1 Develop novel nanoparticles for pharmaceutical wastewater treatment.

SCHOOL OF PHARMACY RESEARCHERS' BIOGRAPHY

Prof. Manal Mohamed Maher Hussein, Dean of the School of Pharmacy, Newgiza University (2016 – present) and professor of microbiology and immunology. She held several positions at the Faculty of Pharmacy, Cairo University, including Acting Dean (7/2014-12/2014); Vice-Dean for Education and Students Affairs (2011-2016); Coordinator of the Clinical Pharmacy Program (2009-2011). She implemented the Clinical Pharmacy Program until the first graduated class in 2011. Former member of the Promotion Committee of Professors and Associate Professors for Microbiology and Immunology.

Her research areas of interest are microbial resistance, fermentation technology, and new vaccines and biotechnological products.

Dr. Manal was the PI investigator in two research projects covering the process development for the industrial production of Rifamycin B and the feasibility study for a cost-effective process for the production of Rifamycin B. Awarded a Patent No. (200312062) titled "Process for Production of Rifamycin B using improved bacterial strain".

Prof. Manal Mohammed Maher - Dean School of Pharmacy

Dr. Marwa Fouad, Professor of Pharmaceutical Chemistry, Vice Dean for Students Affairs, School of Pharmacy, Newgiza University. She earned her PhD from Faculty of Pharmacy, Cairo University in October 2009. She has about 75 international publications in peer reviewed journals with high impact factor and participated with oral and poster presentations in different international conferences in different countries like Egypt, France, and Spain. She joined Prof. Jean-Marie Pages group in UMR-MD1 Research Unit, Aix-Marseille University in France in 2013 where she worked as a postdoctoral fellow then she joined Prof. Bertrand Blankert group in pharmaceutical analysis laboratory, Mons University in Belgium for a postdoctoral fellowship in 2014. She supervised about 50 master and PhD theses. She reviewed around 60 international publications in many international journals. She got the Award of Best International published paper in Pharmaceutical Chemistry from 3rd Scientific Conference of the Faculty of Pharmacy- Cairo University, April 2012 and 8th Scientific Conference of the Faculty of Pharmacy- Cairo University, April 2017. She also got Awards for international publications in 2011-2020 from Cairo University. She is the associate managing editor of Journal of Advanced Research. She is a member of the Consultative Committee on Intellectual Property, Egyptian Drug Authority and also a member of the Specialized Scientific Committee for evaluating the quality file and evaluating the pharmaceutical products submitted by the unified registration system CTD - Egyptian Drug Authority. https://orcid.org/0000-0003-3227-8683

Prof. Marwa Ahmed Fouad – Vice Dean of Education and Student Affairs

Dr. Rania Mohsen Abdelsalam a Professor of Pharmacology & Toxicology, vice dean of graduates and research affaires and the acting head of the biology discipline at the School of Pharmacy, Newgiza University. She has a solid background in the field of hepatic fibrosis, neuropharmacology, and oncology she has more than 55 internationally published papers peer reviewed journals in these fields [H-index (20) and i10-index (29)]. Former member of the ethics committee (REC) in the Faculty of Pharmacy, Cairo University (2010-2020) and was the Head of the Career Center Unit (FOPCC), Faculty of Pharmacy, Cairo University. She is also a member of the Central Committee for Ethics of Scientific Research, The Supreme Council of University Hospitals. Dr. Rania is the coordinator of the student support committee in School of Pharmacy, NewGiza University, and head of the research ethics committee in SOP, NGU.
https://www.scopus.com/authid/detail.uri?authorId=24176800700
https://orcid.org/0000-0003-4623-8754

Prof. Rania Mohsen – Vice dean of Graduates and Research Affairs

Ahmed Sherif Attia works as a Professor of Microbiology and Immunology, Faculty of Pharmacy, Cairo University and has an adjunct faculty position in the School of Pharmacy, Newgiza University. He obtained his Ph.D. in Molecular Microbiology from the University of Texas Southwestern Medical Center, USA working on the molecular aspects of the microbial resistance to the complement system. Working as a postdoctoral fellow at Vanderbilt University, USA, he identified new microbial therapeutic targets and novel host antimicrobial mechanisms using cutting edge technologies. Dr. Attia's current research focuses on; i) identifying novel microbial therapeutic targets, ii) development of new vaccines and biotechnological products, and iii) discovering novel non-traditional antimicrobial agents from natural sources and through synthetic chemistry. Dr. Attia's work is highly recognized as he has been awarded several prestigious awards from both local and international entities.

Prof. Ahmed Sherif Attia – Professor of Microbiology and Immunology

Dr. Nevine is a professor of pharmaceutics and industrial pharmacy, Faculty of Pharmacy, Cairo University. Prof Nevine has a lot of international publications in the field of pharmaceutics. Her research interests include nanotechnology, controlled drug delivery systems, colon targeting, and brain targeting. Dr. Nevine is a member of the scientific committee responsible for evaluating and assessing variations (minor or major changes) for pharmaceutical products, food supplements or veterinary products at the Central Administration of Pharmaceutical Affairs (CAPA), Ministry of Health since 2010.

Prof. Nevine Shawky – Professor of Pharmaceutics and Industrial Pharmacy

Prof. Medhat Al-Ghobashy is currently the director of the Central Administration for Drug Control and advisor for the regulatory and reference labs at the Egyptian Drug Authority. He is a member of the faculty council and former staff member at the School of Pharmacy, Newgiza University. He has a solid background in the field of biomolecular characterization, analysis of biotherapeutics and pharmaceuticals in biological fluids. Dr. Al-Ghobashy is involved in several research projects covering the development and characterization of nano-formulations & synthetic receptors for biotechnology-derived drugs and biosimilarity assessment of locally produced biologics. The research group of Dr. Al-Ghobashy is also involved in the development and implementation of surface-modified magnetic nanoparticles and titanium dioxide nanoparticles for pharmaceutical wastewater treatment.
https://orcid.org/0000-0002-3270-6804

Prof. Medhat Al-Ghobashy – Professor of Analytical Chemistry

Dr. Al-Shorbagy is an Associate Professor of Pharmacology & Toxicology, Faculty of Pharmacy, Cairo University. He was the biology discipline lead at the School of Pharmacy, Newgiza University. He has a solid background in the field of neuropharmacology and is currently involved in a research project funded by the STDF covering the development and characterization of a therapeutic vaccine intended for the treatment of multiple sclerosis. The multidisciplinary aspect of his research encompasses molecular mechanisms involved in various inflammatory disorders and diabetes. Dr. Al-Shorbagy is also involved in the development and validation of orthogonal testing protocols for quality/safety assessment of biopharmaceuticals in partnership with the Bioanalysis Research Group at the Faculty of Pharmacy, Cairo University.
Al-Shorbagy has worked as a member of the pharmacology committee offering technical consultancy to the Central Agency of Pharmaceutical Affairs at the Egyptian Ministry of Health. He is also the Google Team Technical Lead for the FOPCU and the ex-director of the Faculty of Pharmacy IT Computer Center.
Research profile
https://orcid.org/0000-0002-5104-6821s

A/Prof. Muhammad Al-Shorbagy –Professor of Pharmacology and Toxicology

Dr. Ahmed El Kerdawy is currently an associate professor of pharmaceutical chemistry at Faculty of Pharmacy, Cairo University. He earned his doctoral degree from Erlangen-Nuremberg University - Germany in Chemistry with specialization in Computer-aided Drug Design (CADD) in the Computer-Chemistry-Center (CCC) research group. His PhD research project focused on the optimization of the current drug-design computer software; and in the same lab he had his postdoctoral research training. He is the former director of the molecular modeling unit - Faculty of Pharmacy, Cairo University. Dr. El Kerdawy has a unique blend of experiences in synthetic chemistry and CADD. He published more than 35 papers dealing with using computer aided-drug design approaches for lead discovery and lead optimization for new targets in the treatment of series health problems like cancer, Alzheimer's, and inflammation.

A/Prof. Ahmed Elkerdawy – Ass. Professor of Pharmaceutical Chemistry

Dr. Muhammad Abdullatif is an Associate Professor of Pharmacology & Toxicology, Faculty of Pharmacy, Cairo University. Muhammed Abdullatif Saad was graduated from Faculty of Pharmacy, Cairo University in 2005.. He opened his research path by targeting the disorders affecting the brain and was awarded by the 7th International Scientific Conference of Faculty of Pharmacy, Cairo University for the best Ph. D. Thesis in Pharmacology and Toxicology (2015). After getting his PhD, he worked as a full-time lecturer in department of Pharmacology and Toxicology, Faculty of Pharmacy, Cairo university. Alongside he worked as a part-timer in different universities before landing as a Full-time Lecturer in NGU, School of Pharmacy. His post-doctoral research lane extrapolated his previous work, and he is currently involved in a research project funded by the STDF covering the development and characterization of a therapeutic vaccine intended for the treatment of multiple sclerosis. The multidisciplinary aspect of his research encompasses molecular mechanisms involved in various inflammatory disorders and diabetes. He has a deep rooting experience in teaching the preparatory course of the American Pharmacotherapy Board of Pharmacy Specialties in many institutions starting from 2010 till now. He is also a professional statistician using multiple techniques and software such as GraphPad Prism and SPSS.
https://www.scopus.com/authid/detail.uri?authorId=55569666000

A/Prof. Muhammed Abdullatif – Ass. Professor of Pharmacology and Toxicology

Dr. Abdallah is a Lecturer of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Cairo University. He has a solid background in the field of dosage form design and is currently involved in a research project funded by the STDF covering the development and characterization of a therapeutic vaccine intended for the treatment of multiple sclerosis. The multidisciplinary aspect of his research encompasses nano-formulations, design of experiments, pharmacokinetics, and bioequivalence. Dr. Abdallah is also the director of Central Lab Unit at Faculty of Pharmacy, Cairo University and a member of stability committee offering technical consultancy to the Central Agency of Pharmaceutical Affairs at the Egyptian Ministry of Health.
Scopus Author ID: 55551799900 - Researcher ID: N-4383-2017

A/Prof. Mohammed Abdullah – Ass. Professor of Pharmaceutics and Industrial Pharmacy

Sara Nageeb El-Helaly graduated from Faculty of Pharmacy, Cairo university with honors in 2003. Combining academic and professional experience, Sara worked as a teaching assistant in Faculty of Pharmacy, Cairo university as well as community pharmacist for two years in retail pharmacies after which she managed to own and run "El-Helaly pharmacy" while completing her post graduate studies in (brain targeting intranasal liposomal systems) from Cairo University. After acquiring her PhD in 2015, she opted for more academic depth, so she acquired a Professional Certified Trainer (PCT) Certificate from the American University in Cairo (AUC) beside holding a full-time position as a lecturer in Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Cairo university, and lecturing as a part-timer in various academic institutions. In 2020 after promoting to associate professor, she settled as a full-time associate professor in NGU, School of Pharmacy. She co-authored publications in the field of formulation development, nanotechnology, and green chemistry. On the administrative level she held a position as assistant vice dean for community service and environmental development for 3 years and one year as assistant vice dean for graduates and research affairs in Faculty of Pharmacy, Cairo university. In parallel with the academia, she has been the chairman of the Institutional Review Board at Pharma Solutions, a Contract Research Organization, since 2016. In 2022, she has been appointed a member of the specialized scientific committee in the Egyptian Drug Authority (EDA) and a member of the expert committee in the Egyptian Pharmacopoeia.

A/Prof. Sara Nageeb El-Helaly – Ass. Professor of Pharmaceutics and Industrial Pharmacy

Dr. Mohamed AbouGhaly graduated from the Faculty of Pharmacy, Cairo University. In 2013, he got his Ph.D. from the same university. His main interest and expertise are in the field of pharmaceutical formulation with a special emphasis on solid dosage forms and the use of the design of experiments to optimize the dosage form performance to reduce the time and cost of development. His postdoctoral research focused on the use of statistical approaches for the preparation and optimization of nanovesicular systems. He later joined Purdue University as a postdoctoral fellow. His research spanned from using crystallization as a pharmaceutical process intensification tool to studying the application of solid-state hydrogen-deuterium exchange coupled with mass spectrometry as a high-resolution technique for analyzing protein structure and matrix interactions in lyophilized formulations. Dr. AbouGhaly returned to Cairo University as an associate professor and his teaching experience covered multiple curricula for undergraduate and postgraduate students in Cairo University and other academic institutions. He held several administrative positions as head of the drug manufacturing unit and the computer center of the Faculty of Pharmacy, Cairo University as well as a member of the bioequivalence committee, the MOHP. He also has more than ten-year experience as a community pharmacist.

A/Prof. Mohamed AbouGhaly – Ass. Professor of Pharmaceutics and Industrial Pharmacy

Ass. Prof Amr M. Saadeldeen is an associate professor of Pharmacognosy and Natural Products, and Quality Assurance Unit manager, School of Pharmacy, Newgiza University. He was graduated from Faculty of Pharmacy, Cairo University with honors. Dr. Amr completed his Ph.D. 2014 from Helwan University. He was employed at Faculty of Pharmacy, October 6 University from 2003 till September 2019. Dr. Amr Saadeldeen has a solid background in the field of Quality Assurance of education. He was involved in achieving the national accreditation for Faculty of Pharmacy, October 6 University on Feb 2014 from The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) as well as achieving the reaccreditation on Jul 2019 as a member of the Quality Assurance Unit team.
https://orcid.org/0000-0001-5272-0630

A/Prof. Amr M. Saadeldeen – Ass. Professor of Pharmacognosy and Natural Products

Dr. Ayman El-Sahar is an Associate Professor of Pharmacology & Toxicology, Faculty of Pharmacy, Cairo University. Ayman graduated from the Faculty of Pharmacy, Cairo University in 2003. He started his academic career as a teaching assistant in the Pharmacology and toxicology department at the Faculty of Pharmacy, Cairo university. He began his research by targeting the disorders affecting inflammatory joints and the brain. After getting his Ph.D., he worked as a full-time lecturer in the department of Pharmacology and Toxicology, Faculty of Pharmacy, Cairo university. He worked as a part-timer in different universities before landing as a Full-time associate professor at NGU School of Pharmacy. His post-doctoral research lane extrapolated his previous work. The multidisciplinary aspect of his research encompasses molecular mechanisms involved in various inflammatory disorders, diabetes, and neurological disorders. He has a deep rooting experience in teaching the preparatory course of the American Pharmacotherapy Board of Pharmacy Specialties in many institutions starting from 2010 till now. In parallel with academia, Dr. Ayman is a member of several scientific committees to approve and register cardiovascular and hepatic medicines according to the guidelines of the Egyptian drug authority.

A/Prof. Ayman El-Sahar – Ass. Professor of Pharmacology and Toxicology

Dr. Sally Atef Tadros graduated from the Faculty of Pharmacy, Cairo University in 2009. Dr. Sally started her academic career by working as a teaching assistant in the Department of Biochemistry at ACU. She started her research path by working on the glycolytic pathway of breast and liver cancer cell lines, and she introduced some single nucleotide polymorphisms in hepatocellular carcinoma causing genes in the Egyptian population. She achieved her Ph.D. in 2019 from the Faculty of Pharmacy, Cairo University. After achieving her Ph.D., she worked as a full-time lecturer in the Department of Biochemistry at NGU. She has reviewed and published articles in many international journals.

Dr. Sally A. Tadros – Lecturer of Biochemistry and Molecular Biology

Alaa A. Osman is a teaching assistant in Chemistry Department, School of Pharmacy, Newgiza University. She earned her bachelor's degree in Pharmaceutical Sciences from Cairo University in 2018. During her last year of bachelor studies, she was working as a research trainee at the Department of Pharmaceutical and Medicinal Chemistry, Cairo University.
She has several international publications in the field of Computer-aided Drug Design, with the most prominent work of hers, entitled "A Comprehensive Review about the Molecular Structure of Sever Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): Insights into Natural Products against COVID-19" in Pharmaceutics, IF 6.3, Q1. She also coauthored a book chapter entitled "Fungal Lipases: Insights into Molecular Structures and Biotechnological Applications in Medicine and Dairy Industry".

Alaa A. Osman – Teaching assistant of Pharmaceutical Chemistry

Dr. Noha M. Eissa graduated from the Faculty of Pharmacy, Cairo University in 2016. She started her career by working at Newgiza University, and she is currently an assistant lecturer of Pharmacology and Toxicology. Her master's work was about the development of a therapeutic vaccine intended for the treatment of multiple sclerosis which was published in the International Journal of Nanomedicine in 2022. She is a member in the quality assurance unit of the faculty as well as the quality assurance coordinator for the biology department.

Noha M. Eissa – Lecturer assistant of Pharmacology and Toxicology

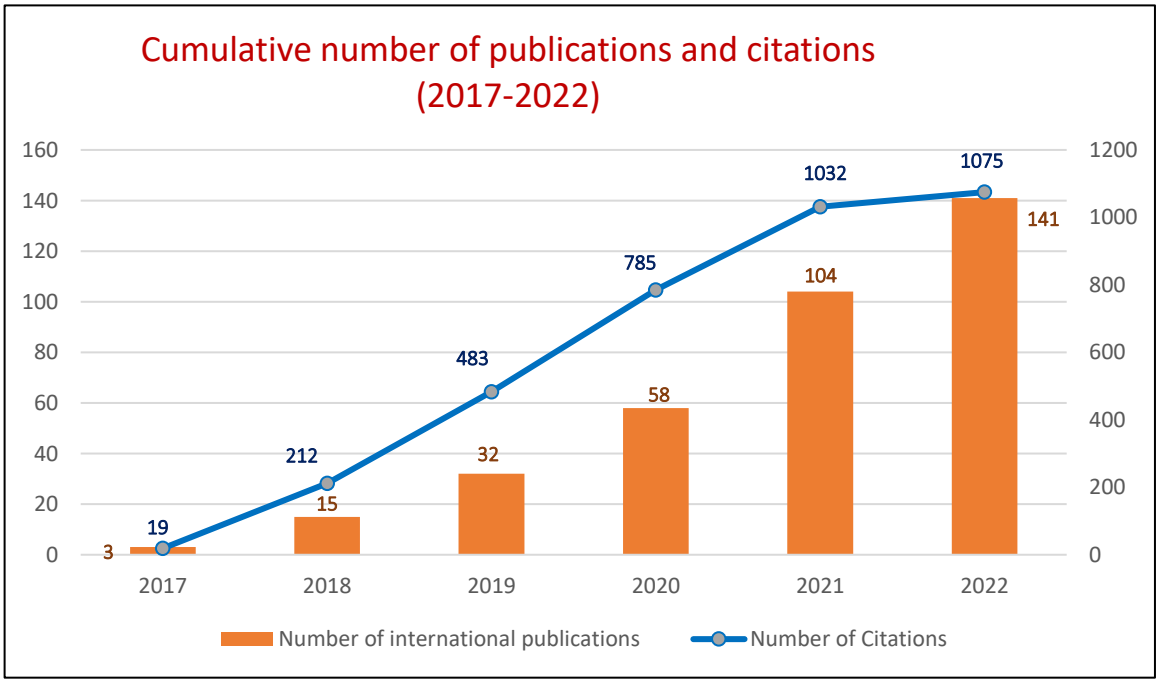
Rodayna Atef has graduated from faculty of Pharmacy, Cairo University in 2016. After graduation, she immediately started her job as a teaching assistant at school of Pharmacy, Newgiza University. In 2020, Rodayna has obtained a professional master's degree in business administration (MBA) in healthcare management, a joint program between Sadat academy in Egypt and Brooklyn Finance institute in USA. In 2022, Rodayna has obtained an academic master's degree in pharmaceutics and industrial pharmacy, her masters scope involved Nanomedicine and topical dosage forms and has been published in the international journal of Nanomedicine under the title "Cubosomal Betamethasone-Salicylic Acid Nano Drug Delivery System for Enhanced Management of Scalp Psoriasis".

Rodayna A. Shalaby – Lecturer assistant of of Pharmaceutics and Industrial Pharmacy

PUBLICATION STATISTICS

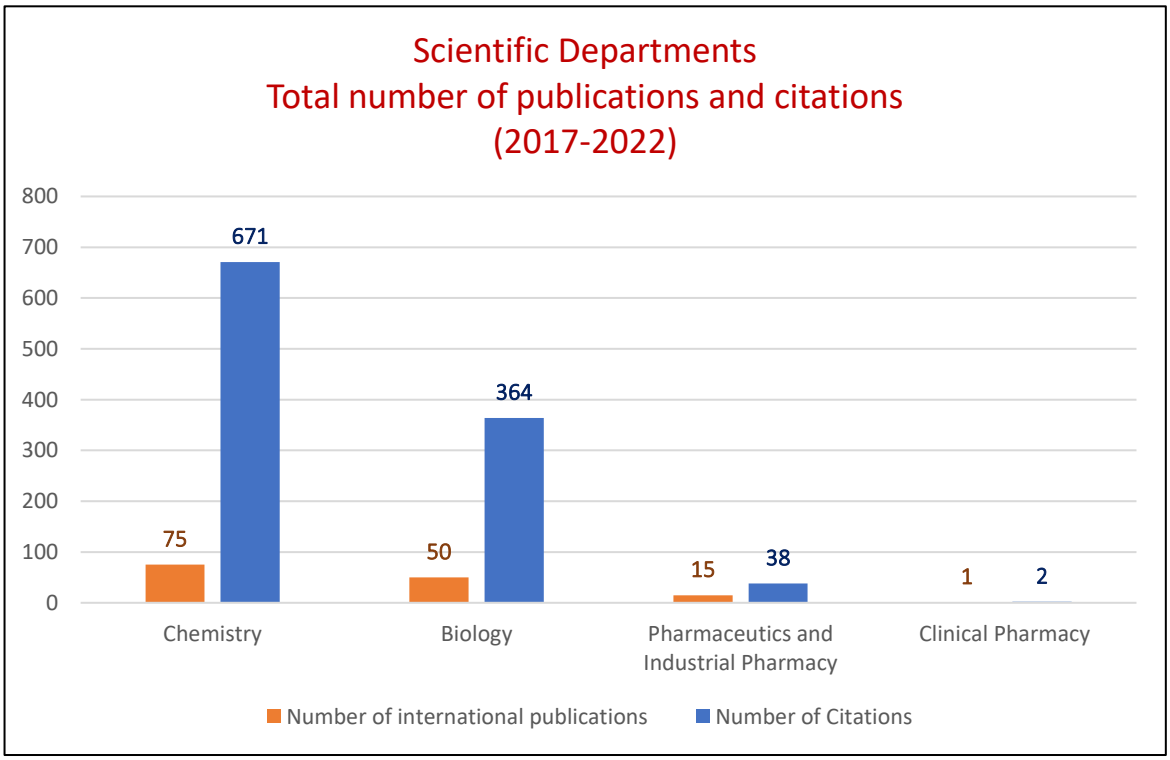
1. Number of international publications and citations with NGU affiliation per year

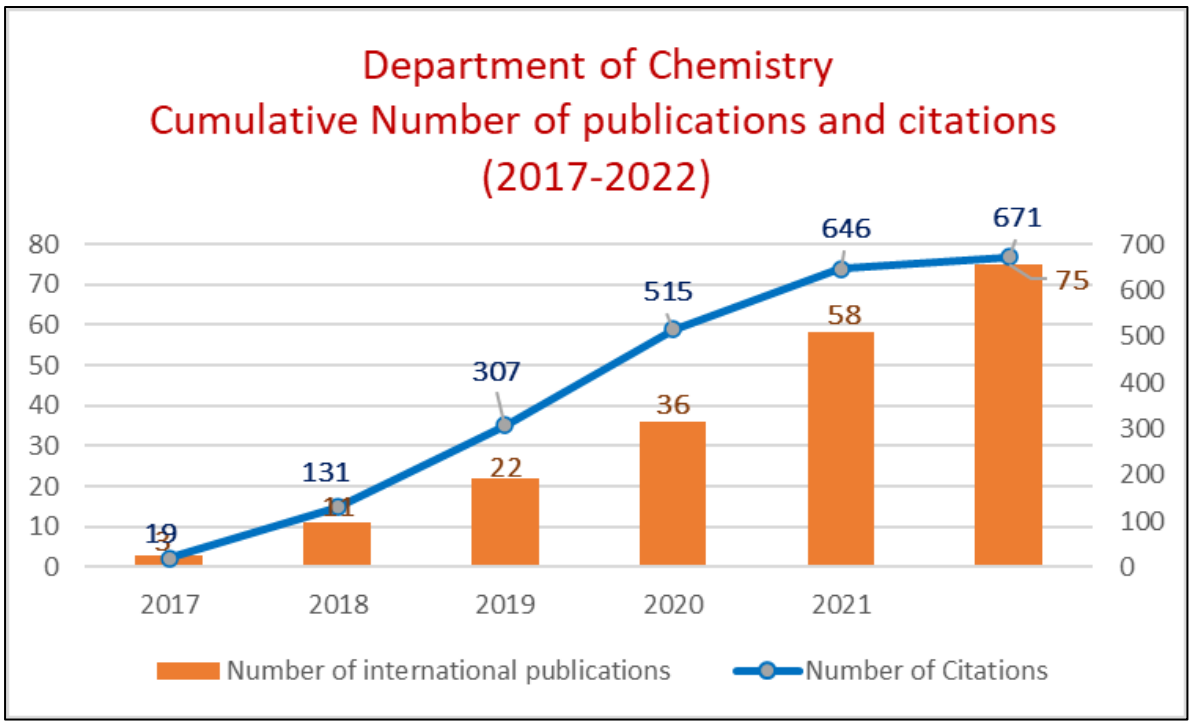
Year	International publications	Citations
2022	37	43
2021	46	247
2020	26	302
2019	17	271
2018	12	193
2017	3	19
Total	141	1075

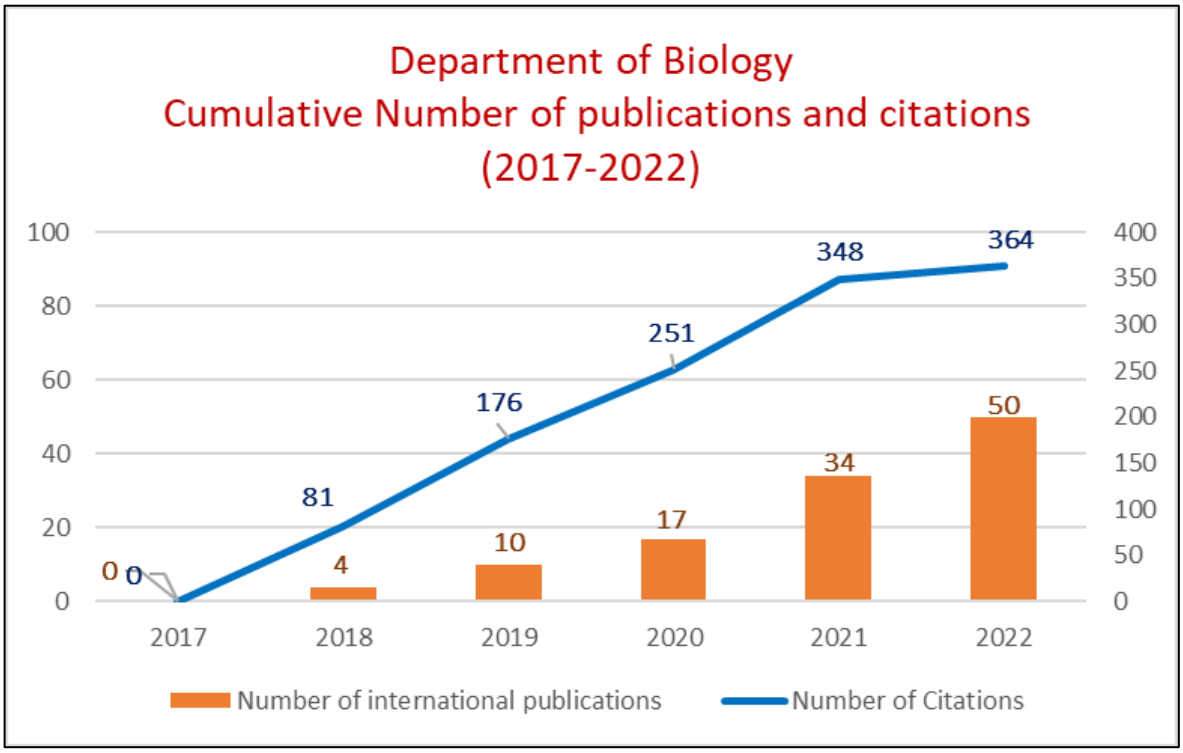


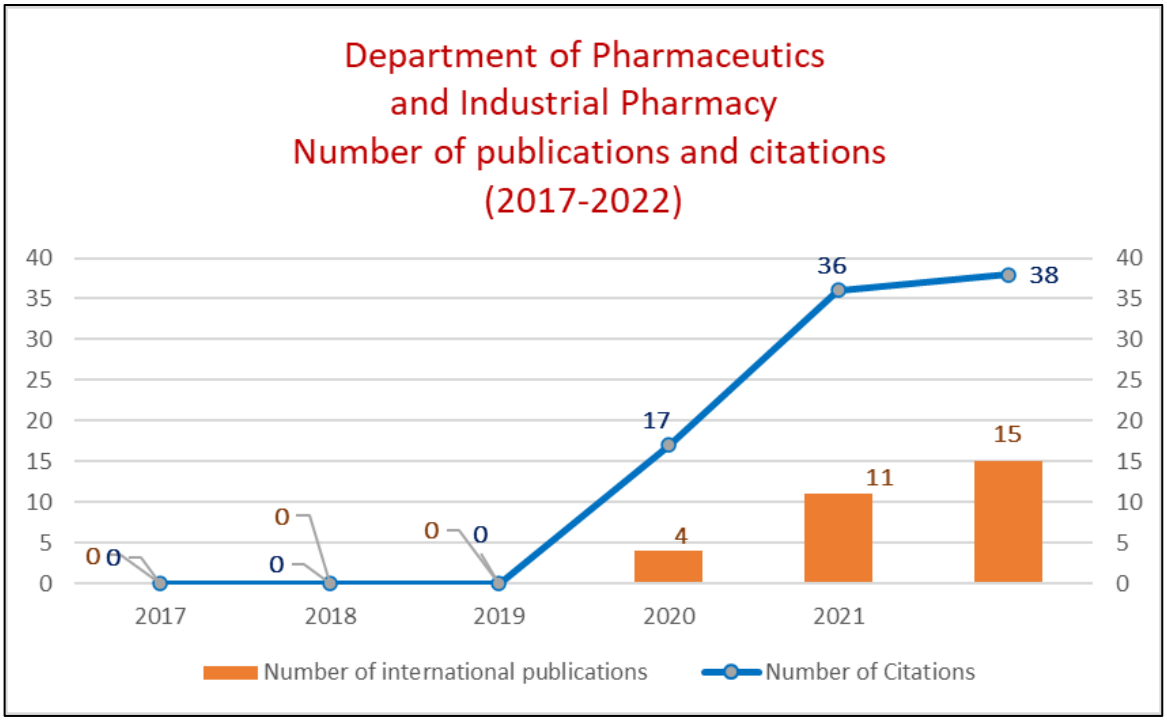
2. Total numbers of international publications and citations with NGU affiliation per scientific department (2017 - 2022)

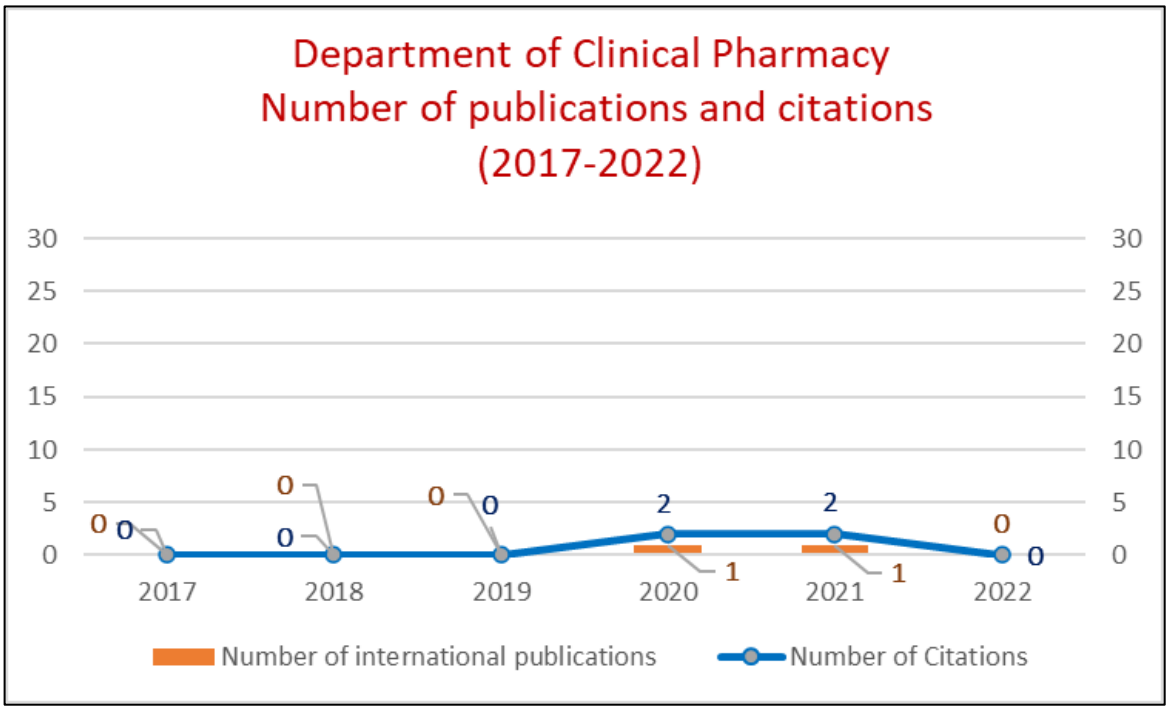
Scientific department	Publications	Citations
Chemistry	75	671
Biology	50	364
Pharmaceutics & Industrial Pharmacy	15	38
Clinical Pharmacy	1	2
Total	141	1075




Department of Chemistry
Cumulative Number of publications and citations
(2017-2022)
80
70
60
50
40
30
20
10
0
700
600
500
400
300
200
100
0
19
131
307
515
646
671
3
11
22
36
58
75
2017
2018
2019
2020
2021
Number of international publications
Number of Citations


Department of Biology
Cumulative Number of publications and citations
(2017-2022)
100
80
60
40
20
0
400
350
300
250
200
150
100
50
0
0
0
81
176
251
348
364
4
10
17
34
50
2017
2018
2019
2020
2021
2022
Number of international publications
Number of Citations


Department of Pharmaceutics
and Industrial Pharmacy
Number of publications and citations
(2017-2022)
40
35
30
25
20
15
10
5
0
0 0
0
0
0 0
17
36
38
4
11
15
2017
2018
2019
2020
2021
Number of international publications
Number of Citations


Department of Clinical Pharmacy
Number of publications and citations
(2017-2022)
30
25
20
15
10
5
0
0 0
0
0
0 0
2
2
0
0
1
1
2017
2018
2019
2020
2021
2022
Number of international publications
Number of Citations

3. The ratio of SOP international publications to staff members (2017-2022)

Year of publication	International publications	Staff members	The ratio
2022	37	13	2.84
2021	46	12	3.83
2020	26	12	2.17
2019	17	10	1.7
2018	12	6	2
2017	3	3	1

4. Number of international publications and citations with NGU affiliation per staff member (2017-2022)

Staff member	International publications	Citations
A/Prof. Ahmed Elkerdawy	34	451
Prof. Medhat Al-Ghobashy	23	183
A/Prof. Muhammed Abdullatif	19	165
A/Prof. Muhammad Al-Shorbagy	11	181
Prof. Marwa Fouad	10	5
Prof. Rania Mohsen	9	26
Prof. Nevine Shawky	6	28
Dr. Sally Atef	6	2
Prof. Ahmed Sherif Attia	6	16
Dr. Alaa Awad	4	43
A/Prof. Mohammed Abdullah	4	6
Dr. Amr Mohammed Saadeldeen	4	5
A/Prof. Sara El-Helaly	2	4
Prof. Manal Maher	1	6
A.L. Noha Salah Eldin Elbaghdady	1	2
A/Prof. Noha Mansour	1	2
A/ Prof. Ayman El-Sahar	1	0
A/ Prof. Mohamed Aboughaly	1	0

5. Staff members with highest number of international publications in 2022

No.	Staff members	Number of publications
1.	A/Prof. Ahmed Elkerdawy	10
2.	Prof. Marwa Fouad	7
3.	Dr. Sally Atef	5

6. International publications with highest impact factor (5 and above) in 2022

No.	Publications	IF
1.	• Architecting novel multilayer nanosponges for co-administration of two drugs managing high-risk type II diabetes mellitus patients suffering from cardiovascular diseases. • International Journal of Biological Macromolecules • **Prof. Nevine Shawky**	8.025
2.	• Exploring the structure-activity relationships of diphenylurea as an antibacterial scaffold active against methicillin- and vancomycin-resistant Staphylococcus aureus. • International Journal of Nanomedicine • **Prof. Ahmed Attia**	7.088
3.	• Application of the dual-tail approach for the design and synthesis of novel Thiopyrimidine-Benzenesulfonamide hybrids as selective carbonic anhydrase inhibitors • Eur J Med Chem • **A/Prof. Ahmed Elkerdawy-1**	7.088
4.	• Cubosomal Betamethasone-Salicylic Acid Nano Drug Delivery System for Enhanced Management of Scalp Psoriasis. • Int J Nanomedicine • **TA. Rodayna Atef**	7.033
5.	• Nanoformulated Recombinant Human Myelin Basic Protein and Rituximab Modulate Neuronal Perturbations in Experimental Autoimmune Encephalomyelitis in Mice. • Int J Nanomedicine. • **Prof. Rania M. Abdelsalam-1, Prof. Ahmed Attia, and TA. Noha Eisaa**	7.033
6.	• Linagliptin attenuates thioacetamide-induced hepatic encephalopathy in rats: Modulation of C/EBP-β and CX3CL1/Fractalkine, neuro-inflammation, oxidative stress and behavioral defects. • Life Sci. • **Prof. Rania M. Abdelsalam-3**	6.780
7.	• Inosine attenuates 3-nitropropionic acid-induced Huntington's disease-like symptoms in rats via the activation of the A2AR/BDNF/TrKB/ERK/CREB signaling pathway. • Life Sci. • **A/Prof. Muhammad Abdullatif-1**	6.780

No.	Publications	IF
8.	• Lead generation of cysteine based mesenchymal epithelial transition (c-Met) kinase inhibitors: Using structure-based scaffold hopping, 3D-QSAR pharmacophore modeling, virtual screening, molecular docking, and molecular dynamics simulation. • Comput Biol Med. • **Prof. Marwa Fouad-1**	6.698
9.	• Hemostatic Alginate/Nano-Hydroxyapatite Composite Aerogel Loaded with Tranexamic Acid or the Potential Protection against Alveolar Osteitis. • Pharmaceutics • **A/Prof. Mohamed Aboughaly**	6.525
10.	• rs62139665 olymorphism in the Promoter Region of EpCAM Is Associated With Hepatitis C Virus-Related Hepatocellular Carcinoma Risk in Egyptians. • Front Oncol. • **Dr. Sally Atef-1**	6.240
11.	• Thymoquinone Suppresses Angiogenesis in DEN-Induced Hepatocellular Carcinoma by Targeting miR-1-3p. • Int J Mol Sci. • **Dr. Sally Atef-2**	6.200
12.	• Identification of 3-(piperazinylmethyl)benzofuran derivatives as novel type II CDK2 inhibitors: design, synthesis, biological evaluation, and in silico insights. • J Enz. Inhib. Med. Chem. • **A/Prof. Ahmed Elkerdawy-3**	5.756
13.	• Targeting the TLR4/NF-κB Axis and NLRP1/3 Inflammasomes by Rosuvastatin: A Role in Impeding Ovariectomy-Induced Cognitive Decline Neuropathology in Rats. • Mol Neurobiol. • **A/Prof. Muhammad Abdullatif-2**	5.686
14.	• Design, synthesis and anticancer activity of novel 2-arylbenzimidazole/2-thiopyrimidines and 2-thioquinazolin-4(3H)-ones conjugates as targeted RAF and VEGFR-2 kinases inhibitors. • Bioorg Chem. • **A/Prof. Ahmed Elkerdawy-2**	5.307
15.	• Phosphodiesterase (PDE) III inhibitor, Cilostazol, improved memory impairment in aluminum chloride-treated rats: modulation of cAMP/CREB pathway. • Inflammopharmacology. • **Prof. Rania M. Abdelsalam-2**	5.093
16.	• Design, synthesis, biological evaluation, and molecular docking of new benzofuran and indole derivatives as tubulin polymerization inhibitors. • Drug Dev Res • **Prof. Marwa Fouad-2**	5.004
17.	• Click chemistry-based synthesis of new benzenesulfonamide derivatives bearing triazole ring as selective carbonic anhydrase II inhibitors. • Drug. Dev Res. • **Prof. Marwa Fouad-3**	5.004

141 International publications were published with NGU affiliation throughout the period from January 2017 to December 2022

Impact factors and number of citations of publications per scientific department

Department of Chemistry			
Total number of publications (2022)	18	Total number of citations (2022)	25

Serial	Publications	IF	Citations
1.	Naglaa F. El-Sayed, Marwa El-Hussieny, Ewies F. Ewies, Mohamed F. El Shehry, Hanem M. Awad, **Marwa A. Fouad**. "Design, synthesis, biological evaluation, and molecular docking of new benzofuran and indole derivatives as tubulin polymerization inhibitors", *Drug Development Research*, **83(2), 485-500, (2022).** **DOI:** 10.3390/molecules27175501.	5.004	0
2.	Asmaa Raafat, Samar Mowafy, Sahar M. Abouseri, **Marwa A. Fouad**, Nahla A. Farag. "Lead generation of cysteine based mesenchymal epithelial transition (c-Met) kinase inhibitors: Using structure-based scaffold hopping, 3D-QSAR pharmacophore modeling, virtual screening, molecular docking, and molecular dynamics simulation", *Computers in Biology and Medicine*, **146, 105526, (2022).** **DOI:** doi.org/10.1016/j.compbiomed.2022.105526	6.698	1
3.	Ewies, Ewies F.; Sabry, Eman; Bekheit, Mohamed S.; Fouad, Marwa A.; Vullo, Daniela; Supuran, Claudiu T. "Click chemistry-based synthesis of new benzenesulfonamide derivatives bearing triazole ring as selective carbonic anhydrase II inhibitors", *Drug Development Research*, **(2022)** In press. **DOI:** doi: 10.1002/ddr.21957	5.004	2
4.	El-Kersh, Dina M.; Abou El-Ezz, Rania F.; **Fouad, Marwa**; Farag, Mohamed A. "Unveiling Natural and Semisynthetic Acylated Flavonoids: Chemistry and Biological Actions in the Context of Molecular Docking", *Molecules,* **27:5501, (2022)** **DOI:** 10.3390/molecules27175501	4.927	0

Department of Chemistry			
5.	**Fouad, Marwa A.;** Serag, Ahmed; Tolba, Enas H.; El-Shal, Manal A.; El Kerdawy, Ahmed M. "QSRR modeling of the chromatographic retention behavior of some quinolone and sulfonamide antibacterial agents using firefly algorithm coupled to support vector machine", BMC Chemistry, **16**, 85, 2022 **DOI:** 10.1186/s13065-022-00874-2	4.095	0
6.	Elkady, Ehab F.; **Fouad, Marwa A.;** Mozayad, Ayoub N. "Application of Box-Behnken experimental design and response surface methodology for selecting the optimum RP-HPLC conditions for the simultaneous determination of methocarbamol, indomethacin and betamethasone in their pharmaceutical dosage form", *BMC Chemistry* **16**, 114 (**2022**) **DOI:** 10.1186/s13065-022-00908-9	4.095	0
7.	Wadhah Atef Salem, Ehab Farouk Elkady, **Marwa Ahmed Fouad**, Mohammad Abdul-Azim Mohammad. "DoE Screening and Optimization of Liquid Chromatographic Determination of Nicotinic Acid and Six Statins: Application to Pharmaceutical Preparations and Counterfeit Detection" J Chromatogr. Sci. 29;61(1):74-86 (**2022**) **DOI**: 10.1093/chromsci/bmab131.	1.555	0
8.	El-Gazzar YI, Ghaiad HR, **El Kerdawy AM**, George RF, Georgey HH, Youssef KM, El-Subbagh HI.Arch Pharm (Weinheim). New quinazolinone-based derivatives as DHFR/EGFR-TK inhibitors: Synthesis, molecular modeling simulations, and anticancer activity. *Arch Pharm (Weinheim).* **18:e2200417. (2022)** **DOI:** 10.1002/ardp.202200417.	4.613	0
9.	Ali IH, Abdel-Mohsen HT, Mounier MM, Abo-Elfadl MT, **El Kerdawy AM**, Ghannam IAY. Design, synthesis and anticancer activity of novel 2-arylbenzimidazole/2-thiopyrimidines and 2-thioquinazolin-4(3H)-ones conjugates as targeted RAF and VEGFR-2 kinases inhibitors. *Bioorg. Chem*. **126:105883 (2022)** **DOI:** 10.1016/j.bioorg.2022.105883.	5.307	1

Department of Chemistry			
10.	Al-Warhi T, **El Kerdawy AM**, Said MA, Albohy A, Elsayed ZM, Aljaeed N, Elkaeed EB, Eldehna WM, Abdel-Aziz HA, Abdelmoaz MA Novel 2-(5-Aryl-4,5-Dihydropyrazol-1-yl)thiazol-4-One as EGFR Inhibitors: Synthesis, Biological Assessment and Molecular Docking Insights. *Drug Des Devel Ther.* **16;16:1457-1471 (2022)** **DOI:** 10.2147/DDDT.S356988.	4.319	1
11.	Hassan RM, Ali IH, Abdel-Maksoud MS, Abdallah HMI, **El Kerdawy AM**, Sciandra F, Ghannam IAY. Design and synthesis of novel quinazolinone-based fibrates as PPARα agonists with antihyperlipidemic activity. *Arch Pharm (Weinheim),* 355(3):e2100399 (**2022**). **DOI:** 10.1002/ardp.202100399	4.319	1
12.	Abdel-Mohsen HT**, El Kerdawy AM**, Omar MA, Petreni A, Allam RM, El Diwani HI, Supuran CT Application of the dual-tail approach for the design and synthesis of novel Thiopyrimidine-Benzenesulfonamide hybrids as selective carbonic anhydrase inhibitors. *Eur J Med Chem*. 15;228:114004 (**2022**). **DOI**: 10.1016/j.ejmech.2021.114004.	7.088	7
13.	Iman A. Y. Ghannam, **Ahmed M. El Kerdawy**, Marwa M. Mounier, Mahmoud T. Abo-elfadl, Islam H. Ali Novel 2-oxo-2-phenylethoxy and benzyloxy diaryl urea hybrids as VEGFR-2 inhibitors: Design, synthesis, and anticancer evaluation *Arch Pharm (Weinheim),* e2200341 (**2022**) **DOI:** 10.1002/ardp.202200341	4.613	0
14.	Heba T. Abdel-Mohsen, **Ahmed M. El Kerdawy**, Andrea Petreni, Claudiu T. Supuran Novel benzenesulfonamide-thiouracil conjugates with a flexible N-ethyl acetamide linker as selective CA IX and CA XII inhibitors Arch Pharm (Weinheim). 2022**, e2200434.** **DOI:** 10.1002/ardp.202200434	4.613	0
15.	Wagdy M. Eldehna, Raed M. Maklad, Hadia Almahli, Tarfah Al-Warhi, Eslam B. Elkaeed, Mohammed A. S. Abourehab, Hatem A. Abdel-Aziz and **Ahmed M. El Kerdawy.** Identification of 3-(piperazinylmethyl) benzofuran derivatives as novel type II CDK2 inhibitors: design, synthesis, biological evaluation, and in silico insights. *J Enz. Inhib. Med. Chem.* 37(1), 1227–1240 **(2022).** **DOI:** 10.1080/14756366.2022.2062337.	5.756	5

Department of Chemistry			
16.	Eman A. Abd El-Meguid, Ahmed M. Naglah, Gaber O. Moustafa, Hanem M. Awad, **Ahmed M. El Kerdawy** Novel benzothiazole-based dual VEGFR-2/EGFR inhibitors targeting breast and liver cancers: Synthesis, cytotoxic activity, QSAR and molecular docking studies *Bioorg. Med.l Chem. Lett.* **58, 128529 (2022).** **DOI:** 10.1016/j.bmcl.2022.128529.	2.940	4
17.	El Gizawy HA, El-Haddad AE, **Saadeldeen AM**, Boshra SA. Tentatively Identified (UPLC/T-TOF-MS/MS) Compounds in the Extract of Saussurea costus Roots Exhibit In Vivo Hepatoprotection via Modulation of HNF-1α, Sirtuin-1, C/ebpα, miRNA-34a and miRNA-223. *Molecules,* 28;27(9):2802 (**2022**). **DOI:** 10.3390/molecules27092802.	4.927	3
18.	El Gizawy HA, El-Haddad AE, Attia YM, Fahim SA, Zafer MM, **Saadeldeen AM**. In Vitro Cytotoxic Activity and Phytochemical Characterization (UPLC/T-TOF-MS/MS) of the Watermelon (Citrullus lanatus) Rind Extract. *Molecules*. 12;27(8):2480 **(2022).** **DOI:** 10.3390/molecules27082480.	4.927	0
Total number of publications (2021)	22	Total number of citations (2021)	137
Serial	Publications	IF	Citations
19.	Wadhah Atef Salem, Ehab Farouk Elkady, **Marwa Ahmed Fouad**, Mohammad Abdul-Azim Mohammad. "Analysis of Metformin and Five Gliptins in Counterfeit Herbal Products: Designs of Experiment Screening and Optimization", *Journal of AOAC International*, **104(6)**, 1667–1680, (**2021**). **DOI:** 10.1093/jaoacint/qsab106	1.913	1
20.	El-Hussieny, M., El-Sayed, N.F., **Fouad, M.A.**, Ewies, E.F. "Synthesis, biological evaluation and molecular docking of new sulfonamide-based indolinone derivatives as multitargeted kinase inhibitors against leukemia", *Bioorganic Chemistry*, **117**, 105421, (**2021**). **DOI:** 10.1016/j.bioorg.2021.105421	5.725	1

Department of Chemistry			
21.	**Fouad, M.A.**, Zaki, M.Y., Lotfy, R.A., Mahmoud, W.R. "Design, synthesis, biological evaluation, and molecular docking of new benzofuran and indole derivatives as tubulin polymerization inhibitors", *Drug Development Research*, **2021**, 1-16, (2021). **DOI:** 10.1002/ddr.21880	**4.360**	**0**
22.	Mohammad Abdul-Azim Mohammad, Ehab Farouk Elkady, **Marwa Ahmed Fouad**, Wadhah Atef Salem. "DoE Screening and Optimization of Liquid Chromatographic Determination of Nicotinic Acid and Six Statins: Application to Pharmaceutical Preparations and Counterfeit Detection", *Journal of Chromatographic Science*, 1-13, (2021). **DOI:** 10.1093/chromsci/bmab131	**1.618**	**0**
23.	Abd El-Aal, May A., **Medhat A. Al-Ghobashy**, and Yasser S. El-Saharty. "Preparation and characterization of 96-well microplates coated with molecularly imprinted polymer for determination and biosimilarity assessment of recombinant human erythropoietin.", *Journal of Chromatography A*, **1641**, 462012, (**2021**), ISSN 0021-9673. **DOI:** https://doi.org/10.1016/j.chroma.2021.462012.	**4.759**	**5**
24.	Nadim, Ahmed H., May A. Abd El-Aal, **Medhat A. Al-Ghobashy**, and Yasser S. El-Saharty. "Facile imprinted polymer for label-free highly selective potentiometric sensing of proteins: case of recombinant human erythropoietin.", *Analytical and Bioanalytical Chemistry*, **413**, 3611–3623, (**2021**). **DOI:** https://doi.org/10.1007/s00216-021-03325-4.	**4.157**	**5**
25.	Nadim, Ahmed H., May A. Abd El-Aal, **Medhat A. Al-Ghobashy**, and Yasser S. El-Saharty. "Optimization of Polydopamine Imprinted Polymer for Label Free Sensitive Potentiometric determination of Proteins: Application to Recombinant Human Erythropoietin Sensing in Different Matrices.", *Microchemical Journal*, **167**, 106333, (**2021**). **DOI:** https://doi.org/10.1016/j.microc.2021.106333.	**4.821**	**4**

Department of Chemistry			
26.	Gamal, Mohammed, Heba-Alla H. Abd-ElSalam, Ibrahim A. Naguib, **Medhat A. Al-Ghobashy**, Hala E. Zaazaa, and M. Abdelkawy. "Green and cost-effective extraction techniques of quercetin from mixture of nutraceuticals with yield analysis via spectrophotometry and high performance liquid chromatograph methods.", *Journal of AOAC International*, **18:qsab071**, (**2021**). **DOI:** 10.1093/jaoacint/qsab071.	1.913	3
27.	Mahdally, N. H., George, R. F., Kashef, M. T., **Al-Ghobashy, M.**, Murad, F. E., & Attia, A. S. "Staquorsin: A Novel Staphylococcus aureus Agr-Mediated Quorum Sensing Inhibitor Impairing Virulence in vivo Without Notable Resistance Development", *Frontiers in microbiology*, **12**, 700494, (**2021**). **DOI:** https://doi.org/10.3389/fmicb.2021.700494.	5.640	14
28.	Abanoub Mosaad Abdallah, Nadia G. Zaki, Walaa H. Mahmoud, **Ahmed M. El Kerdawy**, Gehad G. Mohamed. "Synthesis, structural characterization, density functional theory calculations, and antimicrobial, anticancer, and antimetastatic properties of nanosized heteroleptic complexes of cocaine/TMEDA with d-block metal ions." *App. Organometallic. Chem.,*35: e6441 (**2021**). **DOI:** https://doi.org/10.1002/aoc.6441	4.105	1
29.	Rasha M. Hassan, Islam H. Ali, Mohammed S. Abdel-Maksoud , Heba M. I. Abdallah, **Ahmed M. El Kerdawy**, Francesca Sciandra, Iman A. Y. Ghannam. "Design and synthesis of novel quinazolinone-based fibrates as PPARα agonists with antihyperlipidemic activity" Arch. Pharm. (**2021**); e2100399 **DOI:** https://doi.org/10.1002/ardp.202100399	3.751	0
30.	Abdalla R. Mohamed, **Ahmed M. El Kerdawy**, Riham F. George, Hanan H. Georgey, Nagwa M. Abdel Gawad. "Design, synthesis and in silico insights of new 7,8-disubstituted-1,3-dimethyl-1H-purine-2,6(3H,7H)-dione derivatives with potent anticancer and multi-kinase inhibitory activities", *Bioorganic Chemistry*, **107**, 104569, (**2021**). **DOI:** https://doi.org/10.1016/j.bioorg.2020.104569.	5.725	8

Department of Chemistry			
31.	Eldehna WM, Al-Rashood ST, Al-Warhi T, Eskandrani RO, Alharbi A, **El Kerdawy AM**. "Novel oxindole/benzofuran hybrids as potential dual CDK2/GSK-3β inhibitors targeting breast cancer: design, synthesis, biological evaluation, and in silico studies", *J Enzyme Inhib Med Chem*, **36(1)**, 270-285, (**2021**). **DOI:** 10.1080/14756366.2020.1862101.	4.310	35
32.	Rasha M. Hassan, Mona E. Aboutabl, Manuela Bozzi, Mohammed F. El-Behairy, **Ahmed M. El Kerdawy**, Beatrice Sampaolese, Claudia Desiderio, Federica Vincenzoni, Francesca Sciandra, Iman A.Y. Ghannam. "Discovery of 4-benzyloxy and 4-(2-phenylethoxy) chalcone fibrate hybrids as novel PPARα agonists with anti-hyperlipidemic and antioxidant activities: Design, synthesis and in vitro/in vivo biological evaluation", *Bioorganic Chemistry*,**115**, 105170, (**2021**). **DOI:** 10.1016/j.bioorg.2021.105170	5.725	2
33.	Heba Ibrahim, A. Abdo, **Ahmed M. El Kerdawy**, A. Sharaf Eldin. "Signal Detection in Pharmacovigilance: A Review of Informatics-driven Approaches for the Discovery of Drug-Drug Interaction Signals in Different Data Sources", *Artificial Intelligence in the Life Sciences*, **1**, 100005, (**2021**). **DOI:** 10.1016/j.ailsci.2021.100005	--------	0
34.	Peter A. Halim, Hanan H. Georgey, Mina Y. George, **Ahmed M. El Kerdawy**, Mona F. Said. "Design and synthesis of novel 4-fluorobenzamide-based derivatives as promising anti-inflammatory and analgesic agents with an enhanced gastric tolerability and COX-inhibitory activity", *Bioorganic Chemistry*,**115**, 105253, (**2021**). **DOI:** 10.1016/j.bioorg.2021.105253	5.725	2
35.	Heba Ibrahim, **Ahmed M. El Kerdawy**, A. Abdo, A. Sharaf Eldin "Similarity-based machine learning framework for predicting safety signals of adverse Drug–Drug interactions", *Informatics in Medicine Unlocked*, 100669, (**2021**). **DOI:** 10.1016/j.imu.2021.100699.	2.110	5

Department of Chemistry			
36.	El-Haddad AE, El-Deeb EM, Amer AA, **Saadeldeen AM**, Ahmed FM, Salem MA, Taha HS. "Bioactive Phytoconstituents of Morus Plants exhibiting Numerous Therapeutic Activities", *Egyptian Journal of Chemistry*, (**2021**). **DOI:** 10.21608/EJCHEM.2021.76688.3788	--------	6
37.	El-Mancy, Shereen S., Alaadin E. El-Haddad, Walaa A. Alshareef, **Amr M. Saadeldeen**, Soad Z. El-Emam, and Osama S. Elnahas. "Enhancement of Antimicrobial and Antiproliferative Activities of Standardized Frankincense Extract Using Optimized Self-Nanoemulsifying Delivery System", *Scientia Pharmaceutica,* **89(3)**, 36, (**2021**). **DOI:** https://doi.org/10.3390/scipharm89030036.	--------	2
38.	Darwish, Amira Mohamed Galal, Hebatallah H. Abo Nahas, Yasmin H. Korra, **Alaa A. Osman**, Wedad M. El-Kholy, Maria Reyes-Córdova, Essa M. Saied, and Ahmed M. Abdel-Azeem. "Fungal Lipases: Insights into Molecular Structures and Biotechnological Applications in Medicine and Dairy Industry" *Industrially Important Fungi for Sustainable Development*, 461-514, Springer, Cham, (**2021**). **DOI:** https://doi.org/10.1007/978-3-030-85603-8_13	--------	0
39.	Saied EM, El-Maradny YA, **Osman AA**, Darwish AMG, Abo Nahas HH, Niedbała G, Piekutowska M, Abdel-Rahman MA, Balbool BA, Abdel-Azeem AM. "A Comprehensive Review about the Molecular Structure of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): Insights into Natural Products against COVID-19" *Pharmaceutics,* **13(11)**, 1759, (**2021**). **DOI:** https://doi.org/10.3390/pharmaceutics13111759	6.321	28
40.	El Azab, Islam H., Essa M. Saied, **Alaa A. Osman**, Amir E. Mehana, Hosam A. Saad, and Nadia AA Elkanzi. "Novel N-bridged pyrazole-1-carbothioamides with potential antiproliferative activity: design, synthesis, in vitro and in silico studies" *Future Medicinal Chemistry*, **13(20)**, 1743-1766, (**2021**). **DOI:** https://doi.org/10.4155/fmc-2021-0066	3.808	15

Department of Chemistry			
Total number of publications (2020)	14	Total number of citations (2020)	208

Serial	Publications	IF	Citations
41.	Trabik, Yossra A., Eman M. Moenes, **Medhat A. Al-Ghobashy**, Marianne Nebsen, and Miriam F. Ayad. "Analytical comparability study of anti-CD20 monoclonal antibodies rituximab and obinutuzumab using a stability-indicating orthogonal testing protocol: Effect of structural optimization and glycoengineering.", *Journal of Chromatography B*, **1159**, 122359, (**2020**), ISSN 1570-0232. **DOI:** https://doi.org/10.1016/j.jchromb.2020.122359.	1.911	2
42.	Mohamed, Hadeer G., **Medhat A. Al-Ghobashy**, Mervat A. Fouad, and Hala S. Zaazaa. "Quality Assessment of Lactoferrin in some Marketed Nutraceuticals Derived from Milk using Validated Analytical Methods.", *ChemistrySelect*, **5(46)**, 14816-14825, (**2020**). **DOI:** https://doi.org/10.1002/slct.202003681.	2.109	1
43.	Nadia G. Zaki, Walaa H. Mahmoud, **Ahmed M. El Kerdawy**, Abanoub Abdullah, Gehad G. Mohamed. "Structural Characterization, Thermal Analyses, Antiproliferative and Antimicrobial Activity of Cocaine Complexes with Mn(II) and Cu(II)", *Egyptian Journal of Chemistry*, **63(5)**, 1857-1868, (**2020**). **DOI:** 10.21608/ejchem.2019.16748.2019.	0.966	5
44.	Nadia G. Zaki, Walaa H. Mahmoud, **Ahmed M. El Kerdawy**, Abanoub Mosaad Abdallah, Gehad G. Mohamed. "Heteroleptic complexes of cocaine/TMEDA with some f block metals: Synthesis, DFT studies, spectral, thermal, cytotoxicity and antimetastatic properties", *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, **229**, 117938, (**2020**), ISSN 1386-1425. **DOI:** https://doi.org/10.1016/j.saa.2019.117938.	3.232	11
45.	Ehab M. Gedawy, Asmaa E. Kassab, **Ahmed M. El Kerdawy**. "Design, synthesis and biological evaluation of novel pyrazole sulfonamide derivatives as dual COX-2/5-LOX inhibitors", *European Journal of Medicinal Chemistry*, 189, 112066, (**2020**), ISSN 0223-5234. **DOI:** https://doi.org/10.1016/j.ejmech.2020.112066.	5.573	43

Department of Chemistry			
46.	Heba T. Abdel-Mohsen, **Ahmed M. El Kerdawy**, Mohamed A. Omar, Emanuela Berrino, Ahmed S. Abdelsamie, Hoda I. El Diwani, Claudiu T. Supuran. "New thiopyrimidine-benzenesulfonamide conjugates as selective carbonic anhydrase II inhibitors: synthesis, in vitro biological evaluation, and molecular docking studies", *Bioorganic & Medicinal Chemistry*, **28(5)**, 115329, (**2020**), ISSN 0968-0896. **DOI:** https://doi.org/10.1016/j.bmc.2020.115329.	3.073	14
47.	Zaki, N.G., Mahmoud, W.H., **El Kerdawy, A.M.** *et al*. "Structural characterization, thermal, DFT, cytotoxicity, and antimetastatic properties of cocaine complexes with La(III), Er(III), and Yb(III)", *Res Chem Intermed,* **46**, 3193–3216, (**2020**). **DOI:** https://doi.org/10.1007/s11164-020-04146-3.	2.262	7
48.	Abdel-Mohsen HT, Abd El-Meguid EA, **El Kerdawy AM**, Mahmoud AEE, Ali MM. "Design, synthesis, and molecular docking of novel 2-arylbenzothiazole multiangiokinase inhibitors targeting breast cancer", *Arch Pharm (Weinheim)*, **353(4)**, e1900340, (**2020**). **DOI:** 10.1002/ardp.201900340.	2.590	15
49.	Heba Abdelrasheed Allam, Enayat E. Aly, Ahmed K.B.A.W. Farouk, **Ahmed M. El Kerdawy**, Essam Rashwan, Safinaz E.S. Abbass. "Design and Synthesis of some new 2,4,6-trisubstituted quinazoline EGFR inhibitors as targeted anticancer agents", *Bioorganic Chemistry*, **98**, 103726, (**2020**), ISSN 0045-2068. **DOI:** https://doi.org/10.1016/j.bioorg.2020.103726.	4.831	29
50.	Riham F. George, Manal Kandeel, Dina Y. El-Ansary, **Ahmed M. El Kerdawy**. "Some 1,3,5-trisubstituted pyrazoline derivatives targeting breast cancer: Design, synthesis, cytotoxic activity, EGFR inhibition and molecular docking", *Bioorganic Chemistry*, **99**, 103780, (**2020**), ISSN 0045-2068. **DOI:** https://doi.org/10.1016/j.bioorg.2020.103780.	4.831	13

Department of Chemistry			
51.	Abdel-Mohsen HT, Abdullaziz MA, **El Kerdawy AM**, Ragab FAF, Flanagan KJ, Mahmoud AEE, Ali MM, El Diwani HI, Senge MO. "Targeting Receptor Tyrosine Kinase VEGFR-2 in Hepatocellular Cancer: Rational Design, Synthesis and Biological Evaluation of 1,2-Disubstituted Benzimidazoles", *Molecules*, **25(4)**, 770, (**2020**). **DOI:** https://doi.org/10.3390/molecules25040770.	3.267	19
52.	Mohammad M. Al-Sanea, Ahmed Elkamhawy, Sora Paik, Kyeong Lee, **Ahmed M. El Kerdawy**, Bukhari Syed Nasir Abbas, Eun Joo Roh, Wagdy M. Eldehna, Heba A.H. Elshemy, Rania B Bakr, Ibrahim Ali Farahat, Abdulaziz I. Alzarea, Sami I. Alzarea, Khalid S. Alharbi, Mohamed A. Abdelgawad. "Sulfonamide-based 4-anilinoquinoline derivatives as novel dual Aurora kinase (AURKA/B) inhibitors: Synthesis, biological evaluation and in silico insights", *Bioorganic & Medicinal Chemistry*, **28(13)**, 115525, (**2020**), ISSN 0968-0896. **DOI:** https://doi.org/10.1016/j.bmc.2020.115525.	3.073	25
53.	Al-Warhi T, **El Kerdawy AM**, Aljaeed N, Ismael OE, Ayyad RR, Eldehna WM, Abdel-Aziz HA, Al-Ansary GH. "Synthesis, Biological Evaluation and In Silico Studies of Certain Oxindole–Indole Conjugates as Anticancer CDK Inhibitors", *Molecules*, **25(9)**, 2031, (**2020**). **DOI:** https://doi.org/10.3390/molecules25092031.	3.267	22
54.	Osman SM, Ayoub NA, Hafez SA, Ibrahim HA, El Raey MA, El-Emam SZ, Seada AA, **Saadeldeen AM.** "Aldose reductase inhibitor form Cassia glauca: A comparative study of cytotoxic activity with Ag nanoparticles (NPs) and molecular docking evaluation", *PLoS ONE*, **15(10)**, e0240856, (**2020**). **DOI:** https://doi.org/10.1371/journal.pone.0240856.	3.240	2

Department of Chemistry			
Total number of publications (2019)	11	Total number of citations (2019)	176

Serial	Publications	IF	Citations
55.	Shendy, A.H., Eltanany, B.M., **Al-Ghobashy, M.A.** *et al*. "Coupling of GC-MS/MS to Principal Component Analysis for Assessment of Matrix Effect: Efficient Determination of Ultra-Low Levels of Pesticide Residues in Some Functional Foods", *Food Anal. Methods*, **12**, 2870–2885, (**2019**). **DOI:** https://doi.org/10.1007/s12161-019-01643-z.	3.366	7
56.	El-Sayed, Ghada M., **Medhat A. Al-Ghobashy**, Ali K. Attia, and Samah M. Kamal. "Nanoparticle-Enhanced Potentiometric Ion-Selective Electrodes for Therapeutic Drug Monitoring of Linezolid.", *Journal of The Electrochemical Society,* **166 (14)**, 1-9, (**2019**). **DOI:** 10.1149/2.1221913jes.	4.316	6
57.	Hassan LA, **Al-Ghobashy MA**, Abbas SS. "Evaluation of the pattern and kinetics of degradation of adalimumab using a stability-indicating orthogonal testing protocol", *Biomed Chromatogr.*, **33(12)**, e4676, (**2019**). **DOI:** 10.1002/bmc.4676.	1.902	3
58.	**Al-Ghobashy MA**, Nadim AH, El-Sayed GM, Nebsen M. "Label-Free Potentiometric Ion Flux Immunosensor for Determination of Recombinant Human Myelin Basic Protein: Application to Downstream Purification from Transgenic Milk", *ACS Sens.,* **4(2)**, 413-420, (**2019**). **DOI:** 10.1021/acssensors.8b01315.	7.711	10
59.	Hassan, Lamiaa A., Sara M Shatat, Basma M Eltanany, **Medhat A Al-Ghobashy**, and Samah S Abbas. "Stability and biosimilarity assessment of infliximab using an orthogonal testing protocol and statistically-guided interpretation of peptide mapping", *Analytical methods*, **11 (25)**, 3198-3211, (**2019**). **DOI:** 10.1039/c9ay00903e.	2.896	9
60.	Ibrahim, F.A., **Al-Ghobashy, M.A.** & Abo-Elmagd, I.F. "Energy-efficient carbon-doped titanium dioxide nanoparticles: synthesis, characterization, and catalytic properties under visible LED irradiation for degradation of Gemifloxacin", *SN Appl. Sci.,* **1**, 631, (**2019**). **DOI:** 10.1007/s42452-019-0644-8	----------	2

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61.	Iman A.Y. Ghannam, Eman A. Abd El-Meguid, Islam H. Ali, Donia H. Sheir, **Ahmed M. El Kerdawy**. "Novel 2-arylbenzothiazole DNA gyrase inhibitors: Synthesis, antimicrobial evaluation, QSAR and molecular docking studies", *Bioorganic Chemistry*, **93**, 103373, (**2019**). **DOI:** 10.1016/j.bioorg.2019.103373.	3.926	14
62.	Heba T. Abdel-Mohsen, Mohamed A. Omar, **Ahmed M. El Kerdawy**, Abeer E.E. Mahmoud, Mamdouh M. Ali, Hoda I. El Diwani. "Novel potent substituted 4-amino-2-thiopyrimidines as dual VEGFR-2 and BRAF kinase inhibitors", *European Journal of Medicinal Chemistry*, **179**, 707-722, (**2019**), ISSN 0223-5234. **DOI:** 10.1016/j.ejmech.2019.06.063.	5.573	26
63.	Somaia S. Abd El-Karim, Yasmin M. Syam, **Ahmed M. El Kerdawy**, Tamer M. Abdelghany. "New thiazol-hydrazono-coumarin hybrids targeting human cervical cancer cells: Synthesis, CDK2 inhibition, QSAR and molecular docking studies", *Bioorganic Chemistry*, **86**, 80-96, (**2019**), ISSN 0045-2068. **DOI:** 10.1016/j.bioorg.2019.01.026.	3.926	40
64.	Wagdy M. Eldehna, **Ahmed M. El Kerdawy**, Ghada H. Al-Ansary, Sara T. Al-Rashood, Mamdouh M. Ali, Abeer E. Mahmoud. "Type IIA - Type IIB protein tyrosine kinase inhibitors hybridization as an efficient approach for potent multikinase inhibitor development: Design, synthesis, anti-proliferative activity, multikinase inhibitory activity and molecular modeling of novel indolinone-based ureides and amides", *European Journal of Medicinal Chemistry*, **163**, 37-53, (**2019**), ISSN 0223-5234. **DOI:** 10.1016/j.ejmech.2018.11.061.	5.573	41
65.	**El Kerdawy, A.M., Osman, A.A.** & Zaater, M.A. "Receptor-based pharmacophore modeling, virtual screening, and molecular docking studies for the discovery of novel GSK-3β inhibitors", *J Mol Model,* **25(6)**, 171, (**2019**). **DOI:** 10.1007/s00894-019-4032-5.	1.346	18

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Total number of publications (2018)	8	Total number of citations (2018)	112

Serial	Publications	IF	Citations
66.	Attallah, O.A., **Al-Ghobashy, M.A.**, Nebsen, M. *et al*. "Assessment of pectin-coated magnetite nanoparticles in low-energy water desalination applications", *Environ Sci Pollut Res*, **25**, 18476–18483 (**2018**). **DOI:** 10.1007/s11356-018-2060-9.	4.223	7
67.	**Medhat A. Al-Ghobashy**, Samah M. Kamal, Ghada M. El-Sayed, Ali K. Attia, Mohamed Nagy, Ahmed ElZeiny, Marwa T. Elrakaiby, Mohammed M. Nooh, Maggie Abbassi, Ramy K. Aziz. "Determination of voriconazole and co-administered drugs in plasma of pediatric cancer patients using UPLC-MS/MS: A key step towards personalized therapeutics", *Journal of Chromatography B*, **1092**, 489-498, (**2018**), ISSN 1570-0232. **DOI:** 10.1016/j.jchromb.2018.06.043	1.911	5
68.	Olivia A. Attallah, **Medhat A. Al-Ghobashy**, Ahmed Taha Ayoub, Marianne Nebsen. "Magnetic molecularly imprinted polymer nanoparticles for simultaneous extraction and determination of 6-mercaptopurine and its active metabolite thioguanine in human plasma", *Journal of Chromatography A*, **1561**, 28-38, (**2018**), ISSN 0021-9673. **DOI:** 10.1016/j.chroma.2018.05.038	4.759	28
69.	Attallah OA, **Al-Ghobashy MA**, Ayoub AT, Tuszynski JA, Nebsen M. "Computer-aided design of magnetic molecularly imprinted polymer nanoparticles for solid-phase extraction and determination of levetiracetam in human plasma", *Rsc Advances*, **8(26),** 14280-92, (**2018**). **DOI:** 10.1039/C8RA02379D.	3.361	11
70.	Ali K. Attia, **Medhat A. Al-Ghobashy**, Ghada M. El-Sayed, Samah M. Kamal. "Voltammetric monitoring of linezolid, meropenem and theophylline in plasma", *Analytical Biochemistry*, **545**, 54-64, (**2018**), ISSN 0003-2697. **DOI:** 10.1016/j.ab.2018.01.009.	3.365	11

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71.	Hoda E. Mohamed, Abeer A. Mohamed, **Medhat A. Al-Ghobashy**, Faten A. Fathalla, Samah S. Abbas. "Stability assessment of antibody-drug conjugate Trastuzumab emtansine in comparison to parent monoclonal antibody using orthogonal testing protocol", *Journal of Pharmaceutical and Biomedical Analysis*, **150**, 268-277, (**2018**), ISSN 0731-7085. **DOI:** 10.1016/j.jpba.2017.12.022.	3.935	23
72.	Sara M. Shatat, Basma M. Eltanany, Abeer A. Mohamed, **Medhat A. Al-Ghobashy**, Faten A. Fathalla, Samah S. Abbas. "Coupling of on-column trypsin digestion–peptide mapping and principal component analysis for stability and biosimilarity assessment of recombinant human growth hormone", *Journal of Chromatography B*, **1072**, 105-115, (**2018**), ISSN 1570-0232. **DOI:** 10.1016/j.jchromb.2017.11.007	1.911	11
73.	Marwa A. Fouad, Enas H. Tolba, Manal A. El-Shal, **Ahmed M. El Kerdawy**. "QSRR modeling for the chromatographic retention behavior of some β-lactam antibiotics using forward and firefly variable selection algorithms coupled with multiple linear regression", *Journal of Chromatography A*, **1549**, 51-62, (**2018**), ISSN 0021-9673. **DOI:** 10.1016/j.chroma.2018.03.042.	3.858	16
Total number of publications (2017)	3	Total number of citations (2017)	19
Serial	Publications	IF	Citations
74.	Ibrahim, F.A., **Al-Ghobashy, M.A.**, Abd El-Rahman, M.K. *et al*. "Optimization and in line potentiometric monitoring of enhanced photocatalytic degradation kinetics of Gemifloxacin using TiO2 nanoparticles/H2O2". *Environ Sci Pollut Res*, **24**, 23880–23892 (**2017**). **DOI:** 10.1007/s11356-017-0045-8.	4.223	10
75.	Heba S. Abed, **Medhat A. Al-Ghobashy,** Faten A. Fathalla, Maissa Y. Salem. "Evaluation of the combined effects of pegylation and glycosylation on the stability of erythropoietin using a stability-indicating SE-HPLC", *Biologicals*, **50**, 129-136, (**2017**), ISSN 1045-1056. **DOI:** 10.1016/j.biologicals.2017.08.012.	1.856	3

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76.	Moenes, Eman M., **Medhat A Al-Ghobashy**, Abeer A Mohamed, and Maissa Y Salem. "Comparative Assessment of the Effect of Glyco-engineering on the Pattern and Kinetics of Aggregate Formation of Darbepoetin Alfa using a Stability-Indicating Orthogonal Testing Protocol", *Journal of Chromatography B*, **1072**, 405-414, (**2017**), ISSN 1570-0232. **DOI:** 10.1016/j.jchromb.2017.10.057.	1.911	6

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Total number of publications (2022)	16	Total number of citations (2022)	16

Serial	Publications	IF	Citations
77.	Khalifa M, **Abdelsalam RM**, Safar MM, Zaki HF. Phosphodiesterase (PDE) III inhibitor, Cilostazol, improved memory impairment in aluminum chloride-treated rats: modulation of cAMP/CREB pathway. Inflammopharmacology. (**2022**). Online ahead of print **DOI**: 10.1007/s10787-022-01010-1.	5.093	0
78.	**Saad MA, Eissa NM**, Ahmed MA, ElMeshad AN, Laible G, **Attia AS**, Al-Ghobashy MA, **Abdelsalam RM**, Al-Shorbagy MY. Nanoformulated Recombinant Human Myelin Basic Protein and Rituximab Modulate Neuronal Perturbations in Experimental Autoimmune Encephalomyelitis in Mice. Int J Nanomedicine. 7;17:3967-3987.(**2022**) **DOI:**10.1016/j.biopha.2021.111494.	7.033	0
79.	Hussien YA, Mansour DF, Nada SA, Abd El-Rahman SS, **Abdelsalam RM**, Attia AS, El-Tanbouly DM. Linagliptin attenuates thioacetamide-induced hepatic encephalopathy in rats: Modulation of C/EBP-β and CX3CL1/Fractalkine, neuro-inflammation, oxidative stress and behavioral defects. Life Sci., 15;295:120378.(**2022**) **DOI**: 10.1016/j.lfs.2022.120378	6.780	1
80.	El-Safty H, Ismail A, **Abdelsalam RM**, El-Sahar AE, Saad MA. Dapagliflozin diminishes memory and cognition impairment in Streptozotocin induced diabetes through its effect on Wnt/β-Catenin and CREB pathway. Brain Res Bull.,181:109-120 (**2022**) **DOI:** 10.1016/j.brainresbull.2022.01.017.	3.715	2
81.	El-Shamarka ME, El-Sahar AE, **Saad MA**, Assaf N, Sayed RH. Inosine attenuates 3-nitropropionic acid-induced Huntington's disease-like symptoms in rats via the activation of the A2AR/BDNF/TrKB/ERK/CREB signaling pathway. Life Sci. 2022, 1;300:120569.(**2022**) **DOI**: 10.1016/j.lfs.2022.120569.	6.780	3

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82.	El-Ghannam MS, **Saad MA**, Nassar NN, El-Yamany MF, El-Bahy AAZ. Linagliptin ameliorates acetic acid-induced colitis via modulating AMPK/SIRT1/PGC-1α and JAK2/STAT3 signaling pathway in rats. Toxicol Appl Pharmacol., 1;438:115906. (**2022**) **DOI:** 10.1016/j.taap.2022.115906	4.460	3
83.	**Saad MA**, Al-Shorbagy MY, Arab HH. Targeting the TLR4/NF-κB Axis and NLRP1/3 Inflammasomes by Rosuvastatin: A Role in Impeding Ovariectomy-Induced Cognitive Decline Neuropathology in Rats. Mol Neurobiol., 59(7):4562-4577(**2022**). **DOI:** 10.1007/s12035-022-02852-0.	5.686	1
84.	Al-Madhagy SA, Gad SS, Mostafa ES, Angeloni S, **Saad MA**, Sabry OM, Caprioli G, El-Hawary SS. A new arsenal of polyphenols to make Parkinson's disease extinct: HPLC-MS/MS profiling, very interesting MAO-B inhibitory activity and antioxidant activity of Otostegia fruticosa. Nat Prod Res., 22:1-6.(**2022**) **DOI:** 10.1080/14786419.2022.204481	2.488	1
85.	Amina A Gamal El Din , Khaled Mahmoud , Rabab H Sayed , Yousreya A Maklad, **Ayman E El-Sahar**. Vitamin D ameliorates diethylnitrosamine-induced liver preneoplasia: A pivotal role of CYP3A4/CYP2E1 via DPP-4 enzyme inhibition. Toxicol Appl Pharmacol. 1;458:116324. (**2022**) DOI: 10.1016/j.taap.2022.116324	4.219	0
86.	Elsebaie MM, Nour El-Din HT, Abutaleb NS, Abuelkhir AA, Liang HW, **Attia AS**, Seleem MN, Mayhoub AS. Exploring the structure-activity relationships of diphenylurea as an antibacterial scaffold active against methicillin- and vancomycin-resistant Staphylococcus aureus. Eur J Med Chem., 15;234:114204 (**2022**). DOI: 10.1016/j.ejmech.2022.114204.	7.088	3
87.	Nour El-Din HT, Elsebaie MMn Abutaleb NS, Kotb AM, **Attia AS**, Seleem MN, Mayhoub AS. Expanding the Structure-Activity Relationships of Alkynyl Diphenylurea Scaffold as Promising Antibacterial Agents. RSC Med. Chem., Online ahead of print (**2022**). DOI:org/10.1039/D2MD00351A	3.470	0

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88.	Ibrahim S, Fahim SA, Tadros SA, Badary OA. Suppressive effects of thymoquinone on the initiation stage of diethylnitrosamine hepatocarcinogenesis in rats. IJ Biochem Mol Toxicol. Aug;36(8):e23078. (**2022**) DOI: 10.1002/jbt.23078	3.642	2
89.	Motawi TMK, Sadik NAH, Sabry D, Fahim SA, Shahin NN.rs62139665 olymorphism in the Promoter Region of EpCAM Is Associated With Hepatitis C Virus-Related Hepatocellular Carcinoma Risk in Egyptians. Front Oncol. 5;11:754104. (**2022**) DOI: 10.3389/fonc.2021.754104.	6.24	0
90.	Amul M. Badr, Omayma Elkholy, Mona Said, Sally A. Fahim, Mohamed El-Khatib, Dina Sabry, Radwa M. Gaber. Diagnostic significance of hsa_circ_0000146 and hsa_circ_0000072 biomarkers for diabetic kidney disease in patients with type 2 diabetes mellitus. J Med Biochem. 42: 1–10, 2023.(**2022**) DOI: 10.5937/jomb0-39361.	2.20	0
91.	Tadros SA, Attia YM, Maurice NW, Fahim SA, Abdelwahed FM, Ibrahim S, Badary OA. Thymoquinone Suppresses Angiogenesis in DEN-Induced Hepatocellular Carcinoma by Targeting miR-1-3p. Int J Mol Sci., Dec 14;23(24):15904. (**2022**) DOI: 10.3390/ijms232415904.	6.20	0

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Total number of publications (2021)	17	Total number of citations (2021)	97

Serial	Publications	IF	Citations
92.	Showman, Maha M., **Rania M. Abdelsalam**, Mahmoud M. Tawfick, Sanaa A. Kenawy, and Mona M. El-Naa. "Antisense Tissue Factor Oligodeoxynucleotides Protected Diethyl Nitrosamine/Carbon Tetrachloride-Induced Liver Fibrosis Through Toll Like Receptor4-Tissue Factor-Protease Activated Receptor1 Pathway.", *Frontiers in Pharmacology*, **12**, 1140, (**2021**), ISSN 1663-9812. https://doi.org/10.3389/fphar.2021.676608.	3.845	0
93.	Hagar B. Abo-Zalam , Ezzeldein S. El-Denshary, **Rania M. Abdelsalam**, Islam A. Khalil, Mahmoud M. Khattab, and Mohamed A. Hamzawy. "Therapeutic advancement of simvastatin-loaded solid lipid nanoparticles (SV-SLNs) in treatment of hyperlipidemia and attenuating hepatotoxicity, myopathy and apoptosis: Comprehensive study.", *Biomedicine & Pharmacotherapy*, **139**, 111494, (**2021**). https://doi.org/10.1016/j.biopha.2021.111494.	4.545	3
94.	Hagar B. Abo-Zalam , **Rania M. Abdelsalam**, Rehab F. Abdel-Rahman, Mohamed F. Abd-Ellah, Mahmoud M. Khattab "In Vivo Investigation of the Ameliorating Effect of Tempol against MIA-Induced Knee Osteoarthritis in Rats: Involvement of TGF-β1/SMAD3/NOX4 Cue." *Molecules*. 19;26(22):6993 (2021), ISSN: 1420-3049. https://doi.org/10.3390/molecules26226993.	4.411	3
95.	Radwa N. Muhammad, Lamiaa A. Ahmed, **Rania M. AbdelSalam**, Kawkab A. Ahmed, Amina S. Attia. "Crosstalk Among NLRP3 Inflammasome, ET B R Signaling, and miRNAs in Stress-Induced Depression-Like Behavior: a Modulatory Role for SGLT2 Inhibitors." *Neurotherapeutics.* Online ahead of print (2021). ISSN: 1933-7213 (print); 1878-7479 (web). https://doi.org/10.1007/s13311-021-01140-4.	7.620	11

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96.	Amer MA, Wasfi R, **Attia AS**, Ramadan MA. "Indole Derivatives Obtained from Egyptian *Enterobacter* sp. Soil Isolates Exhibit Antivirulence Activities against Uropathogenic *Proteus mirabilis*", *Antibiotics,* **10(4)**, 363, (**2021**). https://doi.org/10.3390/antibiotics10040363	3.893	5
97.	Elhosseiny, Noha M., Tamer M. Samir, Aliaa A. Ali, Amani A. El-Kholy, and **Ahmed S. Attia**. "Development of an Immunochromatographic Strip Using Conjugated Gold Nanoparticles for the Rapid Detection of *Klebsiella pneumoniae* Causing Neonatal Sepsis" *Pharmaceutics,* **13(8)**, 1141, (**2021**). https://doi.org/10.3390/pharmaceutics13081141.	6.321	0
98.	Samar M. Shawki, **Mohammed A. Saad**, Rania M. Rahmo, Walaa Wadie and Hanan S. El-Abhar, "Liraglutide Improves Cognitive and Neuronal Function in 3-NP Rat Model of Huntington's Disease", *Frontiers in pharmacology*, Epub. Ahead of print, (**2021**). https://doi.org/10.3389/fphar.2021.731483.	5.811	5
99.	Soha Ramadan, Manal M. Sabry, **Muhammed A Saad**, Simone Angeloni, Omar M. Sabry, Giovanni Caprioli & Soheir M. El Zalabani "Dismantling Parkinson's disease with herbs: MAO-B inhibitory activity and quantification of chemical constituents using HPLC-MS/MS of Egyptian local market plants", *Natural Product Research*, Epub. Ahead of print, (**2021**). https://doi.org/10.1080/14786419.2021.2013836.	2.862	2
100.	**Muhammed A.Saad**, Maha A.E. Ahmed, Norhan N.Elbadawy, Noha F.Abdelkader "Nano-ivabradine averts behavioral anomalies in Huntington's disease rat model via modulating Rhes/m-tor pathway",*Progress in Neuro-Psychopharmacology and Biological Psychiatry*, **111**, (**2021**), 110368. https://doi.org/10.1016/j.pnpbp.2021.110368.	5.067	4
101.	Rofida A. Saleh, Tarek F. Eissa, Dalaal M. Abdallah, **Muhammed A. Saad**, Hanan S. El- Abhar. "Peganum harmala enhanced GLP-1 and restored insulin signaling to alleviate AlCl3-induced Alzheimer-like pathology model." *Scientific reports*, **11**, 12040, (**2021**). https://doi.org/10.1038/s41598-021-90545-4.	4.380	6

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102.	Doaa Fathi, Ahmed I.Abulsoud, **Muhammed A.Saad**, Noha N.Nassar, Mina M.Maksimose, Sherine M.Rizk, Mahmoud A.Senousy "Agomelatine attenuates alcohol craving and withdrawal symptoms by modulating the Notch1 signaling pathway in rats", *Life Sciences*, **284**, (**2021**), 119904. https://doi.org/10.1016/j.lfs.2021.119904.	5.037	4
103.	Amr M. Emam**, Muhammad A. Saad**, Naglaa A. Ahmed, Hala F. Zaki. "Vortioxetine mitigates neuronal damage by restricting PERK/eIF2α/ATF4/CHOP signaling pathway in rats subjected to focal cerebral ischemia-reperfusion", *Life Sciences*, **283**, 119865, (**2021**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2021.119865.	5.037	4
104.	El-Yamany, Muhammed F., Eman S. Zaki, Sherif A. Shaltout, and **Muhammed A. Saad.** "Bone marrow mononuclear cells boosts anti-cytogentical aberration effect of N-Acetylcysteine and α-lipoic acid in rat's liver and bone marrow: Implication of oxidative and inflammatory pathways", *Toxicology Mechanisms and Methods*, 1-13, (**2021**). https://doi.org/10.1080/15376516.2021.1906370.	2.987	2
105.	Hany H. Arab, Muhammad Y. Al-Shorbagy, **Muhammed A. Saad**. "Activation of autophagy and suppression of apoptosis by dapagliflozin attenuates experimental inflammatory bowel disease in rats: Targeting AMPK/mTOR, HMGB1/RAGE and Nrf2/HO-1 pathways", *Chemico-Biological Interactions*, **335**, 109368, (**2021**), ISSN 0009-2797. https://doi.org/10.1016/j.cbi.2021.109368.	5.194	40
106.	Motawi, Tarek Mohamed Kamal, Nermin Abdel Hamid Sadik, Dina Sabry, **Sally Atef Fahim**, and Nancy Nabil Shahin. "rs62139665 polymorphism in the promoter region of EpCAM is associated with hepatitis C virus-related hepatocellular carcinoma risk in Egyptians." *Frontiers in Oncology*: 5476. (**2021**). DOI: 10.3389/fonc.2021.754104	6.230	0
107.	**Muhammed A. Saad**, Muhammad A. Eltarzy, **Rania M. Abdel Salam**, Maha A.E. Ahmed. "Liraglutide mends cognitive impairment by averting Notch signaling pathway overexpression in a rat model of polycystic ovary syndrome", *Life Sciences,* **265**, 118731, (**2021**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2020.118731.	5.037	6

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108.	**Saad, Muhammad AE**, Mohamed IM Fahmy, Rabab H. Sayed, Muhammad F. El-Yamany, Reham El-Naggar , Ahmed AE Hegazy, and **Muhammad Al-Shorbagy**. "Eprosartan: A closer insight into its neuroprotective activity in rats with focal cerebral ischemia–reperfusion injury.", *Journal of Biochemical and Molecular Toxicology*, (**2021**). https://doi.org/10.1002/jbt.22796.	3.652	2
Total number of publications (2020)	7	Total number of citations (2020)	37
Serial	Publications	IF	Citations
109.	Nour El-Din HT, Elhosseiny NM, El-Gendy MA, Mahmoud AA, **Hussein MMM**, Attia AS. "A Rapid Lysostaphin Production Approach and a Convenient Novel Lysostaphin Loaded Nano-emulgel; As a Sustainable Low-Cost Methicillin-Resistant Staphylococcus aureus Combating Platform", *Biomolecules*. **10(3)**, 435, (**2020**). https://doi.org/10.3390/biom10030435	4.879	8
110.	Rasha R. Yossef, Mohamed F. Al-Yamany, **Muhammed A. Saad**, Ayman E. El-Sahar. "Neuroprotective effects of vildagliptin on drug induced Alzheimer's disease in rats with metabolic syndrome: Role of hippocampal klotho and AKT signaling pathways", *European Journal of Pharmacology*, **889**, 173612, (**2020**), ISSN 0014-2999. https://doi.org/10.1016/j.ejphar.2020.173612.	3.263	10
111.	Hadir Farouk, **Muhammed A. Saad**, Sawsan S. Mahmoud, Mohammed F. El-Yamany, Ola A. Sharaf, Rania F. Ahmed, Ezz E. El-Denshary. "Effect of (+) and (-) hydroxycitric acid sterio-isomers present in natural products in counteracting insulin resistance", *Egyptian Journal of Chemistry*, **63(11)**, 4341-4354, (**2020**). DOI: 10.21608/ejchem.2020.25054.2493.	0.966	0
112.	Ayman E. El-Sahar, Alyasaa A. Rastanawi, Muhammed F. El-Yamany, **Muhammed A. Saad**. "Dapagliflozin improves behavioral dysfunction of Huntington's disease in rats via inhibiting apoptosis-related glycolysis", *Life Sciences*, **257**, 118076, (**2020**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2020.118076.	3.647	18

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113.	Hebatullah S. Helmy, Mahmoud A. Senousy, Ayman E. El-Sahar, Rabab H. Sayed, **Muhammed A. Saad**, Eman M. Elbaz. "Aberrations of miR-126-3p, miR-181a and sirtuin1 network mediate Di-(2-ethylhexyl) phthalate-induced testicular damage in rats: The protective role of hesperidin", *Toxicology*, **433–434**, 152406, (**2020**). https://doi.org/10.1016/j.tox.2020.152406.	4.099	19
114.	Hany H. Arab, **Muhammed A. Saad**, Ayman E. El-Sahar, **Muhammad Y. Al-Shorbagy**. "Mechanistic perspective of morin protection against ketoprofen-induced gastric mucosal injury: Targeting HMGB1/RAGE/NF-κB, DJ-1/Nrf2/HO-1 and PI3K/mTOR pathways", *Archives of Biochemistry and Biophysics*, **693**, 108552, (**2020**), ISSN 0003-9861. https://doi.org/10.1016/j.abb.2020.108552.	3.391	13
115.	**Saad MAE**, Fahmy MIM, **Al-Shorbagy M**, Assaf N, Hegazy AAE, El-Yamany MF. "Nateglinide Exerts Neuroprotective Effects via Downregulation of HIF-1α/TIM-3 Inflammatory Pathway and Promotion of Caveolin-1 Expression in the Rat's Hippocampus Subjected to Focal Cerebral Ischemia/Reperfusion Injury", *Inflammation,* **43(2)**, 401-416, (**2020**). Doi: 10.1007/s10753-019-01154-3.	3.212	5
Total number of publications (2019)	6	Total number of citations (2019)	54

Serial	Publications	IF	Citations
116.	Muhammed A. Saad, Ayman E. El-Sahhar, Hany H. Arab, **Muhammad Y. Al-Shorbagy**. "Nicorandil abates arthritic perturbations induced by complete Freund's adjuvant in rats via conquering TLR4-MyD88-TRAF6 signaling pathway", *Life Sciences*, **218**, 284-291, (**2019**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2019.01.002	5.037	11
117.	Radwan, A., El-Lakkany, N. M., William, S., El-Feky, G. S., **Al-Shorbagy, M. Y.**, Saleh, S., & Botros, S. A. "Novel praziquantel solid lipid nanoparticle formulation shows enhanced bioavailability and antischistosomal efficacy against murine S. mansoni infection", *Parasites Vectors*, **12(1)**, 304, (**2019**). https://doi.org/10.1186/s13071-019-3563-z.	3.876	10

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118.	Choucry, A.M., **Al-Shorbagy, M.Y.**, Attia, A.S. *et al*. "Pharmacological Manipulation of Trk, p75NTR, and NGF Balance Restores Memory Deficit in Global Ischemia/Reperfusion Model in Rats", *J Mol Neurosci,* **68(1)**, 78–90, (**2019**). https://doi.org/10.1007/s12031-019-01284-1.	3.444	7
119.	Hassan NF, Nada SA, Hassan A, El-Ansary MR, **Al-Shorbagy MY**, Abdelsalam RM. "Saroglitazar Deactivates the Hepatic LPS/TLR4 Signaling Pathway and Ameliorates Adipocyte Dysfunction in Rats with High-Fat Emulsion/LPS Model-Induced Non-alcoholic Steatohepatitis", *Inflammation,* **42(3)**, 1056-1070, (**2019**). Doi: 10.1007/s10753-019-00967-6.	4.092	16
120.	Eman M. Elbaz, Hebatullah S. Helmy, Ayman E. El-Sahar, **Muhammed A. Saad**, Rabab H. Sayed. "Lercanidipine boosts the efficacy of mesenchymal stem cell therapy in 3-NP-induced Huntington's disease model rats via modulation of the calcium/calcineurin/NFATc4 and Wnt/β-catenin signalling pathways", *Neurochemistry International*, **131**, 104548, (**2019**), ISSN 0197-0186. https://doi.org/10.1016/j.neuint.2019.104548.	3.881	8
121.	**Noha Abdel-Rahman**, Maha H. Sharawy, Nirmeen Megahed, Mohammed S. El-Awady. "Vitamin D3 abates BDL-induced cholestasis and fibrosis in rats via regulating Hedgehog pathway", *Toxicology and Applied Pharmacology*, **380**, 114697, (**2019**), ISSN 0041-008X. https://doi.org/10.1016/j.taap.2019.114697.	4.219	2

Department of Biology			
Total number of publications (2018)	4	Total number of citations (2018)	55

Serial	Publications	IF	Citations
122.	Ibrahim, S.M., **Al-Shorbagy, M.Y.**, Abdallah, D.M. *et al*. "Activation of α7 Nicotinic Acetylcholine Receptor Ameliorates Zymosan-Induced Acute Kidney Injury in BALB/c Mice", *Sci Rep*, **8(1)**, 16814, **(2018)**. https://doi.org/10.1038/s41598-018-35254-1.	4.380	15
123.	Rabab M. Ali, **Muhammad Y. Al-Shorbagy**, Maged W. Helmy, Hanan S. El-Abhar. "Role of Wnt4/β-catenin, Ang II/TGFβ, ACE2, NF-κB, and IL-18 in attenuating renal ischemia/reperfusion-induced injury in rats treated with Vit D and pioglitazone", *European Journal of Pharmacology*, **15(831)**, 68-76, (**2018**), ISSN 0014-2999. https://doi.org/10.1016/j.ejphar.2018.04.032.	4.432	24
124.	Mohammed K. AbdElhameid, Madlen B. Labib, Ahmed T. Negmeldin, **Muhammad Al-Shorbagy** & Manal R. Mohammed, "Design, synthesis, and screening of ortho-amino thiophene carboxamide derivatives on hepatocellular carcinomaas VEGFR-2Inhibitors", *Journal of Enzyme Inhibition and Medicinal Chemistry*, **33(1)**, 1472-1493, (**2018**). DOI: 10.1080/14756366.2018.1503654.	5.051	11
125.	Abd Elhameid MK, Ryad N, **Al-Shorbagy MY**, Mohammed MR, Ismail MM, El Meligie S. "Design, Synthesis and Screening of 4,6-Diaryl Pyridine and Pyrimidine Derivatives as Potential Cytotoxic Molecules", *Chem Pharm Bull*, **66(10)**, 939-952. (**2018**). Doi: 10.1248/cpb.c18-00269.	1.645	5

Department of Pharmaceutics and Industrial Pharmacy			
Total number of publications (2022)	4	Total number of citations (2022)	2

Serial	Publications	IF	Citations
126.	Mai El Halawany, Randa Latif and **Mohamed H. H. AbouGhaly**. Hemostatic Alginate/Nano-Hydroxyapatite Composite Aerogel Loaded with Tranexamic Acid or the Potential Protection against Alveolar Osteitis. Pharmaceutics,14(10), 2255 (**2022**) **DOI**: 10.3390/pharmaceutics14102255	6.525	0
127.	Hammad RW, Sanad RA, **Abdelmalak NS**, Latif R. Architecting novel multilayer nanosponges for co-administration of two drugs managing high-risk type II diabetes mellitus patients suffering from cardiovascular diseases. Int J Biol Macromol. 1;220:1429-1443 (**2022**) **DOI**: 10.1016/j.ijbiomac.2022.09.099	8.025	0
128.	Farag MM, Louis MM, Badawy AA, NessemDI, Abdelmalak NS. Drotaverine Hydrochloride Superporous Hydrogel Hybrid System: a Gastroretentive Approach for Sustained Drug Delivery and Enhanced Viscoelasticity. AAPS PharmSciTech, 23:124 (**2022**) **DOI:** org/10.1208/s12249-022-02280-2	3.45	0
129.	Rodayna Atef Shalaby, Omaima El-Gazayerly, Mohammed Abdallah. Cubosomal Betamethasone-Salicylic Acid Nano Drug Delivery System for Enhanced Management of Scalp Psoriasis. Int J Nanomedicine. 13;17:1659-1677 (**2022**). **DOI**: 10.2147/IJN.S345430.	7.033	2

Department of Pharmaceutics and Industrial Pharmacy			
Total number of publications (2021)	7	Total number of citations (2021)	19

Serial	Publications	IF	Citations
130.	Abdelmonem R, Elhabal SF, **Abdelmalak NS**, El-Nabarawi MA, Teaima MH. "Formulation and Characterization of Acetazolamide/Carvedilol Niosomal Gel for Glaucoma Treatment: In Vitro, and In Vivo Study.", *Pharmaceutics*, **13(2)**, 221, (**2021**). https://doi.org/10.3390/pharmaceutics13020221.	6.321	5
131.	**Nageeb El-Helaly, S.**; Abd-Elrasheed, E.; Salim, S.A.; Fahmy, R.H.; Salah, S.; EL-Ashmoony, M.M. "Green Nanotechnology in the Formulation of a Novel Solid Dispersed Multilayered Core-Sheath Raloxifene-Loaded Nanofibrous Buccal Film; In Vitro and In Vivo Characterization", *Pharmaceutics*, **13**, 474, (**2021**). https://doi.org/10.3390/pharmaceutics13040474.	6.321	3
132.	Tawfik, M.A., Mohamed, M.I., Tadros, M.I., **El-Helaly S.N.** "Low-Frequency Sonophoresis as an Active Approach to Potentiate the Transdermal Delivery of Agomelatine-Loaded Novasomes: Design, Optimization, and Pharmacokinetic Profiling in Rabbits." AAPS PharmSciTech **22**, 261 (**2021**). https://doi.org/10.1208/s12249-021-02147-y	3.246	1
133.	Marwa Eid Sayyed, Mohamed AbdEl-Motaleb, Ismail Taha Ibrahim, Hassan Medhat Rashed, Mohamed Ahmed El-Nabarawi, **Mohamed Abdallah Ahmed**. "Preparation, characterization, and in vivo biodistribution study of intranasal 131I-clonazepam-loaded phospholipid magnesome as a promising brain delivery system: Biodistribution and pharmacokinetic behavior of intranasal 131I-Clonazepam loaded phospholipid magnesome as a potential brain targeting system", *European Journal of Pharmaceutical Sciences*, **169**, 106089, (**2021**). https://doi.org/10.1016/j.ejps.2021.106089	4.384	1
134.	**Mohamed Abdallah Ahmed**, Wedian Younis Abdelgawad, Mary Kamal Gad, Magdy Ibrahim Mohamed. "A novel approach for the treatment of oral ulcerative lesion using mucoadhesive proniosome gel", *Journal of Drug Delivery Science and Technology*, 102460, (**2021**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2021.102460.	2.734	1

Department of Pharmaceutics and Industrial Pharmacy			
135.	A. Ramadan, E.B. Basalious and **M. Abdallah.** "Industrial application of QbD and NIR chemometric models in quality improvement of immediate release tablets", *Saudi Pharmaceutical Journal*, (**2021**), ISSN 1319-0164. https://doi.org/10.1016/j.jsps.2021.04.012.	2.879	2
136.	Farag MM, **Abd El Malak NS**, Yehia SA, **Ahmed MA.** "Hyaluronic Acid Conjugated Metformin-Phospholipid Sonocomplex: A Biphasic Complexation Approach to Correct Hypoxic Tumour Microenvironment.", *Int J Nanomedicine.*, **16**, 1005-1019, (**2021**). Doi:10.2147/IJN.S297634	6.400	6
Total number of publications (2020)	4	Total number of citations (2020)	17
Serial	Publications	IF	Citations
137.	Sandy N. Aziz, Alia A. Badawy, Demiana I. Nessem, **Nevine S. Abd El Malak**. "Promising nanoparticulate system for topical delivery of diphenhydramine hydrochloride: In-vitro and in-vivo evaluation", *Journal of Drug Delivery Science and Technology*, **55**, 101454, (**2020**). https://doi.org/10.1016/j.jddst.2019.101454	3.981	2
138.	Reham Waheed Hammad, Rania Abdel-Basset Sanad, **Nevine Shawky Abdelmalak**, Faisal A. Torad, Randa Latif. "New intranasal cross-linked mosapride xyloglucan pluronics micelles (MOS-XPMs) for reflux esophagitis disease: In-vitro optimization and improved therapeutic efficacy", *Journal of Advanced Research*, **23**, 83-94, (**2020**). https://doi.org/10.1016/j.jare.2020.01.013.	10.479	5
139.	Farag, Michael M., **Nevine S. Abd El Malak**, Soad A. Yehia, and Mohammed A. Ahmed. "Sonocomplexation as an effective tool to enhance the antitumorigenic effect of metformin: Preparation, in vitro characterization, molecular dynamic simulation & MiaPaCa-2 cell line hypoxia evaluation.", *Journal of Drug Delivery Science and Technology*, **59**, 101968, (**2020**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2020.101968.	3.981	3
140.	Louis, Mina M., Alia A. Badawy, Demiana I. Nessem, and **Nevine S. Abd Elmalak**. "Drotaverine hydrochloride gastroretentive floating mini-tablets: Formulation, in-vitro and in-vivo evaluation.", Journal of Drug Delivery Science and Technology, **57**, 101733, (**2020**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2020.101733	3.981	7

Department of Clinical Pharmacy			
Total number of publications (2020)	1	Total number of citations (2020)	2

Serial	Publications	IF	Citations
141.	Omar NE, El-Fass KA, Abushouk AI, **Elbaghdady N**, Barakat AEM, Noreldin AE, Johar D, Yassin M, Hamad A, Elazzazy S, Dermime S. "Diagnosis and Management of Hematological Adverse Events Induced by Immune Checkpoint Inhibitors: A Systematic Review", *Front Immunol.*, **11**, 1354, (**2020**). Doi: 10.3389/fimmu.2020.01354.	5.085	2

NEWGIZA UNIVERSITY
SCHOOL of PHARMACY

International Publications 2022

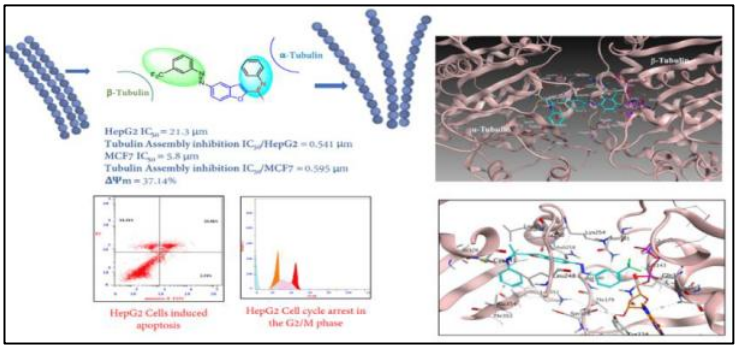
SCHOOL OF PHARMACY INTERNATIONAL PUBLICATIONS 2022

37 International publications with NGU affiliation published in 2022 with 43 citations.

No.	Publication	IF	Citations
1.	Naglaa F. El-Sayed, Marwa El-Hussieny, Ewies F. Ewies, Mohamed F. El Shehry, Hanem M. Awad, **Marwa A. Fouad**. "Design, synthesis, biological evaluation, and molecular docking of new benzofuran and indole derivatives as tubulin polymerization inhibitors", *Drug Development Research*, **83(2), 485-500, (2022).** **DOI:** 10.3390/molecules27175501.	5.004	0

Abstract

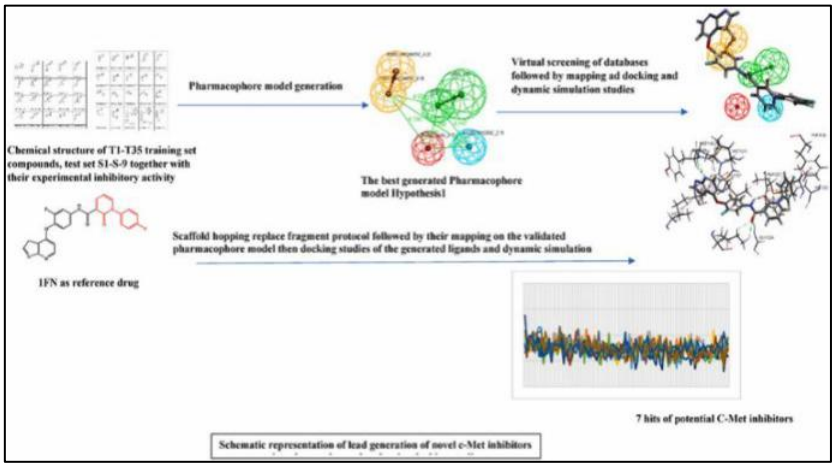
Microtubules and the mitotic spindle have become an important target for cancer treatment due to their critical role in cell division. In this work, a novel series of benzofuran and indole derivatives were designed and synthesized, to be evaluated as tubulin polymerization inhibitors. 2-Acetylbenzofuran derivatives 1a,b and 3-acetylindole 1c were condensed with Wittig reagents 2a–d and Wittig-Horner reagents 3a–e to afford the respective 2-ethylidene derivatives 5a–j and 7a–e. Also, iminomethylene triphenylphosphine (2e) reacted with 1a,b to afford benzofuran2-ylethylidene aniline derivatives 6a,b. In addition, compounds 1a,b reacted with trialkylphosphites 4a–c to give 1:1 adduct for which the Oxaphospholo[4,3-b] benzofuran-7-yl)diazene derivatives 8a–f, were assigned. The possible reactions mechanisms were discussed and structural reasoning for the new compounds were based upon spectroscopic data. Their antiproliferative activities against two cell lines namely, HepG2 and MCF7 cells were then evaluated. It was found that the benzofuran compounds 5b, 6a, and 8c exhibited the strongest antiproliferative activities against both cell lines compared to doxorubicin. By studying the mechanism of action, compound 6a showed good inhibition of tubulin polymerization which leads to mitotic spindle formation disruption, cell cycle arrest in the G2/M phase, and apoptosis of HepG2 cells. A conducted docking study confirmed the in vitro results indicating that compound 6a fitted properly at the colchicine binding site of tubulin. Based on these findings, compound 6a can be considered as a promising anticancer candidate that can be subjected for further development as a tubulin polymerization inhibitor for treating liver and breast cell carcinoma.



No.	Publication	IF	Citations
2.	Asmaa Raafat, Samar Mowafy, Sahar M. Abouseri, **Marwa A. Fouad**, Nahla A. Farag. "Lead generation of cysteine based mesenchymal epithelial transition (c-Met) kinase inhibitors: Using structure-based scaffold hopping, 3D-QSAR pharmacophore modeling, virtual screening, molecular docking, and molecular dynamics simulation", *Computers in Biology and Medicine*, **146, 105526, (2022).** DOI: doi.org/10.1016/j.compbiomed.2022.105526	6.698	1

Abstract

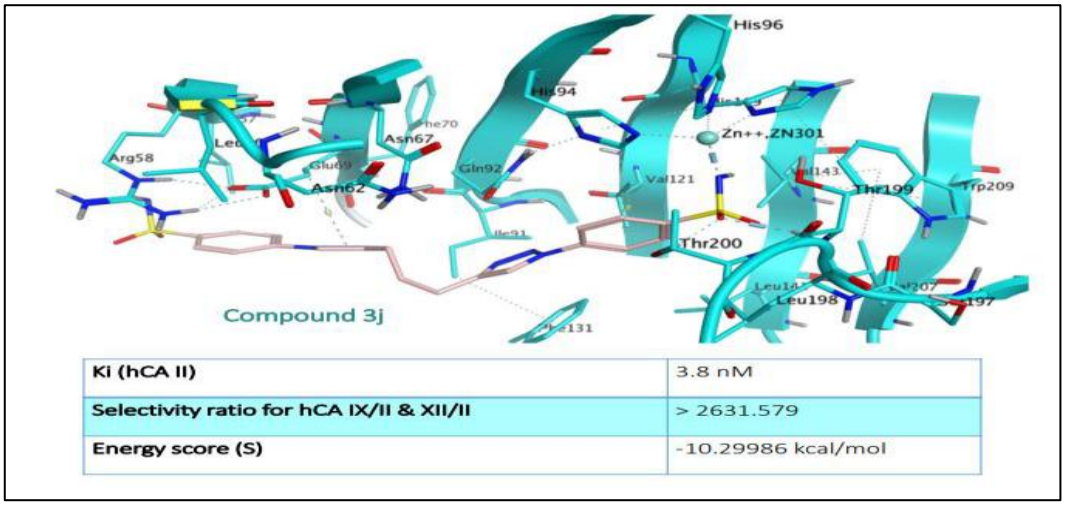
Cysteine-based mesenchymal-epithelial transition (c-Met) is a receptor tyrosine kinase that plays a definitive role during cancer progression and was identified as a possible target for anti-angiogenesis drugs. In the present study, different protocols of computer-based drug design were performed. Construction of predictive pharmacophore model using HypoGen algorithm resulted in a validated model of four features of positive ionizable, hydrogen bond acceptor, hydrophobic, and ring aromatic features with a correlation coefficient of 0.87, a configuration cost of 14.95, and a cost difference of 357.92. The model revealed a promising predictive power and had >90% probability of representing true correlation with the activity data. The model was established using Fisher's validation test at the 95% confidence level and test set prediction (r = 0.96), furthermore, the model was validated by mapping of set of compounds undergoing clinical trials as class Ⅱ c-met inhibitors. The generated valid pharmacophore model was then anticipated for virtual screening of three data bases. Moreover, scaffold hopping using replace fragments protocol was implemented. Hits generated were filtered according to Lipinski's rule; 510 selected hits were anatomized and subjected to molecular docking studies into the crystal structure of c-Met kinase. The good correlation between docking scores and ligand pharmacophore mapping fit values provided a reliable foundation for designing new potentially active candidates that may target c-Met kinase. Eventually, eight hits were selected as potential leads. Subsequently, seven (Hits) have displayed a higher dock score and demonstrated key residue interactions with stable molecular dynamics simulation. Therefore, these c-Met kinase inhibitors may further serve as new chemical spaces in designing new compounds.



No.	Publication	IF	Citations
3.	Ewies, Ewies F.; Sabry, Eman; Bekheit, Mohamed S.; Fouad, Marwa A.; Vullo, Daniela; Supuran, Claudiu T. "Click chemistry-based synthesis of new benzenesulfonamide derivatives bearing triazole ring as selective carbonic anhydrase II inhibitors", *Drug Development Research*, **(2022)** In press. **DOI:** doi: 10.1002/ddr.21957	5.004	2

Abstract

A series of 1,2,3-triazol-1-ylbenzenesulfonamide derivatives was designed, synthesized and their ability to inhibit several carbonic anhydrase isoforms was evaluated. The basis of our design is to hybridize the benzenesulfonamide moiety widely used as a zinc-binding group, a triazole ring as spacer with a tail of different substituted aryl moieties. The synthesis of these compounds was achieved using Cu(I)-mediated click chemistry between the azide containing the benzenesulfonamide pharmacophore and various aryl acetylenes or 1,6-heptadiyne through copper-catalyzed [3+2] cycloaddition reaction. The ability the new derivatives to inhibit four human carbonic anhydrase isoforms hCA I, II, IX, and XII was evaluated. All the compounds exhibited good potency and high selectivity towards isoforms hCA I and II more than isoforms hCA IX and XII, especially for the derivatives 3c and 3j that displayed Ki of 2.8 and 3.8 nM against hCA II and a high hCA II selectivity ratio ranging from 77.6 to 3571.4 over other isoforms. All the compounds were docked in the active site of the downloaded hCA II active site and their binding pattern confirmed their significant activity by interacting of the sulfonamide moiety with zinc ion in the active site, in addition to its hydrogen bond interaction with Thr199 and Thr200. All the above-mentioned findings pointed out towards the promising activity of the synthesized series that can be presented as a new scaffold to be further optimized as selective antiglaucoma drugs.



Ki (hCA II)	3.8 nM
Selectivity ratio for hCA IX/II & XII/II	> 2631.579
Energy score (S)	-10.29986 kcal/mol

No.	Publication	IF	Citations
4.	El-Kersh, Dina M.; Abou El-Ezz, Rania F.; **Fouad, Marwa**; Farag, Mohamed A. "Unveiling Natural and Semisynthetic Acylated Flavonoids: Chemistry and Biological Actions in the Context of Molecular Docking", *Molecules,* **27:5501, (2022)** **DOI:** 10.3390/molecules27175501	4.927	0

Abstract

Acylated flavonoids are widely distributed natural metabolites in medicinal plants and foods with several health attributes. A large diversity of chemical structures of acylated flavonoids with interesting biological effects was reported from several plant species. Of these, 123 compounds with potential antimicrobial, antiparasitic, anti-inflammatory, anti-nociceptive, analgesic, and anti-complementary effects were selected from several databases including SCI-Finder, Scopus, Google Scholar, Science Direct, PubMed, and others. Some selected reported biologically active flavonoids were docked in the active binding sites of some natural enzymes, namely acetylcholinesterase, butyrylcholinesterase, α-amylase, α-glucosidase, aldose reductase, and HIV integrase, in an attempt to underline the key interactions that might be responsible for their biological activities.

No.	Publication	IF	Citations
5.	**Fouad, Marwa A.;** Serag, Ahmed; Tolba, Enas H.; El-Shal, Manal A.; El Kerdawy, Ahmed M. "QSRR modeling of the chromatographic retention behavior of some quinolone and sulfonamide antibacterial agents using firefly algorithm coupled to support vector machine", BMC Chemistry, **16**, 85, 2022 **DOI:** 10.1186/s13065-022-00874-2	4.095	0

Abstract

Quinolone and sulfonamide are two classes of antibacterial agents with an opulent history of medicinal chemistry features that contribute to their bacterial spectrum, efficacy, pharmacokinetics, and adverse effect profiles. The urgent need for their use, combined with the escalating rate of their resistance, necessitates the development of suitable analytical methods that accelerate and facilitate their analysis. In this study, the advanced firefly algorithm (FFA) coupled with support vector regression (SVR) was used to select the most significant descriptors and to construct two quantitative structure-retention relationship (QSRR) models using a series of 11 selected quinolone and 13 sulfonamide drugs, respectively, to predict their retention behavior in HPLC. Precisely, the effect of the pH value and acetonitrile composition in the mobile phase on the retention behavior of quinolones and sulfonamides, respectively, were studied. The obtained QSRR models performed well in both internal and external validations, demonstrating their robustness and predictive ability. Y-randomization validation demonstrated that the obtained models did not result by statistical chance. Moreover, the obtained results shed the light on the molecular features that influence the retention behavior of these two classes under the current chromatographic conditions.

No.	Publication	IF	Citations
6.	Elkady, Ehab F.; **Fouad, Marwa A.;** Mozayad, Ayoub N. "Application of Box-Behnken experimental design and response surface methodology for selecting the optimum RP-HPLC conditions for the simultaneous determination of methocarbamol, indomethacin and betamethasone in their pharmaceutical dosage form", *BMC Chemistry* **16**, 114 (**2022**) **DOI:** 10.1186/s13065-022-00908-9	4.095	0

Abstract

An isocratic RP-HPLC method has been developed for the separation and determination of methocarbamol (MTL), indomethacin (IND), and betamethasone (BET) in combined dosage form using an Inertsil ODS-3v C18 (250×4.6 mm, 5 µm) column with UV- detection at 235 nm. Experimental design using Box-Behnken design (BBD) was applied to study the response surface during method optimization and to achieve a good separation with a minimum number of experimental runs. The three independent parameters were pH of buffer, % of acetonitrile and flow rate of the mobile phase while the peak resolution of IND from MTL and the peak resolution of BET from IND (R2) were taken as responses to obtain mathematical models. The composite desirability was employed to optimize a set of responses overall (peak resolutions). The predicted optimum assay conditions include a mobile phase composition of acetonitrile and phosphate buffer (pH 5.95) in a ratio of 79:21, v/v, pumped at a flow rate of 1.4 mL min−1. With this ideal condition, the optimized method was able to achieve baseline separation of the three drugs with good resolution and a total run time of less than 7 min. The linearity of MTL, IND, and BET was determined in the concentration ranges of 5–600 µg mL−1, 5–300 µg mL−1, and 5–300 µg mL−1 and the regression coefficients were 0.9994, 0.9998, and 0.9998, respectively. The average percent recoveries for the accuracy were determined to be 100.41±0.60%, 100.86±0.86%, and 100.99±0.65% for MTL, IND, and BET, respectively. The R.S.D.% of the intra-day precision was found to be less than 1%, while the R.S.D.% of the inter-day precision was found to be less than 2%. The RP-HPLC method was fully validated with regard to linearity, accuracy, precision, specificity, and robustness as per ICH recommendations. The proposed method has various applications in quality control and routine analysis of the investigated drugs in their pharmaceutical dosage forms and laboratory-prepared mixtures with the goal of reducing laboratory waste, analysis time, and effort.

No.	Publication	IF	Citations
7.	Wadhah Atef Salem, Ehab Farouk Elkady, **Marwa Ahmed Fouad**, Mohammad Abdul-Azim Mohammad. "DoE Screening and Optimization of Liquid Chromatographic Determination of Nicotinic Acid and Six Statins: Application to Pharmaceutical Preparations and Counterfeit Detection" J Chromatogr. Sci. 29;61(1):74-86 (**2022**) **DOI**: 10.1093/chromsci/bmab131.	1.555	0

Abstract

An isocratic reversed-phase high performance liquid chromatographic method has been developed and validated to simultaneously determine nicotinic acid, pravastatin sodium, rosuvastatin calcium, atorvastatin calcium, pitavastatin calcium, lovastatin sodium and simvastatin sodium in focus on counterfeit drug detection. Thin-layer chromatography, nuclear magnetic resonance and mass spectrometry have been additionally performed to verify the identification of adulterants of counterfeit herbal medicines. Chromatographic separation was carried out on Inertsil® ODS-3 C18 (4.6 × 150 mm, 5 µm) with isocratic mobile phase elution containing a mixture of acetonitrile: methanol: 25 mM potassium dihydrogen phosphate buffer, pH 2.86 adjusted with 0.1 M o-phosphoric acid (48: 30: 22, v/v/v), at a flow rate of 1 mL/min and with UV detection at 238 nm. The design of experiment methodology, Plackett-Burman and Box-Behnken designs, was used to screen and optimize the mobile phase composition. The validation of the method was also carried out under the International Conference on Harmonization guidelines. The developed method was sensitive, accurate, simple, economical and highly robust, in addition to the comprehensiveness and novelty of this method for separating the seven drugs. The results were statistically compared with the reference methods used Student's t-test and variance ratio F-test at $P < 0.05$.

No.	Publication	IF	Citations
8.	El-Gazzar YI, Ghaiad HR, **El Kerdawy AM**, George RF, Georgey HH, Youssef KM, El-Subbagh HI.Arch Pharm (Weinheim). New quinazolinone-based derivatives as DHFR/EGFR-TK inhibitors: Synthesis, molecular modeling simulations, and anticancer activity. *Arch Pharm (Weinheim).* **18:e2200417. (2022)** **DOI:** 10.1002/ardp.202200417.	4.613	0

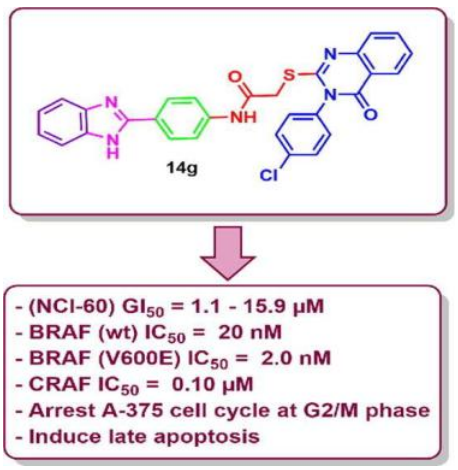
Abstract

New 2-mercapto-quinazolin-4-one analogs were synthesized and tested for their in vitro anticancer activity, dihydrofolate reductase (DHFR) inhibition, and epidermal growth factor tyrosine kinase (EGFR-TK) inhibition activities. Compound 24, which is characterized by a 2-benzyl-thio function, showed broad-spectrum anticancer activity with high safety profile and selectivity index. The concentrations of 24 causing 50% growth inhibition (GI50) and total cell growth inhibition (TGI) and its lethal concentration 50 (LC50) were 15.1, 52.5, and 91.2 µM, respectively, using 5-fluorouracil as a positive control. Also, it showed EGFR-TK inhibitory activity with IC50 = 13.40 nM compared to gefitinib (IC50 = 18.14 nM) and DHFR inhibitory potency with 0.30 µM compared to methotrexate (MTX; IC50 = 0.08 µM). In addition, compound 24 caused cell cycle arrest and apoptosis on COLO-205 colon cancer cells. Compounds 37, 21, and 54 showed remarkable DHFR inhibitory activity with IC50 values of 0.03, 0.08, and 0.08 µM, respectively. The inhibitory properties of these compounds are due to an electron-withdrawing group on the quinazolinone ring, except for compound 54. In a molecular modeling study, compound 24 showed the same binding mode as gefitinib as it interacted with the amino acid Lys745 via π–π interaction. Compound 37 showed a similar binding mode as MTX through the binding interaction with Lys68, Asn64 via hydrogen bond acceptor, and Phe31 via arene–arene interaction. The obtained model and substitution pattern could be used for further development.

No.	Publication	IF	Citations
9.	Ali IH, Abdel-Mohsen HT, Mounier MM, Abo-Elfadl MT, **El Kerdawy AM**, Ghannam IAY. Design, synthesis and anticancer activity of novel 2-arylbenzimidazole/2-thiopyrimidines and 2-thioquinazolin-4(3H)-ones conjugates as targeted RAF and VEGFR-2 kinases inhibitors. *Bioorg. Chem*. **126:105883 (2022)** **DOI:** 10.1016/j.bioorg.2022.105883.	5.307	1

Abstract

In the current study, series of 2-arylbenzimidazole-thiopyrimidine and -thioquinazolin-4(3H)-ones conjugates 12a-d, 13a,b and 14a-l have been synthesized. All the synthesized compounds were tested in vitro for their anticancer activities against a panel of cancer cell lines at NCI - US and their growth inhibition (GI) % were determined at 10 µM. Compounds 14c and 14g-i were selected to be screened at the five dose assay and were found to exhibit GI50 values 1.1–30.0 µM. The benzimidazole-quinazolinone derivative 14c, in particular, showed potent anticancer activity against the tested cancer cell lines (GI50 of 1.3–4.2 µM). In addition, compounds 12a,b, 13a, 14a-e, 14g, 14i and 14j were selected to be tested against some cancer cell lines using MTT assay and the benzimidazole-quinazolinone 14g was found to have potent anticancer activities against melanoma (Mel-501 and A-375), breast (MCF-7), colon (HCT-116), prostate (PC-3), lung (A-549) and pancreas (Paca-2) cancer cell lines reporting IC50 values ranging between 0.1 and 6.2 µM. Moreover, the synthesized hybrids were tested in vitro on kinases; BRAF (wt), BRAF (V600E), CRAF and VEGFR-2. The benzimidazole-quinazolinone derivatives 14f,g revealed potent RAF kinases inhibitory activities on BRAF (wt), BRAF (V600E) and CRAF showing IC50 values 0.002–0.1 µM, whereas, the benzimidazole-quinazolinone derivatives 14i and 14k showed moderate VEGFR-2 inhibitory activity (IC50 = 20.60 and 6.14 µM, respectively). Moreover, the representative compounds 14g and 14i caused cell cycle arrest of A-375 melanoma cell line at G2/M phase and were found to induce late apoptosis. CRAF in the DFG-out inactive conformation homology modeling was first reported in this study and molecular docking studies on BRAF, CRAF and VEGFR-2 were also performed to investigate the binding modes of the target compounds and their interactions with the key amino acids; BRAF (Glu500, Cys531 and Asp593), CRAF (Glu393, Cys424 and Asp486) and VEGFR-2 (Glu885, Cys919 and Asp1046).



No.	Publication	IF	Citations
10.	Al-Warhi T, **El Kerdawy AM**, Said MA, Albohy A, Elsayed ZM, Aljaeed N, Elkaeed EB, Eldehna WM, Abdel-Aziz HA, Abdelmoaz MA Novel 2-(5-Aryl-4,5-Dihydropyrazol-1-yl)thiazol-4-One as EGFR Inhibitors: Synthesis, Biological Assessment and Molecular Docking Insights. *Drug Des Devel Ther.* **16;16:1457-1471 (2022)** **DOI:** 10.2147/DDDT.S356988.	4.319	1

Abstract

Introduction: Epidermal growth factor receptor (EGFR) regulates several cell functions which include cell growth, survival, multiplication, differentiation, and apoptosis. Currently, EGFR kinase inhibitors are of increasing interest as promising targeted antitumor therapeutic agents.

Methods: Different thiazolyl-pyrazoline derivatives (7a-o) were synthesized and were first tested for anti-proliferative effect towards the A549 lung cancer cell line and the T-47D breast cancer cell line in MTT assay. Thereafter, thiazolyl-pyrazolines (7b, 7g, 7l, and 7m) were subsequently evaluated for their PK inhibition for EGFR. Moreover, representative promising derivatives (7g and 7m) in cytotoxic and PK inhibition assays were tested to investigate their impact on the apoptosis and cell cycle phases in T-47D cells in order to explore more insights into the antitumor actions of the target thiazolyl-pyrazolines. Furthermore, docking studies were accomplished to evaluate the patterns of binding of thiazolyl-pyrazolines 7b, 7g, 7l, and 7m in the EGFR active pocket (PDB ID: 1M17).

Results: Testing the thiazolyl pyrazoline compounds 7a-o on A549 and T-47D cell lines showed IC50 arrays between 3.92 and 89.03 µM, and between 0.75 and 77.10 µM, respectively. Also, the tested thiazolyl-pyrazolines (7b, 7g, 7l, and 7m) demonstrated significant sub-micromolar EGFR inhibitory actions with IC50 values 83, 262, 171 and 305 nM, respectively, in comparison to erlotinib (IC50 =57 nM).

Discussion: Generally, it was observed that the tested thiazolyl pyrazolines showed more potent antiproliferative activity toward breast cancer cells T-47D than toward lung cancer cell lines A549. In particular, thiazolyl pyrazolines 7g and 7m showed the best activity against A549 cells (IC50 = 3.92 and 6.53 µM) and T-47D cells (IC50 = 0.88 and 0.75 µM). Compounds 7g and 7m provoked a sub-G1 phase arrest and cell apoptosis which are in agreement with the expected outcome of EGFR inhibition. Finally, the molecular docking of 7g and 7m in the active site of EGFR revealed a common binding pattern similar to that of erlotinib which involves the accommodation of the 1,3 thiazol-4-one ring and pyrazoline ring of target compounds in the binding region of erlotinib's quinazoline ring and anilino moiety.

No.	Publication	IF	Citations
11.	Hassan RM, Ali IH, Abdel-Maksoud MS, Abdallah HMI, **El Kerdawy AM**, Sciandra F, Ghannam IAY. Design and synthesis of novel quinazolinone-based fibrates as PPARα agonists with antihyperlipidemic activity. *Arch Pharm (Weinheim),* 355(3):e2100399 (**2022**). **DOI:** 10.1002/ardp.202100399	4.319	1

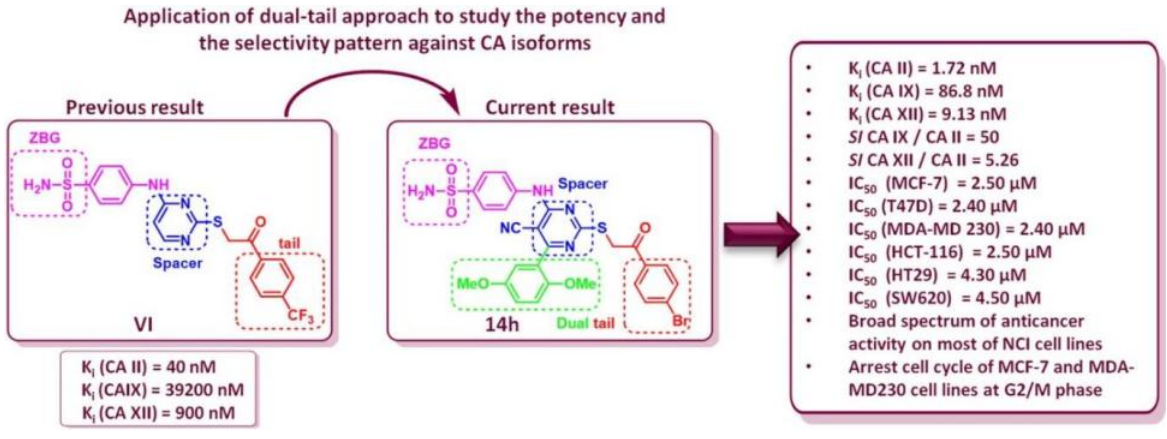
Abstract

Aiming to discover new antihyperlipidemic agents, a new set of quinazolinone fibrate hybrids 9a–r bearing the essential features for peroxisome proliferator activated receptor-α (PPARα) agonistic activity was synthesized and the structures were confirmed by different spectral data. All the target compounds were screened for their PPARα agonistic activity. Compounds 9o and 9q exhibited potent activity, with EC50 values better than that of fenofibrate by 8.7- and 27-fold, respectively. Molecular docking investigations were performed for all the newly synthesized compounds in the active site of the PPARα receptor to study their interactions and energies in the receptor. Moreover, the antihyperlipidemic and antioxidant activities of compounds 9o and 9q were determined using Triton WR-1339-induced hyperlipidemic rats. Compound 9q exhibited effective hypolipidemic activity in a dose-dependent manner, where it significantly reduced the serum levels of total cholesterol, triglycerides, low-density lipoprotein cholesterol, and very-low-density lipoprotein cholesterol and increased the level of high-density lipoprotein cholesterol. Furthermore, it possesses a powerful antioxidant profile where it significantly elevated the levels of reduced glutathione as well as the total antioxidant capacity and significantly decreased the malondialdehyde level. The histopathological studies revealed that compound 9q improved the aortic architecture and hepatic steatosis. These findings support that compound 9q could be a promising lead compound for the development of new antihyperlipidemic agents.

No.	Publication	IF	Citations
12.	Abdel-Mohsen HT, **El Kerdawy AM**, Omar MA, Petreni A, Allam RM, El Diwani HI, Supuran CT Application of the dual-tail approach for the design and synthesis of novel Thiopyrimidine-Benzenesulfonamide hybrids as selective carbonic anhydrase inhibitors. *Eur J Med Chem*. 15;228:114004 (**2022**). **DOI**: 10.1016/j.ejmech.2021.114004.	7.088	7

Abstract

A dual-tail approach was applied to the design of a novel series of 2-thiopyrimidine ebenzenesulfonamides as carbonic anhydrase (CA) inhibitors. The design strategy is based on the hybridization between a benzenesulfonamide moiety as Zn2 binding group and 2,4-disubstituted thiopyridimidine as a tail. Among the synthesized compounds, 14h displayed the highest potency (Ki = 1.72 nM) and selectivity for CA II over the isoforms CA IX and CA XII with selectivity indexes of 50 and 5.26, respectively. Meanwhile, compounds 14a and 14l displayed a potent inhibitory activity against CA IX (Ki = 7.4 and 7.0 nM, respectively) compared with the reference drug acetazolamide (AAZ) (Ki = 25 nM), and compound 14l showed higher potency (Ki = 4.67 nM) than AAZ (Ki = 5.7 nM) against the tumor-associated isoform CA XII. Evaluation of the antiproliferative activity in NCI single-dose testing of selected hybrids revealed a pronounced potency of the selective CA II inhibitor 14h against most of the tested NCI cancer cell lines. Moreover, compound 14h demonstrated an IC50 values ranging from 2.40 to 4.50 mM against MCF-7, T-47D, MDA-MB-231, HCT-116, HT29 and SW-620. These results demonstrate that CA II inhibition can be an alternative therapeutic target for cancer treatment. A cell cycle analysis of MCF-7 and MDA-MB-231 showed that treatment with 14h arrested both cell lines at the G2/M phase with significant accumulation of cells in the pre-G1 phase. Moreover, compound 14h showed a noticeable induction of late apoptosis and necrotic cell death of both cell lines compared with untreated cells as a control. A molecular docking study suggested that the sulfonamide moiety accommodates deeply in the CA active site and interacts with the Zn2 ion while the dual-tail extension interacts with the surrounding amino acids via several hydrophilic and hydrophobic interactions, which affects the potency and selectivity of the hybrids.



No.	Publication	IF	Citations
13.	Iman A. Y. Ghannam, **Ahmed M. El Kerdawy**, Marwa M. Mounier, Mahmoud T. Abo-elfadl, Islam H. Ali Novel 2-oxo-2-phenylethoxy and benzyloxy diaryl urea hybrids as VEGFR-2 inhibitors: Design, synthesis, and anticancer evaluation *Arch Pharm (Weinheim),* e2200341 (**2022**) **DOI:** 10.1002/ardp.202200341	4.613	0

Abstract

Two series of diaryl urea derivatives, 6a–k and 7a–n, were synthesized. All the newly synthesized compounds were tested against the NCI (US) cancer cell lines via SRB assay. The p-chloro-m-trifluoromethyl phenyl derivatives 6e–g and 7e–g showed the most potent cytotoxic activity with a GI50 value range of 1.2–15.9 µM. Furthermore, the p-fluorobenzyloxy diaryl urea derivative 7g revealed the most potent cytotoxicity against eight cancer cell lines in the MTT assay with IC50 values below 5 µM. Compounds 6a–k and 7a–n were tested for their vascular endothelial growth factor receptor-2 (VEGFR-2) kinase inhibitory activities. The p-chloro-mtrifluoromethyl diaryl urea benzyloxy derivatives 7e–i and the p-methoxydiaryl urea benzyloxy derivatives 7k, 7l, and 7n were found to be the most active compounds as VEGFR-2 inhibitors in the benzyloxy series 7, with an IC50 range of 0.09–4.15 µM. In the 2-oxo-2-phenylethoxy series 6, compounds 6e–g and 6i were reported with IC50 values of 0.94, 0.54, 2.71, and 4.81 µM, respectively. Moreover, compounds 7e and 7g induced apoptosis, causing cell cycle arrest in the G2/M phase. In addition, 7g showed an antimigratory effect in A-375 cells and inhibited the VEGFR-2 expression in an immunohistofluorescence study. Molecular docking simulations on VEGFR-2 as well as ADME properties prediction were also performed.

No.	Publication	IF	Citations
14.	Heba T. Abdel-Mohsen, **Ahmed M. El Kerdawy**, Andrea Petreni, Claudiu T. Supuran Novel benzenesulfonamide-thiouracil conjugates with a flexible N-ethyl acetamide linker as selective CA IX and CA XII inhibitors Arch Pharm (Weinheim). 2022, **e2200434.** DOI: 10.1002/ardp.202200434	4.613	0

Abstract

Novel benzenesulfonamide derivatives linked to diverse functionalized thiouracils through a flexible N-ethyl acetamide linker were designed and synthesized as carbonic anhydrase (CA) inhibitors. The synthesized candidates demonstrated a potent inhibitory activity against four different CA isoforms in the nanomolar range. Compound 10d showed more than twofold higher potency than the reference AAZ against CA II with Ki of 5.65 and 12 nM, respectively. Moreover, compounds 10d and 20 revealed potent activity against CA IX with Ki of 18.1 and 14.2 nM, respectively. In addition, 10c, 10d, 11b, 11c, and 20 demonstrated high potency against the CA XII isozyme with a Ki range of 4.18–4.8 nM. Most of the synthesized derivatives displayed preferential selectivity toward the CA IX and CA XII isoforms over CA I and CA II. Compounds 11a and 20 exhibited favorable selectivity toward CA IX over CA II with a selectivity index (SI) of 14.36 and 16.62, respectively, and toward CA XII over CA II with SI of 71.01 and 51.19, respectively. Molecular docking simulations showed that the synthesized conjugates adopted comparable binding modes in the CA I, CA II, CA IX, and CA XII isoforms, involving the deep fitting of the sulfonamide moiety in the base of the CA active site via chelation of the Zn2+ ion and H-bond interaction with the key amino acids Thr199 and/or Thr200. Moreover, the N-ethyl acetamide flexible linker enables the substituted thiouracils and fused thiouracil tail to achieve multiple interactions with the surrounding hydrophobic and hydrophilic regions.

No.	Publication	IF	Citations
15.	Wagdy M. Eldehna, Raed M. Maklad, Hadia Almahli, Tarfah Al-Warhi, Eslam B. Elkaeed, Mohammed A. S. Abourehab, Hatem A. Abdel-Aziz and **Ahmed M. El Kerdawy.** Identification of 3-(piperazinylmethyl) benzofuran derivatives as novel type II CDK2 inhibitors: design, synthesis, biological evaluation, and in silico insights. *J Enz. Inhib. Med. Chem.* 37(1), 1227–1240 **(2022).** DOI: 10.1080/14756366.2022.2062337.	5.756	5

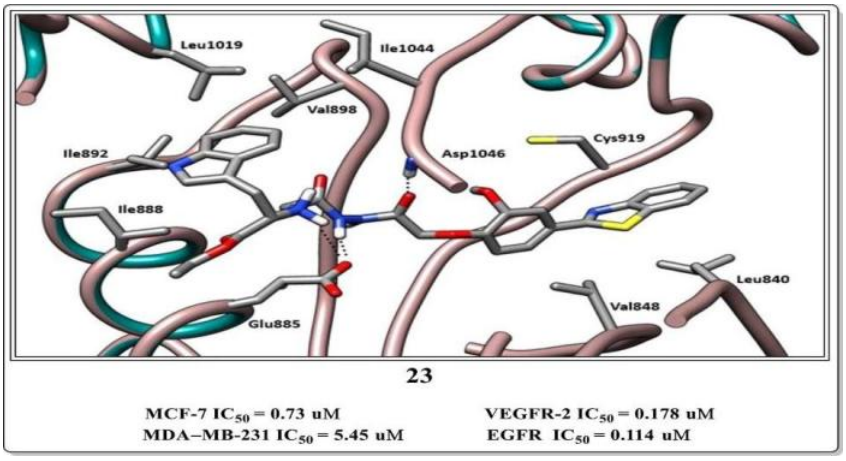
Abstract

In the current work, a hybridisation strategy was adopted between the privileged building blocks, benzofuran and piperazine, with the aim of designing novel CDK2 type II inhibitors. The hybrid structures were linked to different aromatic semicarbazide, thiosemicarbazide, or acylhydrazone tails to anchor the designed inhibitors onto the CDK2 kinase domain. The designed compounds showed promising CDK2 inhibitory activity. Compounds 9h, 11d, 11e and 13c showed potent inhibitory activity (IC50 of 40.91, 41.70, 46.88, and 52.63 nM, respectively) compared to staurosporine (IC50 of 56.76 nM). Moreover, benzofurans 9e, 9h, 11d, and 13b showed promising antiproliferative activities towards different cancer cell lines, and non-significant cytotoxicity on normal lung fibroblasts MRC-5 cell line. Furthermore, a cell cycle analysis as well as Annexin V-FITC apoptosis assay on Panc-1 cell line were performed. Molecular docking simulations were performed to explore the ability of target benzofurans to adopt the common binding pattern of CDK2 type II inhibitors.

No.	Publication	IF	Citations
16.	Eman A. Abd El-Meguid, Ahmed M. Naglah, Gaber O. Moustafa, Hanem M. Awad, **Ahmed M. El Kerdawy** Novel benzothiazole-based dual VEGFR-2/EGFR inhibitors targeting breast and liver cancers: Synthesis, cytotoxic activity, QSAR and molecular docking studies *Bioorg. Med.l Chem. Lett.* **58, 128529 (2022).** **DOI:** 10.1016/j.bmcl.2022.128529.	2.940	4

Abstract

A novel series of benzothiazole-based derivatives linked to various amino acids and their corresponding ethyl ester analogues were prepared and were initially evaluated for their anticancer activity againstMCF-7 and HepG- 2 and were further assessed as VEGFR-2 inhibitors. All the newly synthesized benzothiazole derivatives showed promising cytotoxic activities against the tested cell lines. Derivatives exhibited potent cytotoxic and VEGFR-2 inhibitory activities were then evaluated further as anticancer agents against the resistant MDA-MB-231 and as EGFR inhibitors. The carboxylic acid derivatives 10–12 and their ester analogues 21–23 displayed the highest anticancer activities with IC50 of 0.73–0.89 µM, against MCF-7 and IC50 of 2.54–2.80 µM, against HepG-2; compared to doxorubicin (IC50 = 1.13 and 2.75 µM, respectively); also they showed safety towards the normal cell line, the ethyl ester derivatives 21–23 showed a potent activity against the resistant MDA-MB-231 cell line with IC50 of 5.45–7.28 µM, relative to doxorubicin (IC50 = 7.46 µM) surpassing their carboxylic acid analogues 10–12 (IC50 of 8.88–11.02 µM). Furthermore, the promising derivatives 10–12 and 21–23 displayed promising VEGFR-2 inhibitory activity (IC50 = 0.15–0.19 µM) comparable to that of sorafenib (IC50 = 0.12 µM). Against EGFR, the ethyl ester derivatives 21–23 showed superior inhibitory activity relative to the used reference standard, erlotinib, with IC50 of 0.11–0.16 vs. 0.18 µM, respectively. The QSAR study revealed that the molecular bulkiness and molecular partial charge distribution govern the kinase inhibition potency in this series. Furthermore, the molecular docking study in VEGFR-2 active site showed that the novel synthesized benzothiazole derivatives adopted the common binding pattern of type II PK inhibitors.



No.	Publication	IF	Citations
17.	El Gizawy HA, El-Haddad AE, **Saadeldeen AM**, Boshra SA. Tentatively Identified (UPLC/T-TOF-MS/MS) Compounds in the Extract of Saussurea costus Roots Exhibit In Vivo Hepatoprotection via Modulation of HNF-1α, Sirtuin-1, C/ebpα, miRNA-34a and miRNA-223. *Molecules,* 28;27(9):2802 (**2022**). **DOI:** 10.3390/molecules27092802.	4.927	3

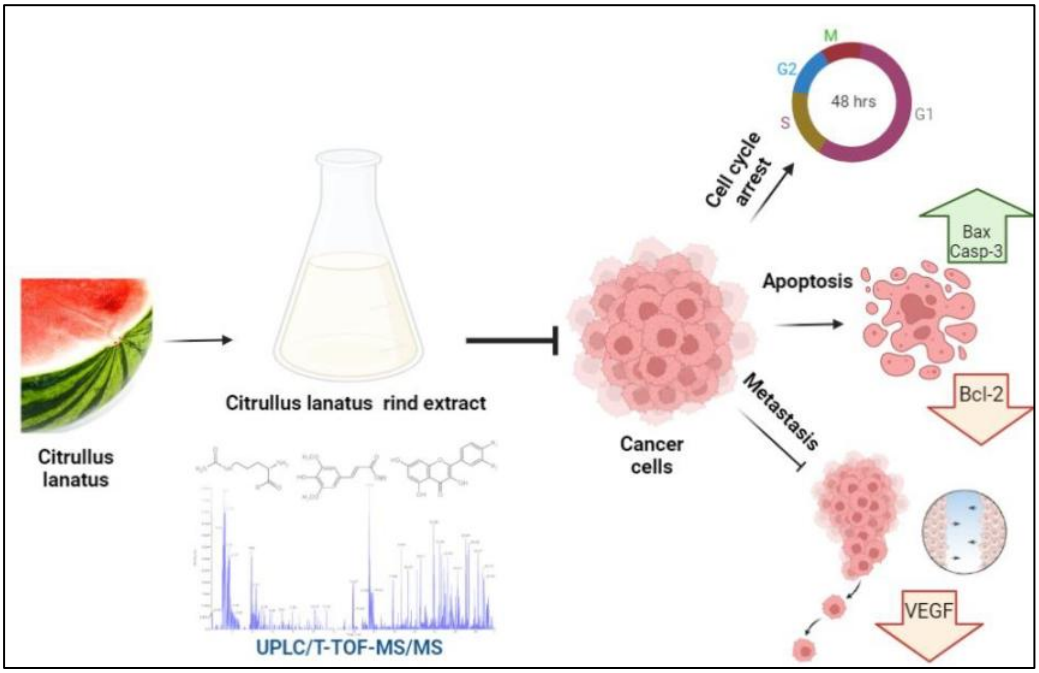
Abstract

Saussurea costus is a plant traditionally used for the treatment of several ailments. Our study accomplished the UPLC/T-TOF–MS/MS analysis of a methanol extract of Saussurea costus roots (MESC), in addition to lipoidal matter determination and assessment of its in vivo hepatoprotective activity. In this study, we were able to identify the major metabolites in MESC rather than the previously known isolated compounds, improving our knowledge of its chemical constituents. The flavones apigenin, acacetin, baicalein, luteolin, and diosmetin, and the flavonol aglycones quercetin, kaempferol, isorhamnetin, gossypetin, and myricetin and/or their glycosides and glucuronic derivatives were the major identified compounds. The hepatoprotective activity of MESC was evaluated by measuring catalase activity using UV spectrophotometry, inflammatory cytokines and apoptotic markers using ELISA techniques, and genetic markers using PCR. Paracetamol toxicity caused a significant increase in plasma caspase 2, cytokeratin 18 (CK18), liver tumor necrosis factor-α (TNF-α), interleukin 6 (IL-6), miRNA-34a, and miRNA-223, as well as a significant decrease in liver catalase (CAT) activity and in the levels of liver nuclear factor 1α (HNF-1α), sirtuin-1, and C/ebpα. Oral pretreatment with MESC (200 mg/kg) showed a significant decrease in caspase 2, CK18, TNF-α, IL-6 and a significant increase in liver CAT activity. MESC decreased the levels of liver miRNA-34a and miRNA-223 and induced HNF-1α, sirtuin-1, and C/ebpα gene expression. The histological examination showed a significant normalization in rats pretreated with MESC. Our findings showed that Saussurea costus may exert a potent hepatoprotective activity through the modulation of the expression of cellular cytokines, miRNA-34a, and miRNA-223.

No.	Publication	IF	Citations
18.	El Gizawy HA, El-Haddad AE, Attia YM, **Fahim SA**, Zafer MM, **Saadeldeen AM**. In Vitro Cytotoxic Activity and Phytochemical Characterization (UPLC/T-TOF-MS/MS) of the Watermelon (Citrullus lanatus) Rind Extract. *Molecules*. 12;27(8):2480 **(2022).** **DOI:** 10.3390/molecules27082480.	4.927	0

Abstract

Reusing food waste is becoming popular in pharmaceutical industries. Watermelon (Citrullus lanatus) rind is commonly discarded as a major solid waste. Here, the in vitro cytotoxic potential of watermelon rind extracts was screened against a panel of human cancer cell lines. Cell cycle analysis was used to determine the induction of cell death, whereas annexin V-FITC binding, caspase-3, BAX, and BCL-2 mRNA expression levels were used to determine the degree of apoptosis. VEGF-promoting angiogenesis and cell migration were also evaluated. Moreover, the identification of phytoconstituents in the rind extract was achieved using UPLC/T-TOF-MS/MS, and a total of 45 bioactive compounds were detected, including phenolic acids, flavonoids aglycones, and their glycoside derivatives. The tested watermelon rind extracts suppressed cell proliferation in seven cancer cell lines in a concentration-dependent manner. The cytotoxicity of the rind aqueous extract (RAE) was higher compared with that of the other extracts. In addition to a substantial inhibitory effect on cell migration, the RAE triggered apoptosis in HCT116 and Hep2 cells by driving the accumulation of cells in the S phase and elevating the activity of caspase-3 and the BAX/BCL-2 ratio. Thus, a complete phytochemical and cytotoxic investigation of the Citrullus lanatus rind extract may identify its potential potency as an anticancer agent.



No.	Publication	IF	Citations
19.	Khalifa M, **Abdelsalam RM**, Safar MM, Zaki HF. Phosphodiesterase (PDE) III inhibitor, Cilostazol, improved memory impairment in aluminum chloride-treated rats: modulation of cAMP/CREB pathway. Inflammopharmacology. (**2022**). Online ahead of print **DOI**: 10.1007/s10787-022-01010-1.	5.093	0

Abstract

The most prevalent type of dementia is Alzheimer's disease (AD), which is currently incurable. Existing treatments for Alzheimer's disease, such as acetylcholinesterase inhibitors, are only effective for symptom relief. Disease-modifying medications for Alzheimer's disease are desperately required, given the enormous burdens that the disease places on individuals and communities. Phosphodiesterase (PDE) inhibitors are gaining a lot of attention in the research community because of their potential in treating age-related cognitive decline. Cilostazol is a selective PDE III inhibitor used as antiplatelet agent through cAMP response element-binding (CREB) protein phosphorylation pathway (cAMP/CREB). The neuroprotective effect of cilostazol in AD-like cognitive decline in rats was investigated in this study. After 2 months of intraperitoneal administration of 10 mg/kg aluminum chloride, Morris water maze and Y-maze (behavioral tests) were performed. After that, histological and biochemical examinations of the hippocampal region were carried out. Aluminum chloride-treated rats showed histological, biochemical, and behavioral changes similar to Alzheimer's disease. Cilostazol improved rats' behavioral and histological conditions, raised neprilysin level while reduced levels of amyloid-beta protein and phosphorylated tau protein. It also decreased the hippocampal levels of tumor necrosis factor-alpha, nuclear factor-kappa B, FAS ligand, acetylcholinesterase content, and malondialdehyde. These outcomes demonstrate the protective activity of cilostazol versus aluminum-induced memory impairment.

No.	Publication	IF	Citations
20.	**Saad MA, Eissa NM**, Ahmed MA, ElMeshad AN, Laible G, **Attia AS**, Al-Ghobashy MA, **Abdelsalam RM**, Al-Shorbagy MY. Nanoformulated Recombinant Human Myelin Basic Protein and Rituximab Modulate Neuronal Perturbations in Experimental Autoimmune Encephalomyelitis in Mice. Int J Nanomedicine. 7;17:3967-3987.(**2022**) **DOI:**10.1016/j.biopha.2021.111494.	7.033	0

Abstract

Introduction: Rituximab (RTX) and recombinant human myelin basic protein (rhMBP) were proven to be effective in ameliorating the symptoms of multiple sclerosis (MS). In this study, a nanoformulation containing rhMBP with RTX on its surface (Nano-rhMBP-RTX) was prepared and investigated in comparison with other treatment groups to determine its potential neuro-protective effects on C57BL/6 mice after inducing experimental autoimmune encephalomyelitis (EAE).

Methods: EAE was induced in the corresponding mice by injecting 100 µL of an emulsion containing complete Freund's adjuvant (CFA) and myelin oligodendrocyte glycoprotein (MOG). The subjects were weighed, scored and subjected to behavioural tests. After reaching a clinical score of 3, various treatments were given to corresponding EAE-induced and non-induced groups including rhMBP, RTX, empty nanoparticle prepared by poly (lactide-co-glycolide) (PLGA) or the prepared nanoformulation (Nano-rhMBP-RTX). At the end of the study, biochemical parameters were also determined as interferon-γ (IFN-γ), myeloperoxidase (MPO), interleukin-10 (IL-10), interleukin-4 (IL-4), tumor necrosis factor alpha (TNF-α), nuclear factor kappa B (NF-kB), brain derived neurotrophic factor (BDNF), 2', 3' cyclic nucleotide 3' phosphodiesterase (CNP) and transforming growth factor beta (TGF-β) along with some histopathological analyses.

Results: The results of the Nano-rhMBP-RTX group showed promising outcomes in terms of reducing the clinical scores, improving the behavioural responses associated with improved histopathological findings. Elevation in the levels of IL-4, CNP and TGF-β was also noticed along with marked decline in the levels of NF-kB and TNF-α.

Conclusion: Nano-rhMBP-RTX treated group ameliorated the adverse effects induced in the EAE model. The effectiveness of this formulation was demonstrated by the normalization of EAE-induced behavioral changes and aberrant levels of specific biochemical markers as well as reduced damage of hippocampal tissues and retaining higher levels of myelination.

No.	Publication	IF	Citations
21.	Hussien YA, Mansour DF, Nada SA, Abd El-Rahman SS, **Abdelsalam RM**, Attia AS, El-Tanbouly DM. Linagliptin attenuates thioacetamide-induced hepatic encephalopathy in rats: Modulation of C/EBP-β and CX3CL1/Fractalkine, neuro-inflammation, oxidative stress and behavioral defects. Life Sci., 15;295:120378.(**2022**) **DOI**: 10.1016/j.lfs.2022.120378	6.780	1

Abstract

The degree of neuroinflammation is correlated mainly with cognitive and motor dysfunctions associated with hepatic encephalopathy (HE). The current study was conducted to explore the possible protective potential of the antidiabetic drug; linagliptin (LNG; 10 or 20 mg/kg) against HE induced by thioacetamide (TAA) in rats. Animals received two consecutive intraperitoneal injections of TAA (200 mg/kg) on alternate days. Neurobehavioral tests were performed 24 h after the last injection, and rats were sacrificed 24 h later (48 h). The higher LNG dose more effectively protected against TAA-induced changes. Administration of LNG for 15 days before TAA notably mitigated TAA-induced acute liver injury and HE, as verified by the marked improvement in motor coordination, locomotor activity, and cognition function. LNG maintained both brain and liver weight indices and retracted the hyperammonemia with a prominent suppression in liver transaminases. This was accompanied by an evident modulation of hepatic and hippocampal oxidative stress markers; GSH and MDA. LNG attenuated both liver and hippocampal pro-inflammatory cytokine; IL-1β while augmented the anti-inflammatory one; IL-10. It noticeably reduced hepatic and hippocampal COX-2 and TNF-α and maintained hepatic and brain architectures. It also induced a marked decrease in the inflammation-regulated transcription factor, C/EBP-β, with a profound increase in hippocampi's anti-inflammatory chemokine, CX3CL1/Fractalkine. LNG modulated TAA-induced disturbances in hippocampal amino acids; glutamate, and GABA with a significant increase in hippocampal BDNF. In conclusion, the regulatory effect of LNG on neuroinflammatory signaling underlines its neuroprotective effect against progressive encephalopathy accompanying acute liver injury.

No.	Publication	IF	Citations
23.	El-Safty H, Ismail A, **Abdelsalam RM**, El-Sahar AE, Saad MA. Dapagliflozin diminishes memory and cognition impairment in Streptozotocin induced diabetes through its effect on Wnt/β-Catenin and CREB pathway. Brain Res Bull.,181:109-120 (**2022**) **DOI:** 10.1016/j.brainresbull.2022.01.017.	3.715	2

Abstract

Diabetic neuropathy is a chronic condition that affects a significant number of individuals with diabetes. Streptozotocin injection intraperitoneally to rodents produces pancreatic islet β-cell destruction causing hyperglycemia, which affect the brain leading to memory and cognition impairment. Dapagliflozin may be able to reverse beta-cell injury and alleviate this impairment. This effect may be via neuroprotective effect or possible involvement of the antioxidant, and anti-apoptotic properties. Forty rats were divided into four groups as follows: The normal control group, STZ-induced diabetes group, STZ-induced diabetic rats followed by treatment with oral dapagliflozin group and normal rats treated with oral dapagliflozin. Behavioral tests (Object location memory task and Morris water maze) were performed. Serum biomarkers (blood glucose and insulin) were measured and then the homeostatic model assessment for insulin resistance (HOMA-IR) was calculated. In the hippocampus the followings were determined; calmodulin, ca-calmodulin kinase **IV** (CaMKIV), protein kinase A (PKA) and cAMP-responsive element-binding protein to determine the transcription factor CREB and its signaling pathway also Wnt signaling pathway and related parameters (WnT, B-catenin, lymphoid enhancer binding factor LEF, glycogen synthase kinase 3β). Moreover, nuclear receptor-related protein-1, acetylcholine and its hydrolyzing enzyme acetylcholine esterase, oxidative stress parameter malondialdehyde (MDA) and apoptotic parameter caspase-3 were determined. STZ was able to cause destruction to pancreatic β-cells which was reflected on glucose levels causing diabetes. Diabetic neuropathy was clear in the rats performing the behavioral tests. Memory and cognition parameters in the hippocampus were negatively affected. Oxidative stress and apoptotic parameter were elevated while the electrical activity was declined. Dapagliflozin was able to reverse the previously mentioned parameters and behavior. Thus, to say dapagliflozin significantly showed neuroprotective action along with antioxidant, and anti-apoptotic properties.

No.	Publication	IF	Citations
24.	El-Shamarka ME, El-Sahar AE, **Saad MA**, Assaf N, Sayed RH. Inosine attenuates 3-nitropropionic acid-induced Huntington's disease-like symptoms in rats via the activation of the A2AR/BDNF/TrKB/ERK/CREB signaling pathway. Life Sci. 2022, 1;300:120569.(**2022**) **DOI**: 10.1016/j.lfs.2022.120569.	6.780	3

Abstract

Huntington's disease (HD) is an autosomal dominant inherited neurodegenerative disease characterized by involuntary bizarre movements, psychiatric symptoms, dementia, and early death. Several studies suggested neuroprotective activities of inosine; however its role in HD is yet to be elucidated. The current study aimed to demonstrate the neuroprotective effect of inosine in 3-nitropropionic acid (3-NP)-induced neurotoxicity in rats while investigating possible underlying mechanisms. Rats were randomly divided into five groups; group 1 received i.p. injections of 1% DMSO, whereas groups 2, 3, 4, and 5 received 3-NP (10 mg/kg, i.p.) for 14 days, concomitantly with inosine (200 mg/kg., i.p.) in groups 3, 4, and 5, SCH58261, a selective adenosine 2A receptor (A2AR) antagonist, (0.05 mg/kg, i.p.) in group 4, and PD98059, an extracellular signal-regulated kinase (ERK) inhibitor, (0.3 mg/kg, i.p.) in group 5. Treatment with inosine mitigated 3-NP-induced motor abnormalities and body weight loss. Moreover, inosine boosted the striatal brain-derived neurotrophic factor (BDNF) level, p-tropomyosin receptor kinase B (TrKB), p-ERK, and p-cAMP response element-binding protein (CREB) expression, which subsequently suppressed oxidative stress biomarkers (malondialdehyde and nitric oxide) and pro-inflammatory cytokines (tumor necrosis factor alpha and interleukin-1β) and replenished the glutathione content. Similarly, histopathological analyses revealed decreased striatal injury score, the expression of the glial fibrillary acidic protein, and neuronal loss after inosine treatment. These effects were attenuated by the pre-administration of SCH58261 or PD98059. In conclusion, inosine attenuated 3-NP-induced HD-like symptoms in rats, at least in part, via the activation of the A2AR/BDNF/TrKB/ERK/CREB signaling pathway.

No.	Publication	IF	Citations
25.	El-Ghannam MS, **Saad MA**, Nassar NN, El-Yamany MF, El-Bahy AAZ. Linagliptin ameliorates acetic acid-induced colitis via modulating AMPK/SIRT1/PGC-1α and JAK2/STAT3 signaling pathway in rats. Toxicol Appl Pharmacol., 1;438:115906. (**2022**) **DOI:** 10.1016/j.taap.2022.115906	4.460	3

Abstract

Ulcerative colitis is a chronic inflammatory disease, profoundly affecting the patient's quality of life and is associated with various complications. Linagliptin, a potent DPP- IV inhibitor, shows favorable anti-inflammatory effects in several animal model pathologies. To this end, the present study aimed to investigate the anti-inflammatory effect of linagliptin in a rat model of acetic acid-induced colitis. Moreover, the molecular mechanisms behind this effect were addressed. Accordingly, colitis was established by the administration of a 2 ml 6% acetic acid intrarectally and treatment with linagliptin (5 mg/kg) started 24 h after colitis induction and continued for 7 days. On one hand, the DPP-IV inhibitor alleviated the severity of colitis as evidenced by a decrease of disease activity index (DAI) scores, colon weight/length ratio, macroscopic damage, and histopathological deteriorations. Additionally, linagliptin diminished colon inflammation via attenuation of TNF-α, IL-6, and NF-κB p65 besides restoration of anti-inflammatory cytokine IL-10. On the other hand, linagliptin increased levels of p-AMPK, SIRT1, and PGC-1α while abolishing the increment in p-JAK2 and p-STAT3. In parallel linagliptin reduced mTOR levels and upregulated expression levels of SHP and MKP-1 which is postulated to mediate AMPK-driven JAK2/STAT3 inhibition. Based on these findings, linagliptin showed promising anti-inflammatory activity against acetic acid-induced colitis that is mainly attributed to the activation of the AMPK-SIRT1-PGC-1α pathway as well as suppression of the JAK2/STAT3 signaling pathway that might be partly mediated through AMPK activation.

No.	Publication	IF	Citations
26.	**Saad MA**, Al-Shorbagy MY, Arab HH. Targeting the TLR4/NF-κB Axis and NLRP1/3 Inflammasomes by Rosuvastatin: A Role in Impeding Ovariectomy-Induced Cognitive Decline Neuropathology in Rats. Mol Neurobiol., 59(7):4562-4577(**2022**). **DOI:** 10.1007/s12035-022-02852-0.	5.686	1

Abstract

Postmenopausal hormone-related cognitive decline has gained an immense interest to explore the underlying mechanisms and potential therapies. The current work aimed to study the possible beneficial effect of rosuvastatin (ROS) on the cognitive decline induced by ovariectomy in rats. Four groups were used as follows: control group, control + rosuvastatin, ovariectomy, and ovariectomy + rosuvastatin. After sham operation or ovariectomy, rats were given saline or oral dosages of ROS (2 mg/kg) every day for 30 days. The cognitive functions were assessed using the Morris water maze paradigm, Y-maze test, and new object recognition test. After rat killing, TLR4, caspase-8, and NLRP mRNA expression and protein levels of ASC, AIM2, caspase-1, NLRP1, and PKR were measured in hippocampus. This was complemented by the estimation of tissue content of NF-κB, IL-1β, and IL-18 and serum lipid profile quantification. Rosuvastatin showed a promising potential for halting the cognitive impairments induced by estrogen decline through interfering with the TLR4/NF-κB/NLRP1/3 axis and inflammasomes activation and the subsequent pyroptosis. This was complemented by the amendment in the deranged lipid profile. Rosuvastatin may exert a beneficial role in attenuating the inflammatory and apoptotic signaling mechanisms associated with postmenopausal cognitive decline. Further investigations are needed to unveil the relationship between deranged plasma lipids and cognitive function.

No.	Publication	IF	Citations
27.	Al-Madhagy SA, Gad SS, Mostafa ES, Angeloni S, **Saad MA**, Sabry OM, Caprioli G, El-Hawary SS. A new arsenal of polyphenols to make Parkinson's disease extinct: HPLC-MS/MS profiling, very interesting MAO-B inhibitory activity and antioxidant activity of Otostegia fruticosa. Nat Prod Res., 22:1-6.(2022) **DOI:** 10.1080/14786419.2022.204481	2.488	1

Abstract

Fifteen compounds belong to phenolic acids, derivatives of phenolic acids, iridoids, xanthones and flavonoids were characterized in the methanolic extract of Otostegia fruticosa leaves using HPLC-MS/MS. Extract has been also investigated for its MAO-B inhibitory activity, antioxidant activity, total phenolic and total flavonoid content. The extract exhibited interesting MAO-B inhibitory activity (IC50; 2.24 ± 0.08) compared to the reference compound selegiline (0.55 ± 0.02 µg/mL). It also showed a potent antioxidant activity proven in both DPPH and ORAC assay methods. The extract showed an IC50 of 3.64 ± 1.22 µg/mL in the DPPH test which was significantly lower than that of the standard ascorbic acid which attained an IC50 of 18.3 ± 1.41 µg/mL. Moreover, in the oxygen radical absorbance capacity assay (ORAC) the extract showed a decline in the IC50 to 3.48 ± 1.16 µg/mL as compared to the standard Trolox which exhibited an IC50 of 27.0 ± 13.41.

No.	Publication	IF	Citations
27.	Amina A Gamal El Din , Khaled Mahmoud , Rabab H Sayed , Yousreya A Maklad, **Ayman E El-Sahar**. Vitamin D ameliorates diethylnitrosamine-induced liver preneoplasia: A pivotal role of CYP3A4/CYP2E1 via DPP-4 enzyme inhibition. Toxicol Appl Pharmacol. 1;458:116324. (**2022**) **DOI**: 10.1016/j.taap.2022.116324	4.219	0

Abstract

Growing evidence has indicated that vitamin D (Vit D) regulates cell proliferation and differentiation in cancer cells. Accordingly, the present study was conducted to investigate the possible beneficial effects of Vit D on diethylnitrosamine (DEN)-induced liver preneoplasia. The effect of Vit D on HepG2 cells was investigated using MTT assay. Additionally, liver preneoplasia was induced in Swiss male albino mice by giving overnight fasted animals 5 consecutive doses of DEN (75 mg/kg/week). Oral treatment with Vit D (200 IU/kg/day) was initiated either 2 weeks before DEN (first protocol) or 1 week after the first dose of DEN injection (second protocol). At the end of the experiment, tissue levels of GGT, DPP-4, TNF-α, IL-6, CYP2E1, and CYP3A4 were also estimated. Moreover, the histopathological study of liver tissue and immunohistochemical detection of GST-P, PCNA, and NF-κB were performed. Vit D exerted a significant cytotoxic effect on HepG2 cells via significantly increasing BAX, p53, and BAX/Bcl2 ratio, and significantly decreasing Bcl2 mRNA expression. In both in vivo protocols, Vit D was capable of normalizing relative liver weight, PCNA, altered hepatocellular foci, and ductular proliferation. Moreover, Vit D significantly reduced the DEN-induced elevation of AST, ALT, ALP, GGT, DDP-4, TNF-α, IL-6, CYP2E1, liver DNA damage, GST-P, NF-κB, nuclear hyperchromasia/pleomorphism, cholestasis, and inflammatory cell aggregates, but significantly increased CYP3A4 content. In conculsion, current results reflect the potential impact of Vit D in the management of early stages of liver cancer.

No.	Publication	IF	Citations
28.	Elsebaie MM, Nour El-Din HT, Abutaleb NS, Abuelkhir AA, Liang HW, **Attia AS**, Seleem MN, Mayhoub AS. Exploring the structure-activity relationships of diphenylurea as an antibacterial scaffold active against methicillin- and vancomycin-resistant Staphylococcus aureus. Eur J Med Chem., 15;234:114204 (**2022**). **DOI**: 10.1016/j.ejmech.2022.114204.	7.088	3

Abstract

A set of structurally related diphenylurea derivatives bearing aminoguanidine moiety were synthesized, and their antibacterial activity was assessed against a panel of multi-drug resistant Gram-positive clinical isolates. Two compounds 6 and 24 were identified with better bacteriological profile than the lead compound I. The multi-step resistance development studies indicated that MRSA are less likely to develop resistance toward diphenylurea compounds. Moreover, these compounds demonstrated a prolonged post-antibiotic effect than that of vancomycin. Furthermore, compounds 6 and 24 were able to re-sensitize VRSA to vancomycin, resulting in 8- to more than 32-fold improvement in vancomycin MIC values against clinical VRSA isolates. Finally, when assessed in an in vivo skin infection mouse model, the efficacy of compound 24 was very comparable to that of the commercially available fusidic acid ointment. Additionally, the diphenylurea 24 did not have a pronounced effect on the animal weights along the experiment indicating its safety and tolerability to mice. Taken together, these results indicate that the diphenylurea scaffold merits further investigation as a promising anti-staphylococcal treatment option.

No.	Publication	IF	Citations
29.	Nour El-Din HT, Elsebaie MMn Abutaleb NS, Kotb AM, **Attia AS**, Seleem MN, Mayhoub AS. Expanding the Structure-Activity Relationships of Alkynyl Diphenylurea Scaffold as Promising Antibacterial Agents. RSC Med. Chem., Online ahead of print (2022). DOI:org/10.1039/D2MD00351A	3.470	0

Abstract

With the continuous and alarming threat of exhausting the current antimicrobial arsenals, efforts are urgently needed to develop new effective ones. In this work, the antibacterial efficacy of a set of structurally related acetylenic-diphenylurea derivatives carrying the aminoguanidine moiety was tested against a panel of multidrug-resistant Gram-positive clinical isolates. Compound 18 was identified with a superior bacteriological profile than the lead compound I. The compound demonstrated excellent antibacterial profile in vitro; low MIC values, extended post-antibiotic effect, refractory ability to resistance development upon extended repeated exposure, and high tolerability towards mammalian cells. Finally, when assessed in a MRSA skin infection animal model, compound 18 showed considerable healing and less inflammation, decrease in the bacterial loads in skin lesions, and it surpassed fusidic acid in controlling the systemic dissemination of S. aureus. Collectively, compound 18 represents a promising lead anti-MRSA agent that merits further investigation for development of new anti-staphylococcal therapeutics.

No.	Publication	IF	Citations
30.	Ibrahim S, Fahim SA, Tadros SA, Badary OA. Suppressive effects of thymoquinone on the initiation stage of diethylnitrosamine hepatocarcinogenesis in rats. IJ Biochem Mol Toxicol. Aug;36(8):e23078. (2022) DOI: 10.1002/jbt.23078	3.642	2

Abstract

Hepatocellular carcinoma (HCC) is the fourth leading cause of cancer-related death globally. Chemoprevention is the most effective technique for reducing HCC incidence. Thymoquinone (TQ), the main bioactive constituent of Nigella sativa, exhibits anti-inflammatory and antineoplastic activities against various cancers. Therefore, TQ was tested as an inhibitor of the initial phase of diethylnitrosamine (DEN)-induced HCC in rats. Twenty-four male Wistar albino rats were randomly placed into four equal groups. Group 1 received saline and acted as the negative control; Group 2 received TQ; Group 3 received DEN; and Group 4 received TQ for 7 days and DEN on the 8th day. After 24 h of fasting, blood samples were taken from the slaughtered rats. Additionally, each rat's liver was dissected and separated into two halves for histological and biochemical investigation. DEN-induced hepatotoxicity was detected by elevated hepatic enzymes and HCC biomarkers reduced antioxidant and proapoptotic statuses. DEN administration caused a significant increase in the levels of glutathione, superoxide dismutase, malondialdehyde, caspase-3, alpha-fetoprotein (AFP), AFPL3, glypican 3, and the expression of BAX. However, DEN significantly decreased glutathione peroxidase, catalase, and CYP2E1 and the expression of BCl-2. Furthermore, it caused histological changes and showed a strong positive GSH S-transferase P expression in the hepatic parenchyma. Pretreatment with TQ prevented the histopathological and most of the biochemical changes and improved the antioxidant status. TQ supplementation appears to suppress the development of DEN-initiated liver cancer by reducing oxidative stress, activating the intrinsic mitotic apoptosis pathway, and retaining the antioxidant enzymes.

No.	Publication	IF	Citations
31.	Motawi TMK, Sadik NAH, Sabry D, Fahim SA, Shahin NN.rs62139665 olymorphism in the Promoter Region of EpCAM Is Associated With Hepatitis C Virus-Related Hepatocellular Carcinoma Risk in Egyptians. Front Oncol. 5;11:754104. (2022) DOI: 10.3389/fonc.2021.754104.	6.24	0

Abstract

Hepatocellular carcinoma (HCC) is a universal health problem that is particularly alarming in Egypt. The major risk factor for HCC is hepatitis C virus (HCV) infection which is a main burden in Egypt. The epithelial cell adhesion molecule (EpCAM) is a stem cell marker involved in the tumorigenesis and progression of many malignancies, including HCC. We investigated the association of -935 C/G single nucleotide polymorphism in EpCAM promoter region (rs62139665) with HCC risk, EpCAM expression and overall survival in Egyptians. A total of 266 patients (128 HCV and 138 HCC cases) and 117 age- and sex-matched controls participated in this study. Genotyping, performed using allelic discrimination and confirmed by sequencing, revealed a significant association between EpCAM rs62139665 and HCC susceptibility, with higher GG genotype and G allele distribution in HCC patients than in non-HCC subjects. Such association was not detected in HCV patients compared to controls. EpCAM gene expression levels, determined in blood by RT-qPCR, and its serum protein expression levels, determined by ELISA, were significantly higher in GG relative to GC+CC genotype carriers in HCV and HCC patients in a recessive model. ROC analysis of EpCAM protein levels revealed significant discriminatory power between HCC patients and non-HCC subjects, with improved diagnostic accuracy when combining α-fetoprotein and EpCAM compared to that of α-fetoprotein alone. Altogether, EpCAM rs62139665 polymorphism is significantly associated with HCC and with EpCAM gene and protein expression levels in the Egyptian population. Moreover, serum EpCAM levels may hold promise for HCC diagnosis and for improving the diagnostic accuracy of α-fetoprotein.

No.	Publication	IF	Citations
32.	Amul M. Badr, Omayma Elkholy, Mona Said, Sally A. Fahim, Mohamed El-Khatib, Dina Sabry, Radwa M. Gaber. Diagnostic significance of hsa_circ_0000146 and hsa_circ_0000072 biomarkers for diabetic kidney disease in patients with type 2 diabetes mellitus. J Med Biochem. 42: 1–10, 2023.(**2022**) **DOI:** 10.5937/jomb0-39361.	2.20	0

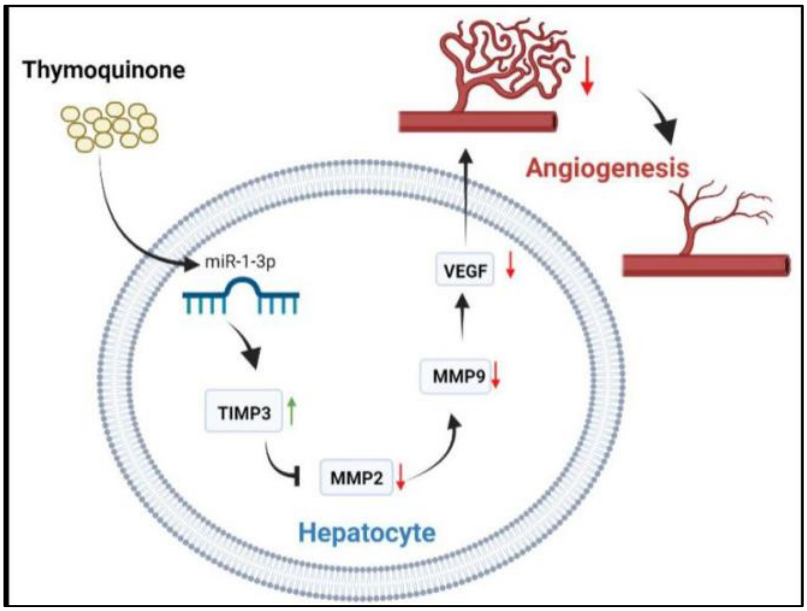
Abstract

Background: Diabetic Kidney Disease (DKD) is a significant challenge in healthcare. However, there are currently no reliable biomarkers for renal impairment diagnosis, prognosis, or staging in DKD patients. CircRNAs and microRNAs have emerged as noninvasive and efficient biomarkers. Methods: We explored Cannabinoid receptor 1 (CNR1), C reactive protein (CRP), hsa_circ_ 0000146 and 0000072, and hsa-miR-21, and 495 as diagnostic biomarkers in DKD. The serum concentrations of CRP and CNR1 were measured using ELISA. Rt-qPCR was used to evaluate the expression levels of CNR1, circRNAs, and miRNAs in 55 controls, 55 type 2 diabetes mellitus patients, and 55 DKD patients. Their diagnostic value was determined by their ROC curve. KEGG pathway was used to predict the functional mechanism of the circRNA's target genes. Results: DKD patients exhibited a significant increase in CRP and CNR1 levels, as well as the expression of miR-21 and 495. The expression levels of circ_0000146 and 0000072 decreased in DKD patients. ROC analysis revealed that circRNAs and miRNAs alone or along with CNR1 and CRP have a significant diagnostic potential. The functional prediction results showed the involvement of hsa_circ_0000146 and 0000072 in various pathways that regulates DKD. Conclusion: Therefore, the examined circRNAs and miRNAs may represent a novel noninvasive biomarker for diagnosing and staging DKD.

No.	Publication	IF	Citations
33.	Tadros SA, Attia YM, Maurice NW, Fahim SA, Abdelwahed FM, Ibrahim S, Badary OA. Thymoquinone Suppresses Angiogenesis in DEN-Induced Hepatocellular Carcinoma by Targeting miR-1-3p. Int J Mol Sci., Dec 14;23(24):15904. (2022) DOI: 10.3390/ijms232415904.	6.20	0

Abstract

Hepatocellular carcinoma (HCC) is characterized by its high vascularity and metastasis. Thymoquinone (TQ), the main bio-active constituent of Nigella sativa, has shown anticancer and hepatoprotective effects. TQ's anticancer effect is mediated through miRNA regulation. miR-1-3p plays a significant role in various cancers but its role in HCC invasiveness remains poorly understood. Bio-informatics analysis predicted that the 3'-UTR of TIMP3 is a target for miR-1-3p; Rats were equally divided into four groups: Group 1, the negative control; Group 2 received TQ; Group 3 received DEN; and Group 4 received DEN after pretreatment with TQ. The expression of TIMP3, MMP2, MMP9, and VEGF in rats' liver was determined immunohistochemically. RT-qPCR was used to measure the miR-1-3p level in rats' liver, and TIMP3, MMP2, MMP9, and VEGF in the HepG2 cells after being transfected with miR-1-3p mimic or inhibitor; In rats pretreated with TQ, a decreased expression of MMP2, MMP9 and VEGF, and increased expression levels of TIMP3 and miR-1-3p were detected. Treating the HepG2 cells with miR-1-3p mimic led to the upregulation of TIMP3 and downregulation of MMP2, MMP9, and VEGF, and showed a significant delay in wound healing; These results suggested that the anti-angiogenic effect of TQ in HCC may be mediated through the regulation of miR-1-3p.



No.	Publication	IF	Citations
34.	Mai El Halawany, Randa Latif and **Mohamed H. H. AbouGhaly**. Hemostatic Alginate/Nano-Hydroxyapatite Composite Aerogel Loaded with Tranexamic Acid or the Potential Protection against Alveolar Osteitis. Pharmaceutics,14(10), 2255 (**2022**) **DOI**: 10.3390/pharmaceutics14102255	6.525	0

Abstract

Wound control in patients on anticoagulants is challenging and often leads to poor hemostasis. They have a higher tendency to develop alveolar osteitis after tooth extraction. The application of a hemostatic dressing that has a high absorbing capacity and is loaded with an antifibrinolytic drug could help in controlling the bleeding. Alginate/nano-hydroxyapatite (SA/Nano-HA) composite aerogels loaded with tranexamic acid (TXA) were prepared. Nano-HA served as a reinforcing material for the alginate matrix and a source of calcium ions that helps in blood clotting. It influenced the porosity and the water uptake capacity. TXA release from SA/Nano-HA aerogels showed a biphasic profile for up to 4 h. Blood coagulation studies were performed on human whole blood. The TXA-loaded aerogel significantly reduced the clotting time by 69% compared to the control (p < 0.0001). Recalcification time was significantly reduced by 80% (p < 0.0001). Scanning electron microscopy analysis revealed the porous nature of the aerogels and the ability of the optimum aerogel to activate and adhere platelets to its porous surface. The cell migration assay showed that there was a delay in wound healing caused by the TXA aerogel compared to the control sample after treating human fibroblasts. Results suggest that the developed aerogel is a promising dressing that will help in hemostasis after tooth extraction.

No.	Publication	IF	Citations
35.	Hammad RW, Sanad RA, **Abdelmalak NS**, Latif R. Architecting novel multilayer nanosponges for co-administration of two drugs managing high-risk type II diabetes mellitus patients suffering from cardiovascular diseases. Int J Biol Macromol. 1;220:1429-1443 (**2022**) **DOI**: 10.1016/j.ijbiomac.2022.09.099	8.025	0

Abstract

Nanosponges are porous solid nanoparticles composed of hyper-cross-linked polymers that serve as specific micro-domains designed for the co-encapsulation of two drugs with different chemical structures. Our goal was to engineer a novel assembly of multilayer nanosponges (MLNS) based on a layer-by-layer approach. This MLNS was engineered to incorporate two drugs (linagliptin and empagliflozin) in a new drug delivery route. Linagliptin has a low oral bioavailability due to intestinal degradation and low permeability. Its pharmacokinetics shows a non-linear profile which leads to a disproportionate increase in its effectiveness with increasing the dose frequency. Empagliflozin has a low permeability and is very slightly soluble in aqueous media between pH 1-7.5. MLNS could improve their bioavailability along with resolving possible risks due to the non-linear pharmacokinetics of linagliptin and maximizing its dose efficiency. 23 factorial design was used to optimize the novel systems. MLNS (F4) was chosen as the optimal system with an average diameter of 40 nm and the highest entrapment efficiency which accounts for 92.93 % ± 2.27 and 100.94 % ± 0.55 for linagliptin and empagliflozin respectively. Förster resonance energy transfer confirmed the formation of a multilayer structure in MLNS. The optimized system was incorporated within chitosan mucoadhesive buccal films which were optimized through 22factorial design. The permeation study from optimized MLNS-film (B4) ensured an improved empagliflozin permeation along with a controlled efflux for linagliptin, resolving possible risks due to the nonlinear plasma profile. The in-vivo study of MLNS-film (B4) revealed that AUC(0-∞)of linagliptin and empagliflozin was enhanced by two-fold and ten-fold, respectively. Therefore, the nano-buccal formulation for the co-delivered hypoglycemic drugs could contribute to improved clinical efficacy in the treatment of diabetes.

No.	Publication	IF	Citations
36.	Farag MM, Louis MM, Badawy AA, NessemDI, Abdelmalak NS. Drotaverine Hydrochloride Superporous Hydrogel Hybrid System: a Gastroretentive Approach for Sustained Drug Delivery and Enhanced Viscoelasticity. AAPS PharmSciTech, 23:124 (2022) **DOI:** org/10.1208/s12249-022-02280-2	3.45	0

Abstract

This study aims to prepare drotaverine hydrochloride superporous hydrogel hybrid systems (DSHH systems) to prolong its residence time in the stomach, provide extended release and reduce its frequency of administration. Drotaverine hydrochloride (DRH) is a spasmolytic drug that suffers from brief residence due to intestinal hypermotility during diarrheal episodes associated with gastrointestinal colics resulting in low bioavailability and repeated dosing. Eight DSHH systems were prepared using gas blowing technique. The prepared DSHH systems were evaluated regarding their morphology, incorporation efficiency, density, porosity, swelling ratio, viscoelastic property, erosion percentage and release kinetics. The FH8 formula containing equal proportion of chitosan (3%) /polyvinyl alcohol (3%) as strengthener and crosslinked with tripolyphosphate showed the highest incorporation efficiency (91.83 ± 1.33%), good swelling ratio (28.32 ± 3.15% after 24 h), optimum viscoelastic properties (60.19 ± 3.82 kPa) and sustained release profile (88.03 ± 2.15% after 24 h). A bioequivalence study was done to compare the bioavailability of the candidate formula versus Spasmocure®. Statistical analysis showed significant ($P < 0.05$) increase in bioavailability 2.7 folds with doubled Tmax (4 h) compared to the marketed product (2 h). These results declared that the superporous hydrogel hybrid systems could be a potential gastroretentive approach for the sustained delivery of drugs with short residence time with enhanced viscoelasticity.

No.	Publication	IF	Citations
37.	Rodayna Atef Shalaby, Omaima El-Gazayerly, Mohammed Abdallah. Cubosomal Betamethasone-Salicylic Acid Nano Drug Delivery System for Enhanced Management of Scalp Psoriasis. Int J Nanomedicine. 13;17:1659-1677 (2022). DOI: 10.2147/IJN.S345430.	7.033	2

Abstract

Introduction: Betamethasone dipropionate (BD), a potent corticosteroid, and salicylic acid (SA), a keratolytic agent, have been used in combination to treat scalp psoriasis; however, undesirable side effects associated with their prolonged topical use are inevitable. In this study, BD and SA were loaded into cubosomes, a nanoparticulate system with outstanding biocompatibility, bio-adhesivity and penetration power. Methods: Design of experiments (DOE) was utilized to prepare thirteen different cubosomal dispersions by emulsification technique using glycerol monoolein (GMO) as a lipid phase and Poloxamer 407 (P407) as a surfactant, sodium carboxymethyl cellulose (SCMC) was added to enhance the dispersions' rheological properties. The thirteen dispersions were in-vitro characterized for their particle size, polydispersity index (PDI), zeta potential, BD and SA content and rheological behaviour. The desirability of an optimized formula (OF) was set to the smallest particle size, lowest zeta-potential and highest viscosity. The OF was in-vitro characterized for the same parameters in addition to transmission electron microscope imaging and in-vitro drug release. The OF's anti-psoriatic activity was evaluated in-vivo using an imiquimod-induced psoriasis model. Results: The OF achieved a particle size of 197.4 ± 9.47 nm, a PDI of 0.443 ± 0.025, a zeta potential of -44.4 ± 0.141mv, BD content of 105.85 ± 2.290%, SA content of 88.855 ± 2.920% with shear-thinning rheological behaviour and completed in-vitro drug release within 2-3 hours. The in-vivo studies confirmed the cubosomes' higher anti-psoriatic efficacy over the commercial product with lower changes in ear thickness, spleen to body weight ratio, psoriasis area severity index score and improved histopathological findings. Conclusion: The developed BD SA-loaded cubosomes exhibit promising anti-psoriatic activity attributed to its nano-size and unique lipid content, with enhanced skin penetration and modified rheological properties; increasing the formulation's in-contact duration with the scalp resulting in lower application frequency and thus reduced BD and SA associated side effects.

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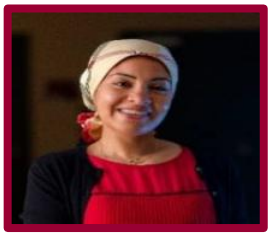




SCHOOL OF PHARMACY INTERNATIONAL PUBLICATIONS 2021

46 International publications with NGU affiliation published in 2021 with 247 citations.

No.	Publication	IF	Citations
38.	Wadhah Atef Salem, Ehab Farouk Elkady, **Marwa Ahmed Fouad**, Mohammad Abdul-Azim Mohammad. "Analysis of Metformin and Five Gliptins in Counterfeit Herbal Products: Designs of Experiment Screening and Optimization", *Journal of AOAC International*, **104(6)**, 1667–1680, (**2021**). DOI: 10.1093/jaoacint/qsab106	1.913	0

Abstract

Background: Drug counterfeiting is a rising problem due to difficulties with identifying counterfeit drugs and the lack of regulations and legislation in developing countries.

Objective: This study aims to develop a robust and economic reversed phase high performance liquid chromatography (LC) method for simultaneously determining metformin HCl, vildagliptin, saxagliptin, alogliptin benzoate, sitagliptin phosphate monohydrate, and linagliptin to target counterfeiting.

Methods: Plackett-Burman (PB) and Box-Behnken (BB) designs were used to screen and optimize the mobile phase composition. Chromatographic separation was carried out on an InertsilVR ODS-3 C18 column with isocratic elution mode and the mobile phase was a mixture of acetonitrile–methanol–ammonium formate buffer, pH 3.5 (25:10:65, v/v/v). This method was applied to analyze synthetic drugs in three traditional Chinese and Indian herbal medicines. To identify the adulterants, thin-layer chromatography (TLC), nuclear magnetic resonance (NMR), and mass spectrometry (MS) were used on counterfeit herbal medicines.

Results: The developed method is sensitive, simple, rapid, economical, accurate, and highly robust. Student's t-test and variance ratio (F-test at $P < 0.05$) were used to compare the results statistically with the reference methods.

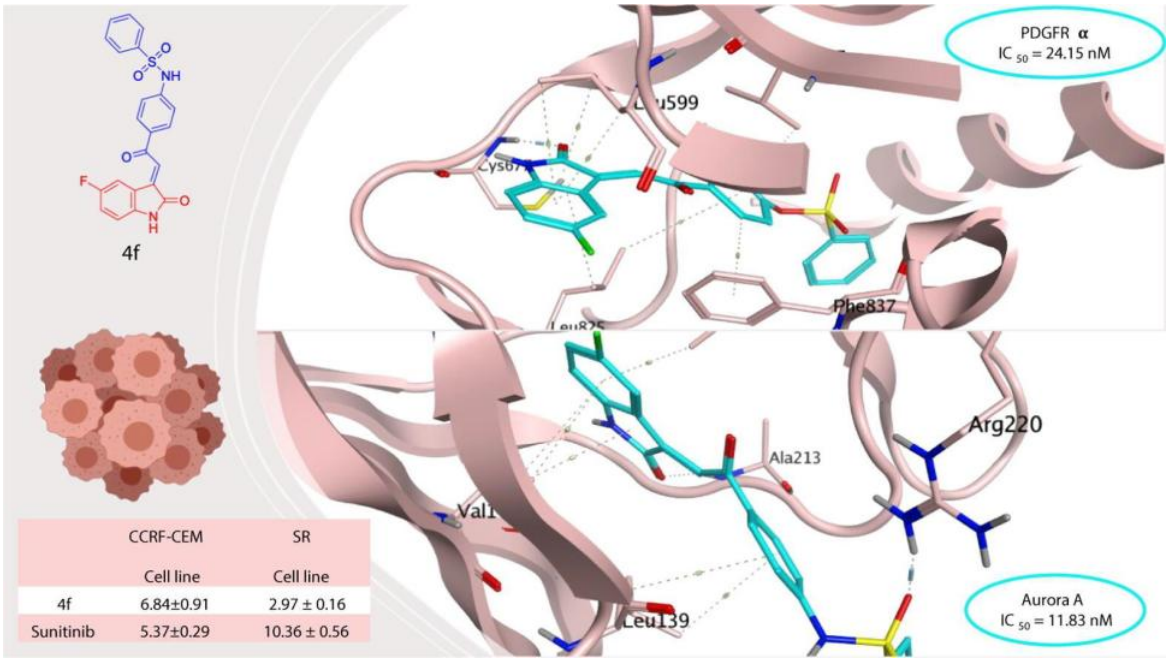
Conclusion: The study found that the analyzed herbal medicines were adulterated with metformin and the quantification of anti-diabetic counterfeits was therefore applied.

Highlights: This study determined counterfeited anti-diabetic drugs in Indian and Chinese traditional herbal medicines (THMs). Design-of-experiment, PB, and BB designs were used. Method validation was also performed in accordance with the International Conference on Harmonization guidelines.

No.	Publication	IF	Citations
39.	El-Hussieny, M., El-Sayed, N.F., **Fouad, M.A.**, Ewies, E.F. "Synthesis, biological evaluation and molecular docking of new sulfonamide-based indolinone derivatives as multitargeted kinase inhibitors against leukemia", *Bioorganic Chemistry*, **117**, 105421, (**2021**). DOI: 10.1016/j.bioorg.2021.105421	5.725	0

Abstract:

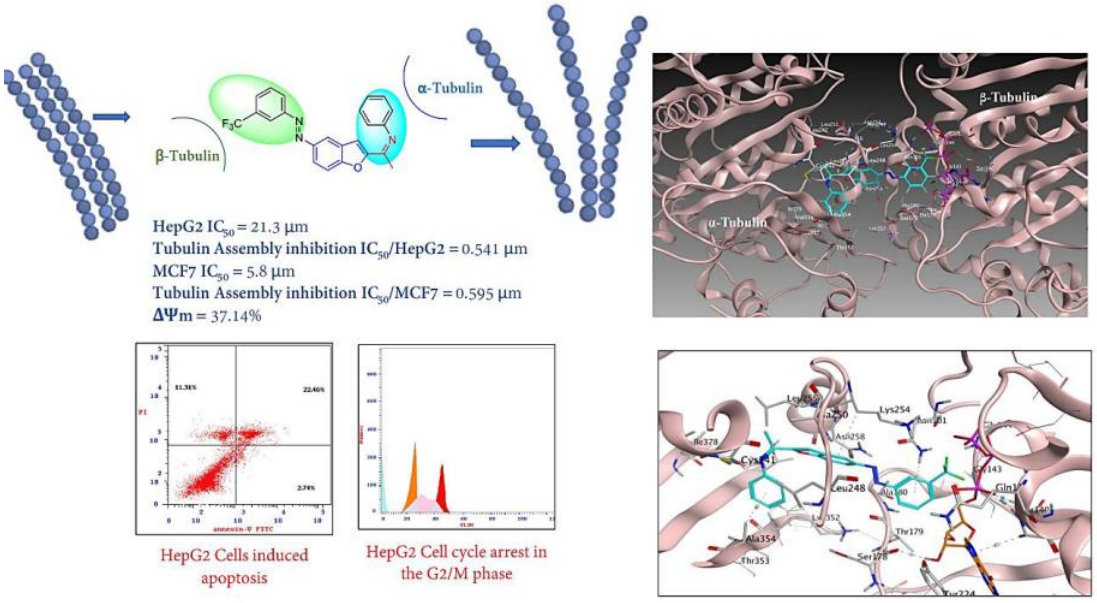
Series of novel sulfonamide-based 3-indolinones 3a-m and 4a-f were designed, synthesized and then their cytotoxic activity was evaluated against a panel of sixty cancer cell lines. This screening indicated that 4-(2-(5-fluoro-2-oxoindolin-3-ylidene)acetyl)phenyl benzenesulfonate (4f) possessed promising cytotoxicity against CCRF-CEM and SR leukemia cell lines with IC50 values 6.84 and 2.97 µM, respectively. Further investigation of the leukemic cytotoxicity of compound 4f was carried out by performing PDGFRα, VEGFR2, Aurora A/B and FLT3 enzyme assays and CCRF-CEM and SR cell cycle analysis. These investigations showed that compound 4f exhibited pronounced dual inhibition of both kinases PDGFRα and Aurora A with potency of 24.15 and 11.83 nM, respectively. The in vitro results were supported by molecular docking studies in order to explore its binding affinity and its key amino acids interactions. This work represents compound 4f as a promising anticancer agent against leukemia.



No.	Publication	IF	Citations
40.	**Fouad, M.A.**, Zaki, M.Y., Lotfy, R.A., Mahmoud, W.R. "Design, synthesis, biological evaluation, and molecular docking of new benzofuran and indole derivatives as tubulin polymerization inhibitors", *Drug Development Research*, **2021**, 1-16, (2021). DOI: 10.1002/ddr.21880	4.360	0

Abstract:

Microtubules and the mitotic spindle have become an important target for cancer treatment due to their critical role in cell division. In this work, a novel series of benzofuran and indole derivatives were designed and synthesized, to be evaluated as tubulin polymerization inhibitors. 2-Acetylbenzofuran derivatives 1a,b and 3-acetylindole 1c were condensed with Wittig reagents 2a–d and Wittig-Horner reagents 3a–e to afford the respective 2-ethylidene derivatives 5a–j and 7a–e. Also, iminomethylene triphenylphosphine (2e) reacted with 1a,b to afford benzofuran-2-ylethylidene aniline derivatives 6a,b. In addition, compounds 1a,b reacted with trialkylphosphites 4a–c to give 1:1 adduct for which the Oxaphospholo[4,3-b]benzofuran-7-yl)diazene derivatives 8a–f, were assigned. The possible reactions mechanisms were discussed and structural reasoning for the new compounds were based upon spectroscopic data. Their antiproliferative activities against two cell lines namely, HepG2 and MCF7 cells were then evaluated. It was found that the benzofuran compounds 5b, 6a, and 8c exhibited the strongest antiproliferative activities against both cell lines compared to doxorubicin. By studying the mechanism of action, compound 6a showed good inhibition of tubulin polymerization which leads to mitotic spindle formation disruption, cell cycle arrest in the G2/M phase, and apoptosis of HepG2 cells. A conducted docking study confirmed the in vitro results indicating that compound 6a fitted properly at the colchicine binding site of tubulin. Based on these findings, compound 6a can be considered as a promising anticancer candidate that can be subjected for further development as a tubulin polymerization inhibitor for treating liver and breast cell carcinoma.



No.	Publication	IF	Citations
41.	Mohammad Abdul-Azim Mohammad, Ehab Farouk Elkady, **Marwa Ahmed Fouad**, Wadhah Atef Salem. "DoE Screening and Optimization of Liquid Chromatographic Determination of Nicotinic Acid and Six Statins: Application to Pharmaceutical Preparations and Counterfeit Detection", *Journal of Chromatographic Science*, 1-13, (2021). DOI: 10.1093/chromsci/bmab131	1.618	0

Abstract:

An isocratic reversed-phase high performance liquid chromatographic method has been developed and validated to simultaneously determine nicotinic acid, pravastatin sodium, rosuvastatin calcium, atorvastatin calcium, pitavastatin calcium, lovastatin sodium and simvastatin sodium in focus on counterfeit drug detection. Thin-layer chromatography, nuclear magnetic resonance and mass spectrometry have been additionally performed to verify the identification of adulterants of counterfeit herbal medicines. Chromatographic separation was carried out on Inertsil® ODS-3 C18 (4.6 × 150 mm, 5 µm) with isocratic mobile phase elution containing a mixture of acetonitrile: methanol: 25 mM potassium dihydrogen phosphate buffer, pH 2.86 adjusted with 0.1 M o-phosphoric acid (48: 30: 22, v/v/v), at a flow rate of 1 mL/min and with UV detection at 238 nm. The design of experiment methodology, Plackett–Burman and Box–Behnken designs, was used to screen and optimize the mobile phase composition. The validation of the method was also carried out under the International Conference on Harmonization guidelines. The developed method was sensitive, accurate, simple, economical and highly robust, in addition to the comprehensiveness and novelty of this method for separating the seven drugs. The results were statistically compared with the reference methods used Student's t-test and variance ratio F-test at $P < 0.05$

No.	Publication	IF	Citations
42.	Showman, Maha M., **Rania M. Abdelsalam**, Mahmoud M. Tawfick, Sanaa A. Kenawy, and Mona M. El-Naa. "Antisense Tissue Factor Oligodeoxynucleotides Protected Diethyl Nitrosamine/Carbon Tetrachloride-Induced Liver Fibrosis Through Toll Like Receptor4-Tissue Factor-Protease Activated Receptor1 Pathway.", *Frontiers in Pharmacology*, **12**, 1140, (**2021**), ISSN 1663-9812. https://doi.org/10.3389/fphar.2021.676608.	3.845	0

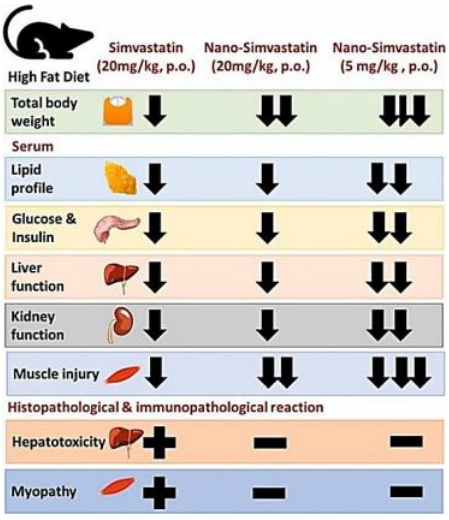
Abstract

Tissue factor (TF) is a blood coagulation factor that has several roles in many non-coagulant pathways involved in different pathological conditions such as angiogenesis, inflammation and fibrogenesis. Coagulation and inflammation are crosslinked with liver fibrosis where protease-activated receptor1 (PAR1) and toll-like receptor4 (TLR4) play a key role. Antisense oligodeoxynucleotides are strong modulators of gene expression. In the present study, antisense TF oligodeoxynucleotides (TFAS) was evaluated in treating liver fibrosis via suppression of TF gene expression. Liver fibrosis was induced in rats by a single administration of N-diethyl nitrosamine (DEN, 200 mg/kg; i. p.) followed by carbon tetrachloride (CCl4, 3 ml/kg; s. c.) once weekly for 6 weeks. Following fibrosis induction, liver TF expression was significantly upregulated along with liver enzymes activities and liver histopathological deterioration. Alpha smooth muscle actin (α-SMA) and transforming growth factor-1beta (TGF-1β) expression, tumor necrosis factor-alpha (TNF-α) and hydroxyproline content and collagen deposition were significantly elevated in the liver. Blocking of TF expression by TFAS injection (2.8 mg/kg; s. c.) once weekly for 6 weeks significantly restored liver enzymes activities and improved histopathological features along with decreasing the elevated α-SMA, TGF-1β, TNF-α, hydroxyproline and collagen. Moreover, TFAS decreased the expression of both PAR1 and TLR4 that were induced by liver fibrosis. In conclusion, we reported that blockage of TF expression by TFAS improved inflammatory and fibrotic changes associated with CCl4+DEN intoxication. In addition, we explored the potential crosslink between the TF, PAR1 and TLR4 in liver fibrogenesis. These findings offer a platform on which recovery from liver fibrosis could be mediated through targeting TF expression.

No.	Publication	IF	Citations
43.	Hagar B. Abo-Zalam , Ezzeldein S. El-Denshary, **Rania M. Abdelsalam**, Islam A. Khalil, Mahmoud M. Khattab, and Mohamed A. Hamzawy. "Therapeutic advancement of simvastatin-loaded solid lipid nanoparticles (SV-SLNs) in treatment of hyperlipidemia and attenuating hepatotoxicity, myopathy and apoptosis: Comprehensive study.", *Biomedicine & Pharmacotherapy*, **139**, 111494, (**2021**), ISSN 0753-3322. https://doi.org/10.1016/j.biopha.2021.111494.	4.545	0

Abstract

This study set out to optimize simvastatin (SV) in lipid nanoparticles (SLNs) to improve bioavailability, efficacy and alleviate adverse effects. Simvastatin-loaded solid lipid nanoparticles (SV-SLNs) were prepared by hot-melt ultrasonication method and optimized by box-Behnken experimental design. Sixty Wister albino rats were randomly assigned into six groups and treated daily for 16 weeks: control group, the group fed with 20 g of high-fat diet (HFD), group treated with vehicle (20 mg/kg, P.O.) for last four weeks, group treated with HFD and SV (20 mg/kg, P.O.) / or SV-SLNs (20 mg/kg/day, P.O.) / or SV-SLNs (5 mg/kg, P.O.) at last four weeks. Blood, liver tissues, and quadriceps muscles were collected for biochemical analysis, histological and immunohistochemical assays. The optimized SV-SLNS showed a particle-size 255.2 ± 7.7 nm, PDI 0.31 ± 0.09, Zeta-potential - 19.30 ± 3.25, and EE% 89.81 ± 2.1%. HFD showed severe changes in body weight liver functions, lipid profiles, atherogenic index (AIX), albumin, glucose, insulin level, alkaline phosphatase as well as muscle injury, oxidative stress biomarkers, and protein expression of caspase-3. Simvastatin treatment in animals feed with HFD showed a significant improvement of all tested parameters, but it was associated with hepatotoxicity, myopathy, and histological changes in quadriceps muscles. SV-SLNs exhibited a significant improvement of all biochemical, histological examinations, and immunohistochemical assays. SV-SLNs (5 mg/kg) treatment returns all measured parameters to control itself. These results represent that SV-SLNs is a promising candidate as a drug carrier for delivering SV with maximum efficacy and limited adverse reaction.



No.	Publication	IF	Citations
44.	Hagar B. Abo-Zalam , **Rania M. Abdelsalam**, Rehab F. Abdel-Rahman, Mohamed F. Abd-Ellah, Mahmoud M. Khattab "In Vivo Investigation of the Ameliorating Effect of Tempol against MIA-Induced Knee Osteoarthritis in Rats: Involvement of TGF-β1/SMAD3/NOX4 Cue." *Molecules*. 19;26(22):6993 (2021), ISSN: 1420-3049. https://doi.org/10.3390/molecules26226993.	4.411	0

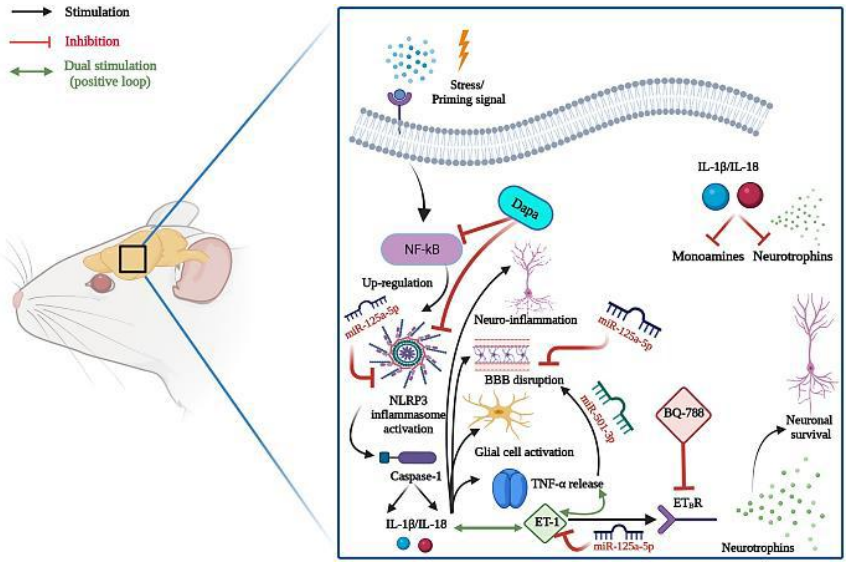
Abstract

Osteoarthritis (OA) is a complex disease characterized by structural, functional, and metabolic deteriorations of the whole joint and periarticular tissues. In the current study, we aimed to investigate the possible effects of tempol on knee OA induced by the chemical chondrotoxic monosodium iodoacetate (MIA) which closely mimics both the pain and structural changes associated with human OA. Rats were administrated oral tempol (100 mg/kg) one week post-MIA injection (3 mg/50 µL saline) at the right knee joints for 21 consecutive days. Tempol improved motor performance and debilitated the MIA-related radiological and histological alterations. Moreover, it subsided the knee joint swelling. Tempol decreased the cartilage degradation-related biomarkers as matrix metalloproteinase-13, bone alkaline phosphatase (bone ALP), and fibulin-3. The superoxide dismutase mimetic effect of tempol was accompanied by decreased NADPH oxidase 4 (NOX4), inflammatory mediators, nuclear factor-kappa B (NF-κB), over-released transforming growth factor-β1 (TGF-β1). Tempol decreased the expression of chemokine (C-C motif) ligand 2 (CCL2). On the molecular level, tempol reduced the phosphorylated protein levels of p38 mitogen-activated protein kinase (MAPK), and small mother against decapentaplegic 3 homologs (SMAD3). These findings suggest the promising role of tempol in ameliorating MIA-induced knee OA in rats via collateral suppression of the catabolic signaling cascades including TGF-β1/SMAD3/NOX4, and NOX4/p38MAPK/NF-κB and therefore modulation of oxidative stress, catabolic inflammatory cascades, chondrocyte metabolic homeostasis.

No.	Publication	IF	Citations
45.	Radwa N. Muhammad, Lamiaa A. Ahmed, **Rania M. AbdelSalam**, Kawkab A. Ahmed, Amina S. Attia. "Crosstalk Among NLRP3 Inflammasome, ET B R Signaling, and miRNAs in Stress-Induced Depression-Like Behavior: a Modulatory Role for SGLT2 Inhibitors." *Neurotherapeutics.* Online ahead of print (2021). ISSN: 1933-7213 (print); 1878-7479 (web). https://doi.org/10.1007/s13311-021-01140-4.	7.620	0

Abstract

Depression is an overwhelming health concern, and many patients fail to optimally respond to available standard therapies. Neuroplasticity and blood–brain barrier (BBB) integrity are the cornerstones of a well-functioning central nervous system, but they are vulnerable to an overly active NLRP3 inflammasome pathway that can also indirectly trigger the release of ET-1 and contribute to the ET system disturbance, which further damages stress resilience mechanisms. Here, the promising yet unexplored antidepressant potential of dapagliflozin (Dapa), a sodium–glucose co-transporter-2 inhibitor, was investigated by assessing its role in the modulation of the NLRP3 inflammasome pathway and ETBR signal transduction, and their impact on neuroplasticity and BBB integrity in an animal model of depression. Dapa (1 mg/kg/day; p.o.) with and without BQ-788 (1 mg/kg/day; i.p.), a specific ETBR blocker, were administered to adolescent male Wistar rats exposed to a 5-week chronic unpredictable stress protocol. The depressive animals demonstrated marked activation of the NLRP3 inflammasome pathway (NF-κB/NLRP3/caspase-1/IL/TNF-α), which was associated with both peripheral and central inflammatory responses. The ET system was disrupted, with noticeable reduction in miR-125a-5p and ETBR gene expression. Cortical ZO-1 expression was downregulated under the influence of NLRP3/TNF-α/miR-501-3p signaling, along with a prominent reduction in hippocampal BDNF and synapsin-1. With ETBR up-regulation being a cornerstone outcome, Dapa administration efficiently created an overall state of resilience, improved histopathological and behavioral variables, and preserved BBB function. These observations were further verified by the results obtained with BQ-788 co-administration. Thus, Dapa may exert its antidepressant action by reinforcing BBB integrity and promoting neuroplasticity through manipulation of the NLRP3/ET-1/ETBR/BDNF/ZO-1 axis, with a significant role for ETBR signaling.



No.	Publication	IF	Citations
46.	**Muhammed A. Saad**, Muhammad A. Eltarzy, **Rania M. Abdel Salam**, Maha A.E. Ahmed. "Liraglutide mends cognitive impairment by averting Notch signaling pathway overexpression in a rat model of polycystic ovary syndrome", *Life Sciences,* **265**, 118731, (**2021**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2020.118731.	5.037	2

Abstract

Aims: Polycystic ovary syndrome (PCOS), the rifest endocrine disorder in women, is involved in disrupting many metabolic processes. However, the impact of PCOS on cognitive deficits is still uncertain. Recently, Notch signaling pathway was identified as a key modifier in regulating the pathological process in the ovary and various neurodegenerative disorders. Liraglutide has favourable neuroprotective effects that may protect against the possible cognitive dysfunction in PCOS.

Main methods: PCOS was induced in rats by administrating Letrozole orally for 21 successive days. Then, Liraglutide (LIR) was administered intraperitoneally for 30 days. Memory was examined using Y-maze, novel object recognition (NOR), and Morris water maze (MWM) tests. Western blotting, enzyme immunoassay, and quantitative real-time PCR were used to examine Notch signaling downstream targets, as well as assessing the expression of the components of various pathways cross talked with Notch signaling in memory impairment. Furthermore, histopathological examination was performed to examine neuronal changes.

Key findings: Notch signaling was overexpressed in PCOS rats, which increased Aβ aggregation, apoptosis, and neuroinflammation. Additionally, histopathological examination showed neuronal degeneration, which was marked by diminished acetylcholine levels in the PCOS rats' hippocampi. Finally, serum levels of insulin and testosterone were elevated while estradiol was reduced. Treatment with LIR repaired Notch signaling-attributed changes and improved the PCOS-induced memory impairment in rats.

Significance: The obtained findings confirm that Notch signaling activation in the hippocampus of rats impairs cognitive functions in PCOS, which is mitigated by LIR. Therefore, LIR may offer a novel therapeutic intervention to impede PCOS-induced dementia.

No.	Publication	IF	Citations
47.	Amer MA, Wasfi R, **Attia AS**, Ramadan MA. "Indole Derivatives Obtained from Egyptian *Enterobacter* sp. Soil Isolates Exhibit Antivirulence Activities against Uropathogenic *Proteus mirabilis*", *Antibiotics,* **10(4)**, 363, (**2021**). https://doi.org/10.3390/antibiotics10040363	**3.893**	**1**

Abstract

Proteus mirabilis is a frequent cause of catheter associated urinary tract infections (CAUTIs). Several virulence factors contribute to its pathogenesis, but swarming motility, biofilm formation, and urease activity are considered the hallmarks. The increased prevalence in antibiotic resistance among uropathogens is alarming and requires searching for new treatment alternatives. With this in mind, our study aims to investigate antivirulence activity of indole derivatives against multidrug resistant P. mirabilis isolates. Ethyl acetate (EtOAc) extracts from Enterobacter sp. (rhizobacterium), isolated from Egyptian soil samples were tested for their ability to antagonize the virulence capacity and biofilm activity of P. mirabilis uropathogens. Extracts of two Enterobacter sp. isolates (coded Zch127 and Cbg70) showed the highest antivirulence activities against P. mirabilis. The two promising rhizobacteria Zch127 and Cbg70 were isolated from soil surrounding: Cucurbita pepo (Zucchini) and Brassica oleracea var. capitata L. (Cabbage), respectively. Sub-minimum inhibitory concentrations (Sub-MICs) of the two extracts showed potent antibiofilm activity with significant biofilm reduction of ten P. mirabilis clinical isolates (p-value < 0.05) in a dose-dependent manner. Interestingly, the Zch127 extract showed anti-urease, anti-swarming and anti-swimming activity against the tested strains. Indole derivatives identified represented key components of indole pyruvate, indole acetamide pathways; involved in the synthesis of indole acetic acid. Additional compounds for indole acetonitrile pathway were detected in the Zch127 extract which showed higher antivirulence activity. Accordingly, the findings of the current study model the feasibility of using these extracts as promising antivirulence agent against the P. mirabilis uropathogens and as potential therapy for treatment of urinary tract infections (UTIs).

No.	Publication	IF	Citations
48.	Elhosseiny, Noha M., Tamer M. Samir, Aliaa A. Ali, Amani A. El-Kholy, and **Ahmed S. Attia**. "Development of an Immunochromatographic Strip Using Conjugated Gold Nanoparticles for the Rapid Detection of *Klebsiella pneumoniae* Causing Neonatal Sepsis" *Pharmaceutics,* **13(8)**, 1141, (**2021**). https://doi.org/10.3390/pharmaceutics13081141.	**6.321**	0

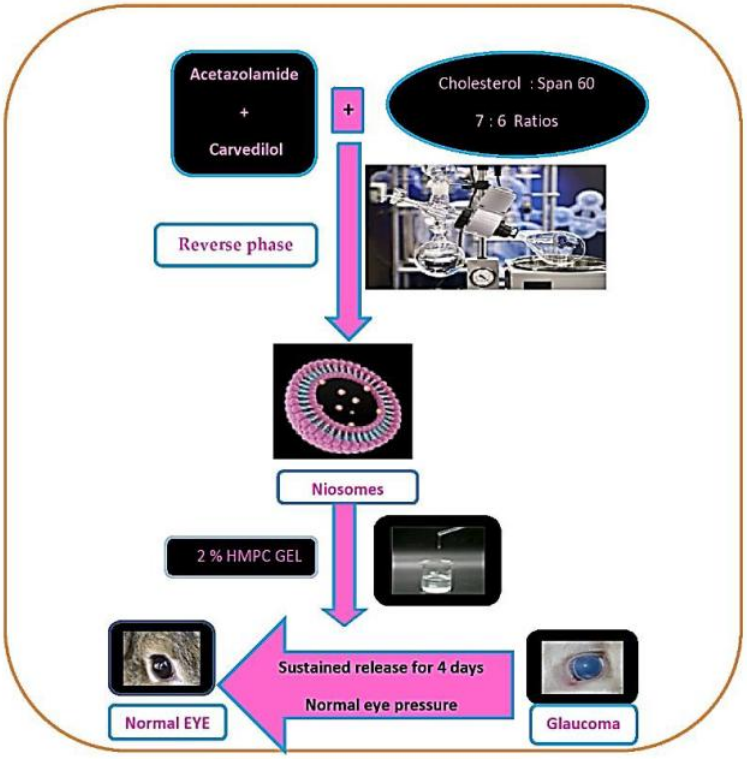
Abstract

Neonatal sepsis is a leading cause of death among newborns and infants, especially in the developing world. The problem is compounded by the delays in pinpointing the causative agent of the infection. This is reflected in increasing mortality associated with these cases and the spread of multi-drug-resistant bacteria. In this work, we deployed bioinformatics and proteomics analyses to determine a promising target that could be used for the identification of a major neonatal sepsis causative agent, Klebsiella pneumoniae. A 19 amino acid peptide from a hypothetical outer membrane was found to be very specific to the species, well conserved among its strains, surface exposed, and expressed in conditions simulating infection. Antibodies against the selected peptide were conjugated to gold nanoparticles and incorporated into an immunochromatographic strip. The developed strip was able to detect as low as 105 CFU/mL of K. pneumoniae. Regarding specificity, it showed negative results with both Escherichia coli and Enterobacter cloacae. More importantly, in a pilot study using neonatal sepsis cases blood specimens, the developed strip selectively gave positive results within 20 min with those infected with K. pneumoniae without prior sample processing. However, it gave negative results in cases infected with other bacterial species.

No.	Publication	IF	Citations
49.	Abdelmonem R, Elhabal SF, **Abdelmalak NS**, El-Nabarawi MA, Teaima MH. "Formulation and Characterization of Acetazolamide/Carvedilol Niosomal Gel for Glaucoma Treatment: In Vitro, and In Vivo Study.", *Pharmaceutics*, **13(2)**, 221, (**2021**). https://doi.org/10.3390/pharmaceutics13020221.	6.321	1

Abstract

Acetazolamide (ACZ) is a diuretic used in glaucoma treatment; it has many side effects. Carvedilol (CAR) is a non-cardioselective beta-blocker used in the treatment of elevated intraocular pressure; it is subjected to the first-pass metabolism and causes fluids accumulation leading to edema. This study focuses on overcoming previous side effects by using a topical formula of a combination of the two previous drugs. Sixty formulations of niosomes containing Span 20, Span 60, Tween 20, and Tween 60 with two different ratios were prepared and characterized. Formulation with the lowest particle size (416.30 ± 0.23), the highest zeta potential (72.04 ± 0.43 mv), and the highest apparent coefficient of corneal permeability (0.02 ± 0.29 cm/h) were selected. The selected formula was incorporated into the gel using factorial design 23. Niosomes (acetazolamide/carvedilol) consisting of Span 60 and cholesterol in the molar ratio (7:6), HMPC, and carbopol with two different ratios were used. The selected formula was subjected to an in vivo study of intraocular pressure in ocular hypertensive rabbits for 60 h. The sustained gel formula of the combination decreased (IOP) to normal after 1 h and sustained efficacy for 4 days. Histological analysis of rabbit eyeballs treated with the selected formula showed improvement in glaucomatous eye retinal atrophy.



No.	Publication	IF	Citations
50.	Farag MM, **Abd El Malak NS**, Yehia SA, **Ahmed MA.** "Hyaluronic Acid Conjugated Metformin-Phospholipid Sonocomplex: A Biphasic Complexation Approach to Correct Hypoxic Tumour Microenvironment.", *Int J Nanomedicine.*, **16**, 1005-1019, (**2021**). Doi:10.2147/IJN.S297634	6.400	2

Abstract

Purpose: Development of hyaluronic acid conjugated metformin-phospholipid sonocomplexes (HA-MPS), a biphasic complexation product compiled for enhancing both the lipophilicity and targeting potential of Metformin (MET) to CD44 receptors on pancreatic cancer.

Methods: MET was chemically conjugated to hyaluronic acid (HA) via amide coupling reaction. Then, the HA conjugated MET was physically conjugated to Lipoid™S100 via ultrasound irradiation. A combined D-optimal design was implemented to statistically optimize formulation variables. The HA-MPS were characterized through solubility studies, partition coefficient, drug content uniformity, particle size and zeta potential. The optimized HA-MPS was tested via proton nuclear magnetic resonance, infrared spectroscopy to elucidate the nature of physicochemical interactions in the complex which was further scrutinized on molecular level via molecular docking and dynamic simulation.

Results: The solubility and partition studies showed a lipophilicity enhancement up to 67 folds as they adopted inverted micelles configuration based on the packing parameter hypothesis. The optimized HA-MPS showed 11.5 folds lower IC_{50}, extra 25% reduction in oxygen consumption rate, better reduction in hypoxia-inducible factor and reactive oxygen species in MiaPaCa-2 cells.

Conclusion: These results proved better internalization of MET which was reflected by abolishing hypoxic tumour microenvironment, a mainstay toward a normoxic and less resistant pancreatic cancer.

No.	Publication	IF	Citations
51.	Abd El-Aal, May A., **Medhat A. Al-Ghobashy**, and Yasser S. El-Saharty. "Preparation and characterization of 96-well microplates coated with molecularly imprinted polymer for determination and biosimilarity assessment of recombinant human erythropoietin.", *Journal of Chromatography A*, **1641**, 462012, (**2021**), ISSN 0021-9673. https://doi.org/10.1016/j.chroma.2021.462012.	4.759	3

Abstract

Synthesis and applications of molecularly imprinted polymers (MIP) are rapidly growing. In this study, a biomimetic MIP was prepared through silanes polymerization on the surface of 96-well microplates using recombinant human erythropoietin-alfa (rhEPO) as a template molecule. The rhEPO was immobilized onto the plate surface using bi-functional cross-linker and a thin imprinted layer following sol-gel procedure was constructed. After template extraction, uniform three-dimensional cavities compatible with the configuration of rhEPO were obtained. The rhEPO-MIP preparation was optimized using 2-level factorial design and response surface design where polymerization time and interactions between the different variable were found to be the most significant factors. Size-exclusion chromatography (SEC) was used to monitor the stability of the rhEPO under the investigated polymerization conditions. Determination of rhEPO using the MIP microplate showed good dynamic response fitting to the 4 PL regression model (0.9962) over a concentration range of 10.00 - 100.00 ng mL^{-1}. Adsorption of rhEPO onto MIP followed the Langmuir isotherm model ($r = 0.9957$, $\chi 2 = 0.02786$) with pseudo-second-order kinetics ($r = 0.9984$). The surface of the rhEPO-MIP was characterized using scanning electron microscopy (SEM) while step-by-step surface modification was tracked using Fourier transform infrared (FTIR) spectroscopy. The rhEPO-MIP was able to distinguish between the rhEPO-alfa template and modified rhEPO molecules; rhEPO-beta, hyperglycosylated and pegylated forms (imprinting factors < 2) and in the commonly used formulation additive human serum albumin (HSA) (R% = 113.96 -95.22%). The rhEPO-MIP was applied to compare the receptor-binding pattern to rhEPO and its biosimilars / structural analogues. The results were cross-validated using the conventional assay protocol (RP-HPLC and ELISA) and an acceptable correlation was observed with RP-HPLC (maximum deviation is 7.78%). This work confirmed the applicability of rhEPO-MIP with its unique binding features for batch release, stability and biosimilarity assessment as well as subsequent evaluation of batch-to-batch consistency during bioproduction of target analytes.

No.	Publication	IF	Citations
52.	Nadim, Ahmed H., May A. Abd El-Aal, **Medhat A. Al-Ghobashy**, and Yasser S. El-Saharty. "Facile imprinted polymer for label-free highly selective potentiometric sensing of proteins: case of recombinant human erythropoietin.", *Analytical and Bioanalytical Chemistry*, **413**, 3611–3623, (**2021**). https://doi.org/10.1007/s00216-021-03325-4.	4.157	1

Abstract

In the current study, a molecularly imprinted polymer (MIP)-based potentiometric sensor was fabricated for a label-free determination of recombinant human erythropoietin (rhEPO). The MIP sensor was operated under zero current conditions using tetra-butyl ammonium bromide as a marker ion. A highly ordered rhEPO surface imprinted layer was prepared using 3-aminopropyl triethoxysilane and tetraethoxysilane as a monomer and cross-linker, respectively, under mild reaction conditions. A two-fold increase in the signal output was obtained by polymeric surface minimization (0.5 mm) that allowed more pronounced molecular recognition (imprinting factor = 20.1). The proportion of cross-reactivity was examined using different interfering biomolecules. Results confirmed sensor specificity for both structurally related and unrelated proteins. An ~40% decrease in the response was obtained for rhEPO-β compared to rhEPO-α. The imprinted polymeric surface was evaluated using scanning electron microscopy and Fourier transform infrared spectroscopy. Under the optimal measurement conditions, a linear range of 10.00–1000.00 ng mL^{-1} (10^{-10} – 10^{-8} M) was obtained. The sensor was employed for the determination of rhEPO in different biopharmaceutical formulations. Results were validated against standard immunoassay. Spiked human serum samples were analyzed and the assay was validated. The presence of non-specific proteins did not significantly affect (~8%) the results of our assay. A concentration-dependent linear response was produced in an identical range with detection limit as low as 6.50 ng mL^{-1} (2.14×10^{-10} M). The facile fabricated MIP sensor offers a cost-effective, portable, and easy to use alternative for biosimilarity assessment and clinical application.

No.	Publication	IF	Citations
53.	Nadim, Ahmed H., May A. Abd El-Aal, **Medhat A. Al-Ghobashy**, and Yasser S. El-Saharty. "Optimization of Polydopamine Imprinted Polymer for Label Free Sensitive Potentiometric determination of Proteins: Application to Recombinant Human Erythropoietin Sensing in Different Matrices.", *Microchemical Journal*, **167**, 106333, (**2021**), ISSN 0026-265X. https://doi.org/10.1016/j.microc.2021.106333.	4.821	1

Abstract

The integration of molecular imprinted polymers (MIPs) with ion selective electrodes (ISE) has been an ideal platform for sensing of biological products. In this work, a facile MIP was constructed over the surface of PVC polymeric membrane using self-assembled dopamine (DA) as a monomer around recombinant human Erythropoietin (rhEPO) as a template. A label free passive ion flux MIP potentiometric sensor was fabricated using tetra butyl ammonium bromide as a marker ion. MIP preparation was optimized for critical factors (monomer concentration and polymerization time) that affect the thickness of the imprinted layer by central composite response surface design. The optimum condition for DA-MIP preparation was found to be 3.79 mg mL^{-1} DA for 18.14 h with desirability of 0.9919. A highly selective and sensitive potentiometric sensor was obtained by combining membrane surface minimization with superficial imprinting process strategy. The sensor has elicited selectivity for template molecule as confirmed by imprinting factor exceeding 11-fold the values obtained from closely related rhEPO analogues. The imprinted layer surface was characterized using scanning electron microscopy (SEM) and Fourier transform infrared (FTIR) spectroscopy. The quantitative determination of rhEPO was established over the range of 1.00–100.00 ng mL^{-1} (10^{-9} to 10^{-11} M) with a limit of detection of 0.33 ng mL^{-1}. The sensor could classify rhEPO-α products in a similar attitude of natural antibodies. The potentiometric sensor was able to quantitate rhEPO in human serum with a limit of detection of 0.50 ng mL^{-1} and the bioanalytical assay was successfully validated. The proposed MIP biosensor elicited specificity for template recognition and selectivity in biological fluids without the need of immunoaffinity purification. Such approach shall plan the direction towards a portable sensor for doping disclosure in sports cheating.

No.	Publication	IF	Citations
54.	Gamal, Mohammed, Heba-Alla H. Abd-ElSalam, Ibrahim A. Naguib, **Medhat A. Al-Ghobashy**, Hala E. Zaazaa, and M. Abdelkawy. "Green and cost-effective extraction techniques of quercetin from mixture of nutraceuticals with yield analysis via spectrophotometry and high performance liquid chromatograph methods.", *Journal of AOAC International*, **18:qsab071**, (**2021**). DOI: 10.1093/jaoacint/qsab071.	**1.913**	**0**

Abstract

Background

Extraction is the leading critical stage in the analysis of nutraceuticals. Ginkgo biloba (GB) has gained an interest because of its therapeutic usages.

Objectives

Development of four cost effective extraction techniques for extraction of quercetin from GB in mixture of nutraceuticals sachet. These techniques are solid phase extraction (SPE), liquid-liquid extraction (LLE), inverted dispersive liquid-liquid microextraction (IDLLME) and QuEChERS.

Methods

Direct spectrophotometry was used to monitor the recovery of the standard quercetin throughout the optimization steps. HPLC-UV method of analysis was optimized to quantify the yields from the extracts present in the complicated sachets. The presented study was assessed by analytical eco-scale assessment (ESA) and National Environmental Method Index (NEMI) for greenness in comparison with literature.

Results

Only SPE showed the best cleanup outcomes. ESA and NEMI showed an adequate greenness of proposed extraction protocol.

Conclusion

Quercetin (marker for GB) extraction from market nutraceutical sachets is considered an exemplary for analysis in quality control of nutraceuticals. Regarding the greenness results, the proposed method of extraction is grander even with adequate greenness as the extraction was one-step, in comparison with multi-steps in previously published protocols. Accordingly, it is recommended to be used in routine extraction and analysis of such kind of nutraceuticals.

No.	Publication	IF	Citations
55.	Mahdally, N. H., George, R. F., Kashef, M. T., **Al-Ghobashy, M.**, Murad, F. E., & Attia, A. S. "Staquorsin: A Novel Staphylococcus aureus Agr-Mediated Quorum Sensing Inhibitor Impairing Virulence in vivo Without Notable Resistance Development", *Frontiers in microbiology*, **12**, 700494, (**2021**). https://doi.org/10.3389/fmicb.2021.700494.	5.640	0

Abstract

The emergence of microbial resistance to the available antibiotics is a major public health concern, especially with the limited rate of developing new antibiotics. The utilization of anti-virulence agents is a non-conventional approach that can be used to combat microbial infection. In Staphylococcus aureus, many virulence factors are regulated by the Agr-mediated quorum sensing (QS). We developed a chemical compound that acts a potential Agr-inhibitor without reducing bacterial viability. The compound was designated staquorsin for Staphylococcus aureus QS inhibitor. In silico analyses confirmed the binding of staquorsin to the AgrA active site with an absolute binding score comparable to savirin, a previously described AgrA inhibitor. However, staquorsin turned out to be superior over savarin in not affecting the S. aureus viability in concentrations up to 600 µM. On the other hand, savirin inhibited S. aureus growth in concentrations as low as 25 µM. Moreover, staquorsin proved to be a potent inhibitor of the Agr system by inhibiting hemolysins, lipase production, and affecting biofilms formation and detachment. On the molecular level it significantly inhibited the effector transcript RNA III. In vivo testing, using the murine skin abscess model, confirmed the ability of staquorsin to modulate S. aureus virulence by effectively controlling the infection. Twenty passages of S. aureus in the presence of 40 µM staquorsin have not resulted in loss of activity as evidenced by maintaining its ability to reduce hemolysin production and RNA III transcript levels. In conclusion, we hereby describe a novel anti-virulence compound inhibiting the S. aureus Agr-system and its associated virulence factors. It is active both in vitro and in vivo, and its frequent use does not lead to the development of resistance. These findings model staquorsin as a promising drug candidate to join the fierce battle against the formidable pathogen S. aureus.

No.	Publication	IF	Citations
56.	Abanoub Mosaad Abdallah, Nadia G. Zaki, Walaa H. Mahmoud, **Ahmed M. El Kerdawy**, Gehad G. Mohamed. "Synthesis, structural characterization, density functional theory calculations, and antimicrobial, anticancer, and antimetastatic properties of nanosized heteroleptic complexes of cocaine/TMEDA with d-block metal ions." *App. Organometallic. Chem.,*35: e6441 (**2021**). https://doi.org/10.1002/aoc.6441	4.105	0

Abstract

In the field of transition metal chemistry, the development of transition metal based drugs for the treatment of diseases such as cancer or microbial infections with minimization of adverse effects and drug resistance constitutes an active area of research. Herein, eight novel nanosized heteroleptic complexes of cocaine/TMEDA with the formula [M(COC)(TMEDA)Cly(OH2)z]nCl_xH2O (M = Cr(III), Mn(II), Fe(III), Co(II), Ni(II), Cu(II), Zn(II), and Cd(II); COC = cocaine; TMEDA = N,N,N0,N0-tetramethylethylenediamine, y = 1–2; z = 0–1; n = 0–1; and x = 0–2) were synthesized and structurally characterized via elemental analysis, molar conductivity, mass spectrometry, and spectroscopic and microscopic techniques. The thermal properties and kinetic thermodynamic parameters of the synthesized complexes were also studied. The geometry and electronic structures were investigated via density functional theory (DFT) calculations. The antiproliferative activity of the complexes on HepG-2 and MCF-7 cancer cell lines was quantified via MTT assay. The Fe(III) and Cd(II) complexes exhibited promising cytotoxic activities against the HepG-2 and MCF-7 cancer cell lines, respectively, with minimum effect on HFB4 human normal cells. Further molecular mechanistic studies were performed on the Cd(II) complex to inspect its influence on different cancer pathophysiology-related processes in the MCF-7 cell line including metastasis, apoptosis, and cellular oxidative stress and on the cellular levels of the human tumor suppressor nuclear proteins p21 and p27. The results revealed that the Cd(II) complex is a promising anticancer agent that acts through several molecular mechanisms with minimum effect on the normal cells and with additional antimetastatic properties. Furthermore, the antibacterial and antifungal activities of the prepared complexes were investigated.

No.	Publication	IF	Citations
57.	Rasha M. Hassan, Islam H. Ali, Mohammed S. Abdel-Maksoud , Heba M. I. Abdallah, **Ahmed M. El Kerdawy**, Francesca Sciandra, Iman A. Y. Ghannam. "Design and synthesis of novel quinazolinone-based fibrates as PPARα agonists with antihyperlipidemic activity" Arch. Pharm. (**2021**); e2100399 https://doi.org/10.1002/ardp.202100399	3.751	0

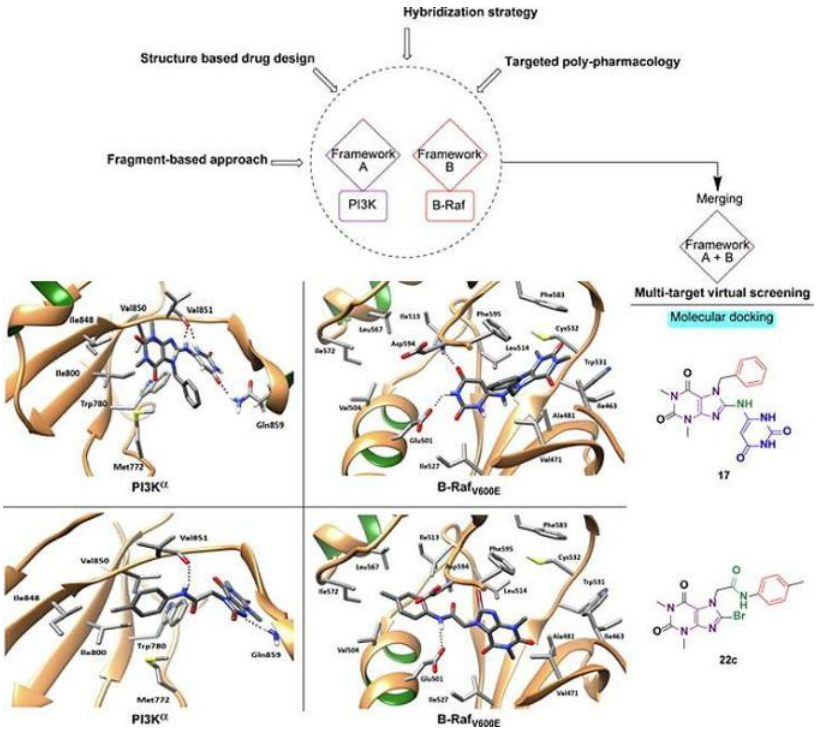
Abstract

Aiming to discover new antihyperlipidemic agents, a new set of quinazolinone-fibrate hybrids 9a–r bearing the essential features for peroxisome proliferator-activated receptor-α (PPARα) agonistic activity was synthesized and the structures were confirmed by different spectral data. All the target compounds were screened for their PPARα agonistic activity. Compounds 9o and 9q exhibited potent activity, with EC_{50} values better than that of fenofibrate by 8.7- and 27-fold, respectively. Molecular docking investigations were performed for all the newly synthesized compounds in the active site of the PPARα receptor to study their interactions and energies in the receptor. Moreover, the antihyperlipidemic and antioxidant activities of compounds 9o and 9q were determined using Triton WR-1339-induced hyperlipidemic rats. Compound 9q exhibited effective hypolipidemic activity in a dose-dependent manner, where it significantly reduced the serum levels of total cholesterol, triglycerides, low-density lipoprotein cholesterol, and very-low-density lipoprotein cholesterol and increased the level of high-density lipoprotein cholesterol. Furthermore, it possesses a powerful antioxidant profile where it significantly elevated the levels of reduced glutathione as well as the total antioxidant capacity and significantly decreased the malondialdehyde level. The histopathological studies revealed that compound 9q improved the aortic architecture and hepatic steatosis. These findings support that compound 9q could be a promising lead compound for the development of new antihyperlipidemic agents.

No.	Publication	IF	Citations
58.	Abdalla R. Mohamed, **Ahmed M. El Kerdawy**, Riham F. George, Hanan H. Georgey, Nagwa M. Abdel Gawad. "Design, synthesis and in silico insights of new 7,8-disubstituted-1,3-dimethyl-1H-purine-2,6(3H,7H)-dione derivatives with potent anticancer and multi-kinase inhibitory activities", *Bioorganic Chemistry*, **107**, 104569, (**2021**). https://doi.org/10.1016/j.bioorg.2020.104569.	5.725	2

Abstract

Aiming to obtain an efficient anti-proliferative activity, structure- and ligand-based drug design approaches were expanded and utilized to design and refine a small compound library. Subsequently, thirty-two 7,8-disubstituted-1,3-dimethyl-1H-purine-2,6(3H,7H)-dione derivatives were selected for synthesis based on the characteristic pharmacophoric features required for PI3K and B-Raf oncogenes inhibition. All the synthesized compounds were evaluated for their in vitro anticancer activity. Compounds 17 and 22c displayed an acceptable potent activity according to the DTP-NCI and were further evaluated in the NCI five doses assay. To validate our design, compounds with the highest mean growth inhibition percent were screened against the target PI3Ka and B-RafV600E to confirm their multi-kinase activity. The tested compounds showed promising multi-kinase activity. Compounds 17 and 22c anticancer effectiveness and multi-kinase activity against PI3Ka and B-RafV600E were consolidated by the inhibition of B-RafWT, EGFR and VEGFR-2 with IC_{50} in the sub-micromolar range. Further investigations on the most potent compounds 17 and 22c were carried out by studying their safety on normal cell line, in silico profiling and predicted ADME characteristics.



No.	Publication	IF	Citations
59.	Eldehna WM, Al-Rashood ST, Al-Warhi T, Eskandrani RO, Alharbi A, **El Kerdawy AM**. "Novel oxindole/benzofuran hybrids as potential dual CDK2/GSK-3β inhibitors targeting breast cancer: design, synthesis, biological evaluation, and in silico studies", *J Enzyme Inhib Med Chem*, **36(1)**, 270-285, (**2021**). Doi: 10.1080/14756366.2020.1862101.	**4.310**	**12**

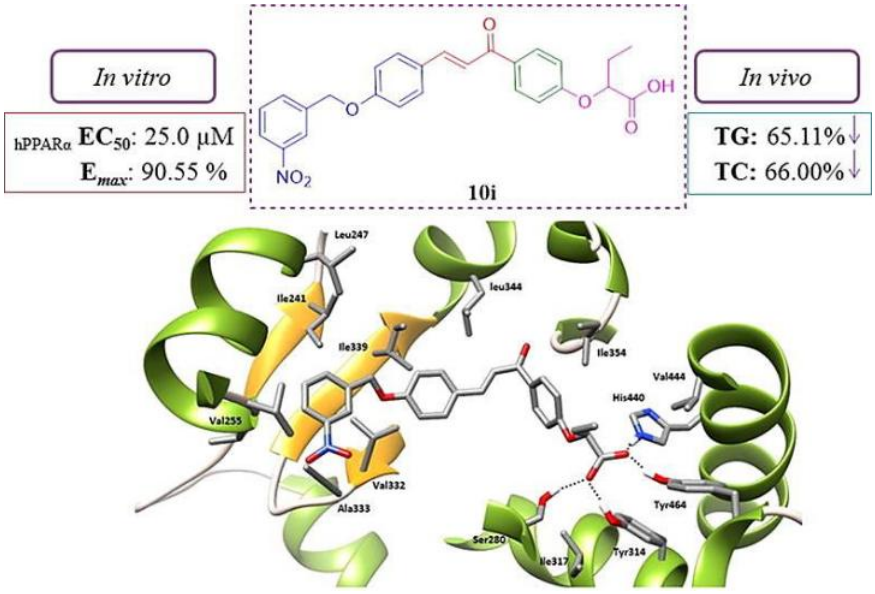
Abstract

The serine/threonine protein kinases CDK2 and GSK-3β are key oncotargets in breast cancer cell lines, therefore, in the present study three series of oxindole-benzofuran hybrids were designed and synthesised as dual CDK2/GSK-3β inhibitors targeting breast cancer (5a–g, 7a–h, and 13a–b). The N1 -unsubstituted oxindole derivatives, series 5, showed moderate to potent activity on both MCF-7 and T-47D breast cancer cell lines. Compounds 5d–f showed the most potent cytotoxic activity with IC50 of 3.41, 3.45 and 2.27 µM, respectively, on MCF-7 and of 3.82, 4.53 and 7.80 µM, respectively, on T-47D cell lines, in comparison to the used reference standard (staurosporine) IC50 of 4.81 and 4.34 µM, respectively. On the other hand, the N1 -substituted oxindole derivatives, series 7 and 13, showed moderate to weak cytotoxic activity on both breast cancer cell lines. CDK2 and GSK-3β enzyme inhibition assay of series 5 revealed that compounds 5d and 5f are showing potent dual CDK2/GSK-3β inhibitory activity with IC50 of 37.77 and 52.75 nM, respectively, on CDK2 and 32.09 and 40.13 nM, respectively, on GSK-3β. The most potent compounds 5d–f caused cell cycle arrest in the G2/M phase in MCF-7 cells inducing cell apoptosis because of the CDK2/GSK-3β inhibition. Molecular docking studies showed that the newly synthesised N1 -unsubstituted oxindole hybrids have comparable binding patterns in both CDK2 and GSK-3β. The oxindole ring is accommodated in the hinge region interacting through hydrogen bonding with the backbone CO and NH of the key amino acids Glu81 and Leu83, respectively, in CDK2 and Asp133 and Val135, respectively, in GSK-3β. Whereas, in series 7 and 13, the N1 -substitutions on the oxindole nucleus hinder the compounds from achieving these key interactions with hinge region amino acids what rationalises their moderate to low anti-proliferative activity.

No.	Publication	IF	Citations
60.	Rasha M. Hassan, Mona E. Aboutabl, Manuela Bozzi, Mohammed F. El-Behairy, **Ahmed M. El Kerdawy**, Beatrice Sampaolese, Claudia Desiderio, Federica Vincenzoni, Francesca Sciandra, Iman A.Y. Ghannam. "Discovery of 4-benzyloxy and 4-(2-phenylethoxy) chalcone fibrate hybrids as novel PPARα agonists with anti-hyperlipidemic and antioxidant activities: Design, synthesis and in vitro/in vivo biological evaluation", *Bioorganic Chemistry*,**115**, 105170, (**2021**). Doi: 10.1016/j.bioorg.2021.105170	5.725	0

Abstract

In the current work, a series of novel 4-benzyloxy and 4-(2-phenylethoxy) chalcone fibrate hybrids (10a-o) and (11a-e) were synthesized and evaluated as new PPARα agonists in order to find new agents with higher activity and fewer side effects. The 2-propanoic acid derivative 10a and the 2-butanoic acid congener 10i showed the best overall PPARα agonistic activity showing Emax% values of 50.80 and 90.55%, respectively, and EC50 values of 8.9 and 25.0 µM, respectively, compared to fenofibric acid with Emax = 100% and EC50 = 23.22 µM, respectively. These two compounds also stimulated carnitine palmitoyltransferase 1A gene transcription in HepG2 cells and PPARα protein expression. Molecular docking simulations were performed for the newly synthesized compounds to study their predicted binding pattern and energies in PPARα active site to rationalize their promising activity. In vivo, compounds 10a and 10i elicited a significant hypolipidemic activity improving the lipid profile in triton WR-1339-induced hyperlipidemic rats, including serum triglycerides, total cholesterol, LDL, HDL and VLDL levels. Compound 10i possessed better anti-hyperlipidemic activity than 10a. At a dose of 200 mg/kg, it demonstrated significantly lower TC, TG, LDL and VLDL levels than that of fenofibrate at the same dose with similar HDL levels. Compounds 10i and 10a possessed atherogenic indices (CRR, AC, AI, CRI-II) like that of fenofibrate. Additionally, a promising antioxidant activity indicated by the increased tissue reduced glutathione and plasma total antioxidant capacity with decreased plasma malondialdehyde levels was demonstrated by compounds 10a and 10i. No histopathological alterations were recorded in the hepatic tissue of compound 10i (200 mg/kg).



No.	Publication	IF	Citations
61.	Heba Ibrahim, A. Abdo, **Ahmed M. El Kerdawy**, A. Sharaf Eldin. "Signal Detection in Pharmacovigilance: A Review of Informatics-driven Approaches for the Discovery of Drug-Drug Interaction Signals in Different Data Sources", *Artificial Intelligence in the Life Sciences*, **1**, 100005, (**2021**). Doi: 10.1016/j.ailsci.2021.100005	----------	0

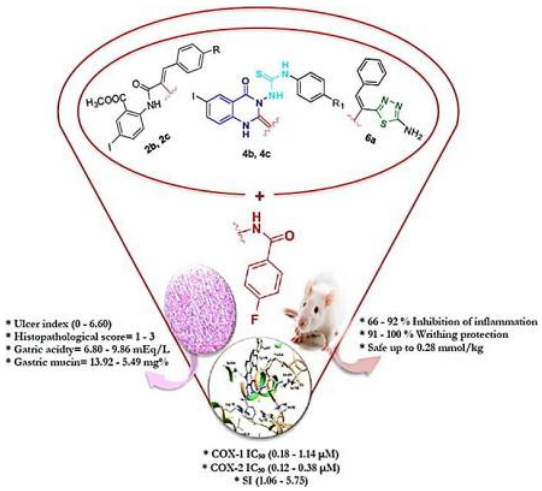
Abstract

The objective of this article is to review the application of informatics-driven approaches in the pharmacovigilance field with focus on drug-drug interaction (DDI) safety signal discovery using various data sources. Signal can be a new safety information or new aspect to already known adverse drug reaction which is possibly causally related to a medication/medications that warrants further investigation to accept or refute. Signals can be detected from different data sources such as spontaneous reporting system, scientific literature, biomedical databases and electronic health records. This review is substantiated based on the fact that DDIs are contributing to a public health problem represented in 6-30% adverse drug event occurrences. In this article, we review informatics-driven approaches applied by authors focusing on DDI signal detection using different data sources. The aim of this article is not to laboriously survey all PV literature. As an alternative, we discussed informatics-driven methods used to discover DDI signals and various data sources reinforced with instances of studies from PV literature. The adoption of informatics-driven approaches can complement and optimize the practice of safety signal detection. However, further research should be carried out to evaluate the efficiency of those approaches and to address the limitations of external validation, implementation and adoption in real clinical environments and by the regulatory bodies.

No.	Publication	IF	Citations
62.	Peter A. Halim, Hanan H. Georgey, Mina Y. George, **Ahmed M. El Kerdawy**, Mona F. Said. "Design and synthesis of novel 4-fluorobenzamide-based derivatives as promising anti-inflammatory and analgesic agents with an enhanced gastric tolerability and COX-inhibitory activity", *Bioorganic Chemistry*,**115**, 105253, (**2021**). Doi: 10.1016/j.bioorg.2021.105253	5.725	0

Abstract

Responding to the great demand of developing potent NSAIDs with an enhanced safety profile and reasonable selectivity, in the present study novel 4-fluorobenzamide derivatives were synthesized and screened for their anti-inflammatory and analgesic activities using carrageenan-induced rat paw edema method and acetic acid-induced abdominal writhing in mice, respectively. All the new target compounds except the carbamothioylhydrazine series (5a-d), and the 4-fluorophenyl thiadiazolo derivative 6b showed promising anti-inflammatory activity ranged between 53.43 and 92.36% inhibition of edema (at 3 h) compared to the reference standard indomethacin (65.64%). All the newly synthesized compounds showed potent analgesic activity ranged between 71 and 100 % writhing protection compared to indomethacin (74.06%). Moreover, the most active compounds; the ester hybrids 2a,b, the thioureido quinazolinones 4b,c, and the thiadiazole congener 6a, showed promising gastric tolerability with ulcer index ranged between 0 and 6.60 compared to indomethacin (12.13). The thioureido quinazolinone derivatives 4b,c showed the most potent anti-inflammatory and analgesic activities with a remarkable gastric tolerability compared to the other derivatives. The 4-chlorophenyl derivative 4b is considered the most promising analogue showing 92.36% inhibition of edema, 100% writhing protection in analgesia testing, and a COX-2 selectivity index of 5.75 which was better than that of indomethacin and celecoxib standards (selectivity index = 0.27 and 4.55; respectively). Moreover, it showed an ulcer index equals zero with gastric acidity and mucin levels comparable to that of the control group indicating its minor effect on gastric cell physiology and its high tolerability. Molecular docking studies predicted the binding pattern of the newly synthesized compounds in COX-1 and COX-2 enzymes confirming the ability of the most active candidates to satisfy the structural features required for binding and rationalized their selectivity based on their docking binding patterns and scores. Furthermore, the newly synthesized 4-fluorobenzamide derivatives possess promising predicted pharmacokinetic properties indicated by calculating their key physicochemical parameters and absorption percentages.



No.	Publication	IF	Citations
63.	Heba Ibrahim, **Ahmed M. El Kerdawy**, A. Abdo, A. Sharaf Eldin "Similarity-based machine learning framework for predicting safety signals of adverse Drug–Drug interactions", *Informatics in Medicine Unlocked*, 100669, (**2021**). Doi: 10.1016/j.imu.2021.100699.	2.110	0

Abstract

Drug–drug interaction (DDI) is a major public health problem contributing to 30% of the unexpected clinical adverse drug events. Informatics-based studies for DDI signal detection have been evolving in the last decade. We aim at providing a boosted machine learning (ML) framework to predict novel DDI safety signals with high precision. We propose a similarity-based machine learning framework called "SMDIP" using DrugBank as one of the most reliable pharmaceutical knowledge bases. For this study, DrugBank provides the latest drug information in terms of DDIs, targets, enzymes, transporters, and carriers. We computed drug–drug similarities using a Russell–Rao measure for the available biological and structural information on DrugBank for representing the sparse feature space. Logistic regression is adopted to conduct DDI classification with a focus on searching for key similarity predictors. Six types of ML models are deployed on the selected DDI key features. Our study reveals that SMDIP has yielded favourable predictive performance compared to relevant studies with results as follows: AUC 76%, precision 82%, accuracy 79%, recall 62%, specificity 90%, and F-measure 78%. To further confirm the reliability and reproducibility of SMDIP, we investigate SMDIP on an unseen subset of direct-acting-antiviral (DAA) drugs for treating hepatitis C infections. Forty novel DAA DDIs are predicted that show consistency with the pharmacokinetic and pharmacodynamic profiles of these drugs. Furthermore, several reports from the pharmacovigilance literature corroborate our framework results. Those evaluations show that SMDIP is a promising framework for uncovering DDIs, which can be multifariously feasible in drug development, postmarketing surveillance, and public health fields.

No.	Publication	IF	Citations
64.	Samar M. Shawki, **Mohammed A. Saad**, Rania M. Rahmo, Walaa Wadie and Hanan S. El-Abhar, "Liraglutide Improves Cognitive and Neuronal Function in 3-NP Rat Model of Huntington's Disease", Frontiers in pharmacology, Epub. Ahead of print, (**2021**). https://doi.org/10.3389/fphar.2021.731483.	5.811	0

Abstract

Huntington's disease (HD) is an autosomal dominant inherited neurodegenerative disease characterized by progressive motor, psychiatric, and cognitive abnormalities. The antidiabetic drug liraglutide possesses a neuroprotective potential against several neurodegenerative disorders; however, its role in Huntington's disease (HD) and the possible mechanisms/trajectories remain elusive, which is the aim of this work. Liraglutide (200 µg/kg, s.c) was administered to rats intoxicated with 3-nitropropionic acid (3-NP) for 4 weeks post HD model induction. Liraglutide abated the 3-NP-induced neurobehavioral deficits (open field and elevated plus maze tests) and histopathological changes. Liraglutide downregulated the striatal mRNA expression of HSP 27, PBR, and GFAP, while it upregulated that of DARPP32. On the molecular level, liraglutide enhanced striatal miR-130a gene expression and TrKB protein expression and its ligand BDNF, while it reduced the striatal protein content and mRNA expression of the death receptors sortilin and p75NTR, respectively. It enhanced the neuroprotective molecules cAMP, p-PI3K, p-Akt, and p-CREB, besides modulating the *p*-GSK-3β/*p*-β-catenin axis. Liraglutide enhanced the antioxidant transcription factor Nrf2, abrogated TBARS, upregulated both Bcl2 and Bcl-XL, and downregulated Bax along with decreasing caspase-3 activity. Therefore, liraglutide exerts a neurotherapeutic effect on 3-NP-treated rats that is, besides the upturn of behavioral and structural findings, it at least partially, increased miR-130a and modulated PI3K/Akt/CREB/BDNF/TrKB, sortilin, and p75NTR, and Akt/GSK-3β/*p*-β-catenin trajectories besides its capacity to decrease apoptosis and oxidative stress, as well as its neurotrophic activity.

No.	Publication	IF	Citations
65.	Soha Ramadan, Manal M. Sabry, **Muhammed A Saad**, Simone Angeloni, Omar M. Sabry, Giovanni Caprioli & Soheir M. El Zalabani "Dismantling Parkinson's disease with herbs: MAO-B inhibitory activity and quantification of chemical constituents using HPLC-MS/MS of Egyptian local market plants", Natural Product Research, Epub. Ahead of print, (**2021**). https://doi.org/10.1080/14786419.2021.2013836.	2.862	0

Abstract

Withania somnifera, Angelica sinensis, Glycyrrhiza glabra, and Simmondsia chinensis were acquired from the Egyptian market, profiled for their chemical constituents, screened for the in-vitro MAO-B inhibitory activity and evaluated for the total phenolic content. Thirty compounds were characterized in the selected herbs using HPLC-MS/MS. In-vitro MAO-B inhibitory activity and total phenolic content of the acquired herbs were compared with those of a prepared herbal formula consisting of a mixture of equal amounts of the four mentioned herbs. The most potent MAO-B inhibitory activity was exerted by the methanol extract of the prepared formula (IC_{50} of 712.19 ± 13.90 ng/mL) compared to selegiline (IC_{50} of 581.69 ± 11.35 ng/mL). The highest value of the total phenolic content was shown by Angelica sinensis methanolic extract (76.15 ± 0.1 mg/g) followed by Glycyrrhiza glabra methanolic extract (65.74 ± 0.1 mg/g), then the mixture's methanolic extract of the four herbs (37.04 ± 0.1 mg/g).

No.	Publication	IF	Citations
66.	**Muhammed A.Saad**, Maha A.E. Ahmed, Norhan N.Elbadawy, Noha F.Abdelkader "Nano-ivabradine averts behavioral anomalies in Huntington's disease rat model via modulating Rhes/m-tor pathway", Progress in Neuro-Psychopharmacology and Biological Psychiatry, **111**, (**2021**), 110368. https://doi.org/10.1016/j.pnpbp.2021.110368.	5.067	1

Abstract

Huntington's disease (HD) is characterized by abnormal involuntary movements together with cognitive impairment and disrupted mood changes. 3-nitropropionic acid (3-NP) is one of the chemo-toxic models used to address the striatal neurotoxicity pattern encountered in HD. This study aims to explain the neuroprotective effect of nano-formulated ivabradine (nano IVA) in enhancing behavioral changes related to 3-NP model and to identify the involvement of ras homolog enriched striatum (Rhes)/mammalian target of rapamycin (m-Tor) mediated autophagy pathway. Rats were divided into 6 groups, the first 3 groups received saline (control), ivabradine (IVA), nano IVA respectively, the fourth received a daily dose of 3-NP (20 mg/kg, s.c) for 2 weeks, the fifth received 3-NP + IVA (1 mg/kg, into the tail vein, every other day for 1 week) and the last group received 3-NP + nano IVA (1 mg/kg, i.v, every other day for 1 week). Interestingly, nano IVA reversed motor disabilities, improved memory function and overcame the psychiatric changes. It boosted expression of autophagy markers combined with down regulation of Rhes, m-Tor and b-cell lymphoma 2 protein levels. Also, it restored the normal level of neurotransmitters and myocardial function related-proteins. Histopathological examination revealed a preserved striatal structure with decreased number of darkly-degenerated neurons. In conclusion, the outcomes of this study provide a well-recognized clue for the promising neuroprotective effect of IVA and the implication of autophagy and Rhes/m-Tor pathways in the 3-NP induced HD and highlight the fact that nano formulations of IVA would be an auspicious approach in HD therapy.

No.	Publication	IF	Citations
67.	Rofida A. Saleh, Tarek F. Eissa, Dalaal M. Abdallah, **Muhammed A. Saad**, Hanan S. El- Abhar. "Peganum harmala enhanced GLP-1 and restored insulin signaling to alleviate AlCl3-induced Alzheimer-like pathology model." *Scientific reports*, **11**, 12040, (**2021**). https://doi.org/10.1038/s41598-021-90545-4.	4.380	2

Abstract

Peganum harmala (P. harmala) is a folk medicinal herb used in the Sinai Peninsula (Egypt) as a remedy for central disorders. The main constituents, harmine and harmaline, have displayed therapeutic efficacy against Alzheimer's disease (AD); however, the P. harmala potential on sensitizing central insulin to combat AD remains to be clarified. An AD-like rat model was induced by aluminum chloride (AlCl3; 50 mg/kg/day for six consecutive weeks; i.p), whereas a methanolic standardized P. harmala seed extract (187.5 mg/kg; p.o) was given to AD rats starting 2 weeks post AlCl3 exposure. Two additional groups of rats were administered either the vehicle to serve as the normal control or the vehicle + P. harmala seed extract to serve as the P. harmala control group. P. harmala enhanced cognition appraised by Y-maze and Morris water maze tests and improved histopathological structures altered by AlCl3. Additionally, it heightened the hippocampal contents of glucagon-like peptide (GLP)-1 and insulin, but abated insulin receptor substrate-1 phosphorylation at serine 307 (pS307-IRS-1). Besides, P. harmala increased phosphorylated Akt at serine 473 (pS473-Akt) and glucose transporter type (GLUT)4. The extract also curtailed the hippocampal content of beta amyloid (Aβ)42, glycogen synthase (GSK)-3β and phosphorylated tau. It also enhanced Nrf2, while reduced lipid peroxides and replenished glutathione. In conclusion, combating insulin resistance by P. harmala is a novel machinery in attenuating the insidious progression of AD by enhancing both insulin and GLP-1 trajectories in the hippocampus favoring GLUT4 production.

No.	Publication	IF	Citations
68.	Doaa Fathi, Ahmed I.Abulsoud, **Muhammed A.Saad**, Noha N.Nassar, Mina M.Maksimose, Sherine M.Rizk, Mahmoud A.Senousy "Agomelatine attenuates alcohol craving and withdrawal symptoms by modulating the Notch1 signaling pathway in rats", Life Sciences, **284**, (**2021**), 119904. https://doi.org/10.1016/j.lfs.2021.119904.	5.037	0

Abstract

Aim: Alcohol abuse is a significant causative factor of death worldwide. The Notch1 signaling pathway is involved in alcohol tolerance, withdrawal and dependence. Agomelatine is a known antidepressant acting as a melatonin receptor (MT1/2) agonist and a 5-hydroxytryptamine receptor-2C antagonist. However, its effects on alcohol cravings and alcohol withdrawal symptoms have not been investigated. In this study, we assessed the possibility of using agomelatine for the treatment of these symptoms in a rat model of alcoholism and the possible role of Notch1 signaling. Main methods: We induced alcoholism in rats using a free-choice drinking model for 60 days. From day 61, free-choice was continued until day 82 for the craving model, whereas only water was offered in the withdrawal model. Meanwhile, the treated groups for both models received agomelatine (50 mg/kg/day) orally from day 61 to 82, followed by behavioral, histopathological and biochemical assessment. Key findings: Agomelatine treatment caused significant decrease in alcohol consumption with a positive effect on anxiety-like behavior in the open field, memory in the Morris water maze and immobility in the forced swim test. Moreover, agomelatine induced the expression of Notch1 pathway markers, including Notch1, NICD, CREB, CCNE-2, Hes-1, both total and phosphorylated ERK1/2, MMP9, Per2and RGS-2 in the hippocampal formation. By contrast, NMDAR expression was reduced. Furthermore, agomelatine normalized the serum levels of BDNF, cortisol, dopamine and glutamate which were disrupted by alcohol consumption. Significance: Based on these findings, agomelatine reversed alcohol cravings and withdrawal symptoms associated with alcohol dependence by modulating the Notch1 signaling pathway.

No.	Publication	IF	Citations
69.	Amr M. Emam, **Muhammad A. Saad**, Naglaa A. Ahmed, Hala F. Zaki. "Vortioxetine mitigates neuronal damage by restricting PERK/eIF2α/ATF4/CHOP signaling pathway in rats subjected to focal cerebral ischemia-reperfusion", *Life Sciences*, **283**, 119865, (**2021**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2021.119865.	5.037	0

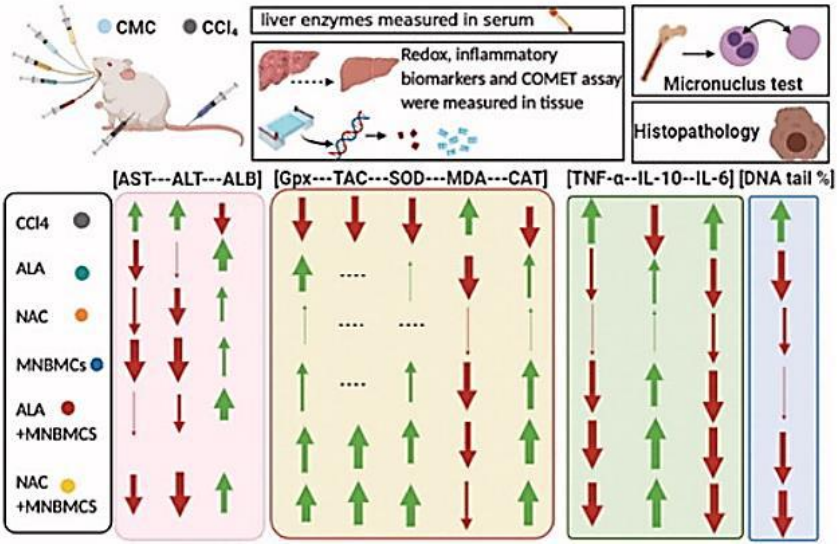
Abstract

Aims: Stroke has risen to the fifth and third most common causes of death in the United States and the rest of the world, respectively. Vortioxetine (VTX) is a multimodal antidepressant agent that balances 5-HT receptors and represses the serotonin transporter. Our study aimed to examine the neuroprotective impacts of VTX against cerebral ischemia caused by occluding the middle cerebral artery (MCA). Main methods: Until the middle cerebral artery occlusion (MCAO) induction, VTX (10 mg/kg/day) was taken orally for 14 days. Behavioral assessments were carried out 24 h after the MCAO technique. The hippocampal and cortical tissues of the brain were isolated to assess the histological changes and the levels of the biochemical parameters. Key findings: MCAO damage led to severe neurological deficits and histopathological damage. However, VTX improved MCAO-induced neurological deficits and ameliorated histopathological changes in both hippocampal and cortical tissues of MCAO rats. Western blot analysis showed increments of p-PERK, CHOP, ASK-1, NICD, HES-1, HES-5, and p-eIF2α expression levels in MCAO rats. Moreover, ELISA revealed an increase in the levels of ATF4, IRE1, Apaf-1, and HIF-1α, while VTX administration ameliorated most of these perturbations induced after MCAO injury. Significance: This research suggests that VTX could be a potent neuroprotective agent against ischemic stroke by inhibiting a variety of oxidative, apoptotic, inflammatory, and endoplasmic reticulum stress pathways.

No.	Publication	IF	Citations
70.	El-Yamany, Muhammed F., Eman S. Zaki, Sherif A. Shaltout, and **Muhammed A. Saad.** "Bone marrow mononuclear cells boosts anti-cytogentical aberration effect of N-Acetylcysteine and α-lipoic acid in rat's liver and bone marrow: Implication of oxidative and inflammatory pathways", *Toxicology Mechanisms and Methods*, 1-13, (**2021**). https://doi.org/10.1080/15376516.2021.1906370.	2.987	0

Abstract

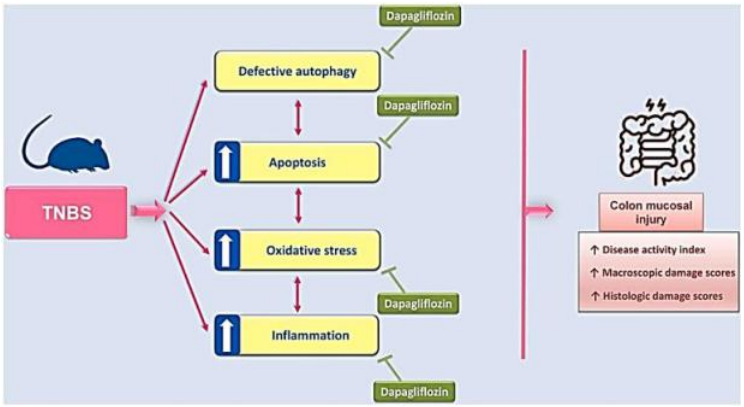
This study investigates the hepatoprotective effect of bone marrow mononuclear cells (BM-MNCs) transplantation, N-acetylcysteine (NAC) and α-lipoic acid (ALA). Rats were administrated carbon tetrachloride (CCl4) (1 mg/kg, i.p.) twice/week for 8 weeks for the induction of hepatotoxicity. 7 groups of rats were used as follows: Normal control, CCl4, CCl4 co-administered with BM-MNCs (1 × 106 in 0.1 ml PBS, i.v.), or NAC (300 mg/kg, p.o) or ALA (100 mg/kg, p.o) single or combination. Liver function was tested by measuring serum alanine aminotransferase (ALT), aspartate aminotransferase (AST) and albumin as well as interleukin-6 (IL-6), interleukin-10 (IL-10), tumor necrosis factor-α (TNF-α), malondialdehyde (MDA), total antioxidant capacity (TAC), glutathione peroxidase (Gpx), superoxide dismutase (SOD) and catalase (CAT) activities in liver homogenates. Besides that, estimation of DNA damage was performed. In addition to Micronucleus test and histopathological investigation. CCl4 treated rats showed elevation in ALT, AST, TNF-α, IL-6 and MDA accompanied by reduction in ALB, IL-10, SOD, CAT, GPx and TAC and increased the number of DNA breaks in liver tissue, showed many micronucleated polychromatic erythrocytes (MnPCEs) in bone marrow. NAC, ALA, BM-MNCs and their combination caused a reduction of ALT, AST, while, increase albumin, CAT, TAC, GPx, SOD as compared to CCl4 treated groups. Also decrease in MDA, IL-6 and TNF-α concurrently with an increase in IL-10. Moreover, BM-MNCs, NAC, ALA, and their combination decreased DNA tail %, and the count of MnPCEs. BM-MNCs combination with NAC or ALA exerted significant antioxidant, anti-inflammatory and anti-cytogenetical aberrations effect compared to each of them alone.Highlights CCl4 elevated ALT, AST, TNF-α, IL-6 and MDA CCl4 reduced ALB, IL-10, SOD, CAT, GPx and TAC CCl4 increased the number of DNA breaks in liver NAC, ALA and BM-MNCs reduced ALT, AST, while, increase albumin, CAT, TAC, GPx, SOD NAC, ALA and BM-MNCs decreased in MDA, IL-6 and TNF-α and increased IL-10.



No.	Publication	IF	Citations
71.	Hany H. Arab, Muhammad Y. Al-Shorbagy, **Muhammed A. Saad**. "Activation of autophagy and suppression of apoptosis by dapagliflozin attenuates experimental inflammatory bowel disease in rats: Targeting AMPK/mTOR, HMGB1/RAGE and Nrf2/HO-1 pathways", *Chemico-Biological Interactions*, **335**, 109368, (**2021**), ISSN 0009-2797. https://doi.org/10.1016/j.cbi.2021.109368.	5.194	12

Abstract

Dapagliflozin, a selective sodium-glucose co-transporter 2 (SGLT2) inhibitor, has featured marked anti-inflammatory effects in murine models of myocardial infarction, renal injury, and neuroinflammation. Yet, its potential impact on the pathogenesis of inflammatory bowel diseases (IBD) has not been previously investigated. The presented study aimed to explore the prospect of dapagliflozin to mitigate 2,4,6 trinitrobenzene sulfonic acid (TNBS)-induced rat colitis model which recapitulates several features of the human IBD. The molecular mechanisms pertaining to the dynamic balance between autophagy/apoptosis and colon injury were delineated, particularly, AMPK/mTOR, HMGB1/RAGE/NF-κB and Nrf2/HO-1 pathways. The colon tissues were examined using immunoblotting, ELISA, and histopathology. Dapagliflozin (0.1, 1 and 5 mg/kg; p.o.) dose-dependently mitigated colitis severity as manifested by suppression of the disease activity scores, macroscopic damage scores, colon weight/length ratio, histopathologic perturbations, and inflammatory markers. More important, dapagliflozin enhanced colonic autophagy via upregulating Beclin 1 and downregulating p62 SQSTM1 protein expression. In this context, dapagliflozin activated the AMPK/mTOR pathway by increasing the p-AMPK/AMPK and lowering the p-mTOR/mTOR ratios, thereby, favoring autophagy. Moreover, dapagliflozin dampened the colonic apoptosis via lowering the caspase-3 activity, cleaved caspase-3 expression, and Bax/Bcl-2 ratio. Furthermore, dapagliflozin attenuated the HMGB1/RAGE/NF-κB pathway via lowering HMGB1, RAGE, and p-NF-κBp65 protein expression. Regarding oxidative stress, dapagliflozin lowered the oxidative stress markers and augmented the Nrf2/HO-1 pathway. Together, the present study reveals, for the first time, the ameliorative effect of dapagliflozin against experimental colitis via augmenting colonic autophagy and curbing apoptosis through activation of AMPK/mTOR and Nrf2/HO-1 pathways and suppression of HMGB1/RAGE/NF-κB cascade.



No.	Publication	IF	Citations
72.	**Saad, Muhammad AE**, Mohamed IM Fahmy, Rabab H. Sayed, Muhammad F. El-Yamany, Reham El-Naggar, Ahmed AE Hegazy, and **Muhammad Al-Shorbagy**. "Eprosartan: A closer insight into its neuroprotective activity in rats with focal cerebral ischemia–reperfusion injury.", *Journal of Biochemical and Molecular Toxicology*, (**2021**). https://doi.org/10.1002/jbt.22796.	**3.652**	**0**

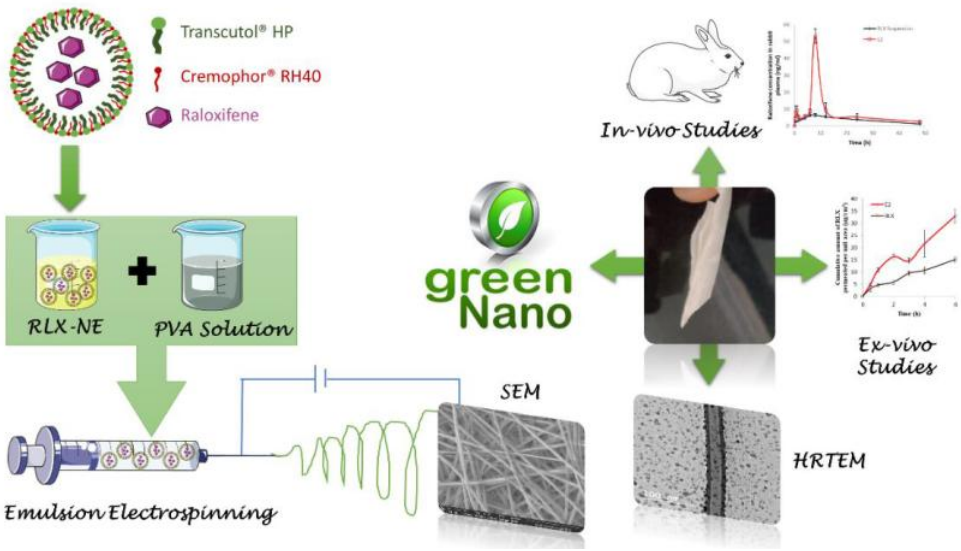
Abstract

Eprosartan (EPRO), an angiotensin receptor type-1 (AT-1) blocker, exhibited neuroprotective activities in ischemic stroke resulting from focal cerebral ischemia in rats. The current study aimed to clarify the neuroprotective role of EPRO in middle carotid artery occlusion (MCAO)-induced ischemic stroke in rats. Fifty-six male Wistar rats were divided into four groups (n = 14 per group): sham-operated group, sham receiving EPRO (60 mg/kg/day, po) group, ischemia–reperfusion (IR) group, and IR receiving EPRO (60 mg/kg/day, po) group. MCAO led to a remarkable impairment in motor function together with stimulation of inflammatory and apoptotic pathways in the hippocampus of rats. After MCAO, the AT1 receptor in the brain was stimulated, resulting in activation of Janus kinase 2/signal transducers and activators of transcription 3 signaling generating more neuroinflammatory milieu and destructive actions on the hippocampus. Augmentation of caspase-3 level by MCAO enhanced neuronal apoptosis synchronized with neurodegenerative effects of oxidative stress biomarkers. Pretreatment with EPRO opposed motor impairment and decreased oxidative and apoptotic mediators in the hippocampus of rats. The anti-inflammatory activity of EPRO was revealed by downregulation of nuclear factor-kappa B and tumor necrosis factor-β levels and (C–X–C motif) ligand 1 messenger RNA (mRNA) expression. Moreover, the study confirmed the role of EPRO against a unique pathway of hypoxia-inducible factor-1α and its subsequent inflammatory mediators. Furthermore, upregulation of caveolin-1 mRNA level was also observed along with decreased oxidative stress marker levels and brain edema. Therefore, EPRO showed neuroprotective effects in MCAO-induced cerebral ischemia in rats via attenuation of oxidative, apoptotic, and inflammatory pathways.

No.	Publication	IF	Citations
73.	**Nageeb El-Helaly, S.**; Abd-Elrasheed, E.; Salim, S.A.; Fahmy, R.H.; Salah, S.; EL-Ashmoony, M.M. "Green Nanotechnology in the Formulation of a Novel Solid Dispersed Multilayered Core-Sheath Raloxifene-Loaded Nanofibrous Buccal Film; In Vitro and In Vivo Characterization", *Pharmaceutics*, **13**, 474, (**2021**). https://doi.org/10.3390/pharmaceutics13040474.	6.321	2

Abstract

Green nanotechnology utilizes the principles of green chemistry to formulate eco-friendly nanocarrier systems to mitigate patients and environment hazards. Raloxifene (RLX) demonstrates poor aqueous solubility (BCS class II) and low bioavailability, only 2% (extensive first-pass metabolism). The aim of this study is to enhance RLX solubility and bioavailability via development of novel solid dispersed multilayered core-sheath RLX-loaded nanofibers (RLX-NFs) without the involvement of organic solvents. A modified emulsion electrospinning technique was developed. Electrospinning of RLX-nanoemulsion (RLX-NE) with polymer solution (Poly vinyl alcohol (PVA), hydroxypropyl methylcellulose (HPMC) and Chitosan (CS)) in different volume ratios (1:9, 2:8 and 4:6) using D-optimal response surface methodology was adopted. In-vitro characterization of RLX-loaded NFs was performed; scanning electron microscope (SEM), thermal analysis, drug content, release studies and bioadhesion potential. The optimum NFs formula was evaluated for morphology using high resolution transmission electron microscopy (HRTEM), and ex-vivo drug permeation. The superiority of E2 [comprising RLX-NE and PVA (2:8)] over other NFs formulae was statistically observed with respect to Q60 (56.048%), Q240 (94.612%), fiber size (594.678 nm), mucoadhesion time 24 h, flux (5.51 µg/cm2/h) and enhancement ratio (2.12). RLX pharmacokinetics parameters were evaluated in rabbits following buccal application of NFs formula E2, relative to RLX oral dispersion. E2 showed significantly higher Cmax (53.18±4.56 ng/mL), and relative bioavailability (≈ 2.29 folds).



No.	Publication	IF	Citations
74.	Tawfik, M.A., Mohamed, M.I., Tadros, M.I., **El-Helaly S.N.** "Low-Frequency Sonophoresis as an Active Approach to Potentiate the Transdermal Delivery of Agomelatine-Loaded Novasomes: Design, Optimization, and Pharmacokinetic Profiling in Rabbits." AAPS PharmSciTech **22**, 261 (**2021**). https://doi.org/10.1208/s12249-021-02147-y	3.246	0

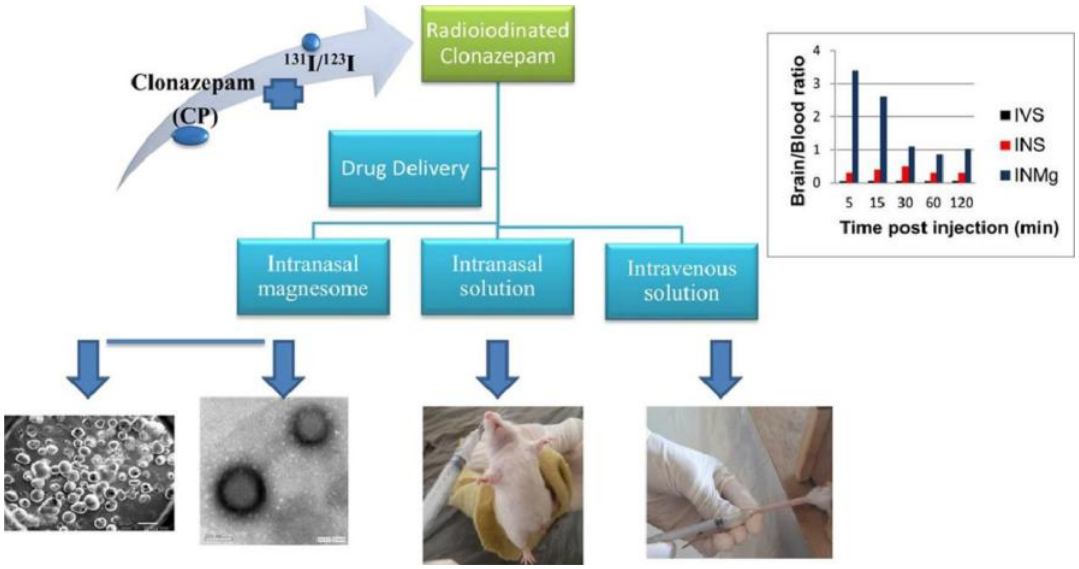
Abstract

The first melatonergic antidepressant drug, agomelatine (AGM), is commonly used for controlling major depressive disorders. AGM suffers low (<5%) oral bioavailability owing to the hepatic metabolism. The current work investigated the potential of low-frequency sonophoresis on enhancing transdermal delivery of AGM-loaded novasomes and, hence, bioavailability of AGM. Drug-loaded novasomes were developed using free fatty acid (stearic acid or oleic acid), surfactant (span 60 or span 80), and cholesterol via thin-film hydration technique. The systems (N1-N16) were assessed for zeta potential (ZP), particle size (PS), encapsulation efficiency (EE%), and drug percent released after 0.5 h (Q0.5 h) and 8 h (Q8h), drug-crystallinity, morphology, and ex vivo drug permeation. Skin pre-treatment with low-frequency ultrasound (LFU) waves, via N13-novasomal gel systems, was optimized to enhance ex vivo drug permeation. Influences of LFU mode (continuous or pulsed), duty cycle (50% or 100%), and application period (10 or 15 min) were optimized. The pharmacokinetics of the optimized system (N13-LFU-C4) was assessed in rabbits. N13 was the best achieved novasomal system with respect to PS (471.6 nm), ZP (−63.6 mv), EE% (60.5%), Q0.5 h (27.8%), Q8h (83.9%), flux (15.5 µg/cm^2/h), and enhancement ratio (6.9). N13-LFU-C4 was the optimized novasomal gel system (desirability; 0.997) which involves skin pre-treatment with LFU in a continuous mode, at 100% duty cycle, for 15 min. Compared to AGM dispersion, the significantly ($P<0.05$) higher flux (26.7 µg/cm^2/h), enhancement ratio (11.9), Cmax (118.23 ng/mL), and relative bioavailability (≈ 8.6 folds) could elucidate the potential of N13-LFU-C4 system in improving transdermal drug permeability and bioavailability.

No.	Publication	IF	Citations
75.	Marwa Eid Sayyed, Mohamed AbdEl-Motaleb, Ismail Taha Ibrahim, Hassan Medhat Rashed, Mohamed Ahmed El-Nabarawi, **Mohamed Abdallah Ahmed**. "Preparation, characterization, and in vivo biodistribution study of intranasal 131I-clonazepam-loaded phospholipid magnesome as a promising brain delivery system: Biodistribution and pharmacokinetic behavior of intranasal 131I-Clonazepam loaded phospholipid magnesome as a potential brain targeting system", *European Journal of Pharmaceutical Sciences*, **169**, 106089, (**2021**). https://doi.org/10.1016/j.ejps.2021.106089	4.384	0

Abstract

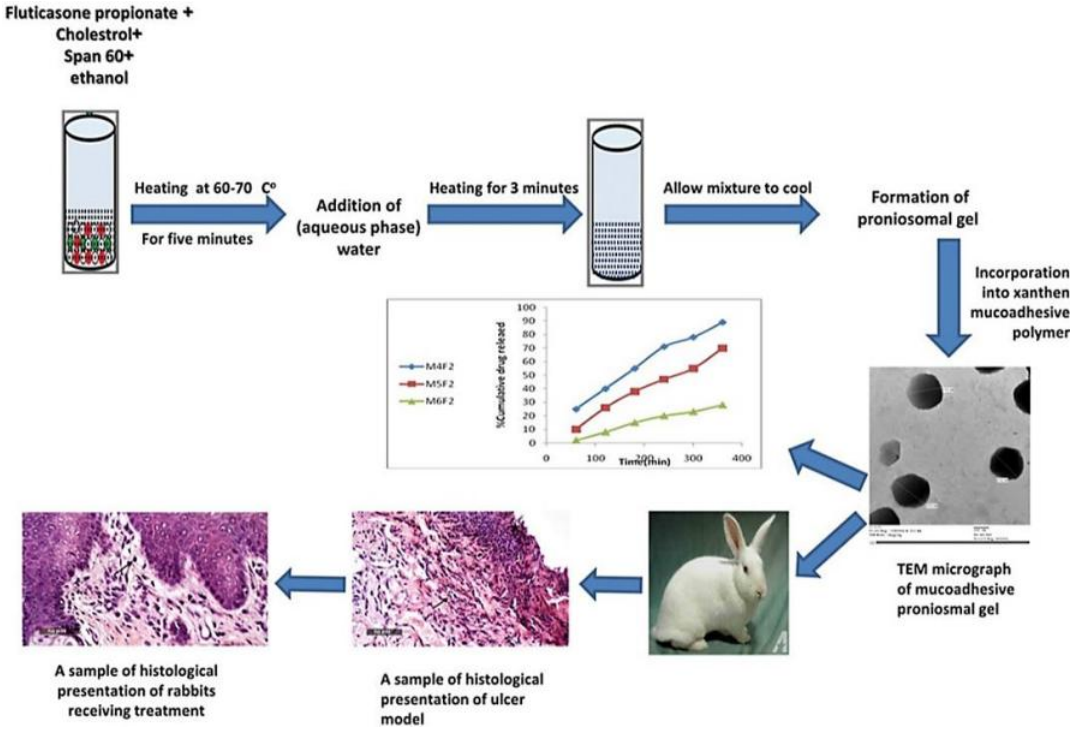
Objective: Clonazepam (CP) is a potent long-acting nitrobenzodiazepine derivative that could be used for targeting peripheral benzodiazepine receptors. Phospholipid magnesome is a new vesicular nanosystem recently developed for brain targeting. Improving the uptake of 131I-CP to the brain might be effective for the diagnosis and/or radiotherapy of certain brain diseases and/or tumors. Methods: CP was radiolabeled with 131I using direct electrophilic substitution reaction. Quality control of 131I-CP was performed using different techniques. Different formulas of 131I-CP were prepared and characterized according to particle size and polydispersity index. The structural features of the optimized formula were then interpreted using transmission electron microscopy and scanning electron microscopy, whereas pharmacokinetic and in vivo behaviors were estimated using the intravenous and intranasal delivery routes. Results: The heart and blood demonstrated lower uptake of 131I-CP, which inevitably decreased the nontarget effects of radioiodine. Intranasally administered 131I-CP-loaded magnesomes (INMg) had noticeably higher brain uptake (7.1 ± 0.09%ID/g) with rapid onset of action within 5 min and effective pharmacokinetic behavior. INMg had a drug targeting efficiency and nose-to-brain direct transport percentage of 121.1% and 94.6%, respectively as well as a relative bioavailability of 441.04 ± 75.5%. Conclusion: The present study showed that 131I-CP-loaded magnesomes can be a beneficial brain-targeting approach for improving the diagnosis and/or radiotherapy of certain brain diseases.



No.	Publication	IF	Citations
76.	**Mohamed Abdallah Ahmed**, Wedian Younis Abdelgawad, Mary Kamal Gad, Magdy Ibrahim Mohamed. "A novel approach for the treatment of oral ulcerative lesion using mucoadhesive proniosome gel", *Journal of Drug Delivery Science and Technology*, 102460, (**2021**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2021.102460.	2.734	1

Abstract

A mucoadhesive proniosome gel containing a potent corticosteroid drug (fluticasone propionate) was formulated for the local treatment of oral ulcerative lesions. The formula was made-up in an attempt to avoid the drug's severe systemic adverse effects, moreover, ensuring both efficacy and safety. Full factorial design was employed to prove the significant effect of surfactant type and cholesterol concentration on entrapment efficiency and vesicle size of the formulated proniosome gels. The optimum formula with an entrapment efficiency of 85.5 ± 2.4% was incorporated into mucoadhesive gels using different mucoadhesive polymers, namely, xanthan gum or sodium alginate. The effects of the polymer type and its concentration on the quantity of fluticasone propionate release as well as on the mucoadhesion force were studied. The optimum formula was found to possess a mucoadhesion force of 14425 ± 5.4 dyne/cm^2 and maximum quantity of drug release of 89± 0.09 % which showed to follow Higuchi diffusion model of release. High-resolution transmission electron micrographs revealed that the chosen formula was smooth, homogenous and in nano size range. Cytotoxicity assay test was conducted to ensure the safety of the optimum formula. Curing of oral ulcerative lesions using an animal model was assessed and emphasized by the histopathological findings.



No.	Publication	IF	Citations
77.	A. Ramadan, E.B. Basalious and **M. Abdallah.** "Industrial application of QbD and NIR chemometric models in quality improvement of immediate release tablets", *Saudi Pharmaceutical Journal*, (**2021**), ISSN 1319-0164. https://doi.org/10.1016/j.jsps.2021.04.012.	2.879	1

Abstract

Quality by Design (QbD) and chemometric models are different sides of the same coin. While QbD models utilize experimentally designed settings for optimization of some quality attributes, these settings can also be utilized for chemometric prediction of the same attributes. We aimed to synchronize optimization of comparative dissolution results of **carvedilol** immediate release tablets with chemometric prediction of dissolution profile and content uniformity of the product. As an industrial application, selection of variables for optimization was done by performing risk assessment utilizing the archived product records at the pharmaceutical site. Experimental tablets were produced with 20 different settings with the variables being contents of sucrose, **sodium starch glycolate**, lactose monohydrate, and **avicel Ph 101**. Contents of the **excipients** were modelled with F1 dissimilarity factor and F2 similarity factor in HCL, acetate, and USP dissolution media to determine the design space. We initiatively utilized Partial Least Square based Structural Equation Modelling (PLS-SEM) to explore how the excipients and their NIR records explained dissolution of the product. Finally, the optimized formula was utilized with varied content of carvedilol for chemometric prediction of the content uniformity.

No.	Publication	IF	Citations
78.	El-Haddad AE, El-Deeb EM, Amer AA, **Saadeldeen AM**, Ahmed FM, Salem MA, Taha HS. "Bioactive Phytoconstituents of Morus Plants exhibiting Numerous Therapeutic Activities", *Egyptian Journal of Chemistry*, (**2021**). https://doi.org/10.21608/EJCHEM.2021.76688.3788	----------	0

Abstract

Morus is a plant genus of the family Moraceae, most of which is used as a decoction in traditional medicines for the treatment of cough, bronchitis, pulmonary diseases and reduces the plasma sugar level. Many studies on Morus phytochemistry have contributed to the discovery of Diels-Alder-type adducts, arylbenzofurans, and flavonoids with antioxidant, antihyperglycemic, antihypertensive, antihyperlipidemic, and anti-inflammatory activities. The purpose of this article was to offers an account of the updated knowledge on the phytochemicals and pharmacological activities of these compounds. This review will help to fully understanding the efficacy and pave the way for further explore the comprehensive use of Morus. We conclude that Morus needs many more reports in the identification of bioactive constituents to strengthen the claim of folk medicines.

No.	Publication	IF	Citations
79.	El-Mancy, Shereen S., Alaadin E. El-Haddad, Walaa A. Alshareef, **Amr M. Saadeldeen**, Soad Z. El-Emam, and Osama S. Elnahas. "Enhancement of Antimicrobial and Antiproliferative Activities of Standardized Frankincense Extract Using Optimized Self-Nanoemulsifying Delivery System", *Scientia Pharmaceutica,* **89(3)**, 36, (**2021**). https://doi.org/10.3390/scipharm89030036.	----------	0

Abstract

Boswellic acids (BAs) are the main bioactive compounds of frankincense, a natural resin obtained from the genus Boswellia. This study aimed to develop a self-nanoemulsifying delivery system (SNEDS) to improve the antimicrobial and antiproliferative activities of standardized frankincense extract (Fr-extract). Fr-extract was standardized, and BA content was quantified using the developed HPLC-UV method. Screening studies of excipients followed by formula optimization using a mixture simplex lattice design was employed. The optimized Fr-SENDS formulation was characterized. Furthermore, microbiological and antiproliferative assessments of the standardized Fr-extract and Fr-SNEDS were evaluated. Quantification demonstrated that the major constituent is 11-keto-boswellic acid (KBA) (16.25%) among BA content (44.96%). The optimized Fr-SENDS (composed of 5% CapryolTM 90, 48.7% Gelucire® 44/14 and 46.3% ethanol) showed spherical nanosized dispersions with DS, PDI, and zeta potential of 17.9 nm, 0.2, and −14.5 mV, respectively. Fr-SNEDS exhibited lower MIC and MBC values compared with Fr-extract against pathogens conjugated with lung cancer and was comparable to reference antimicrobials. Fr-SNEDS showed superior antiproliferative activity over Fr-extract, with IC_{50} values of 20.49 and 109.5 µg mL^{-1}, respectively. In conclusion, the optimized Fr-SNEDS could be easily developed and manufactured at a low cost and the in vitro results support its use as a potential adjuvant oral therapy for lung cancer. Further in vivo studies could be continued to assess the therapeutic efficiency of the prepared system.

No.	Publication	IF	Citations
80.	Motawi, Tarek Mohamed Kamal, Nermin Abdel Hamid Sadik, Dina Sabry, **Sally Atef Fahim**, and Nancy Nabil Shahin. "rs62139665 polymorphism in the promoter region of EpCAM is associated with hepatitis C virus-related hepatocellular carcinoma risk in Egyptians." *Frontiers in Oncology*: 5476. (**2021**). DOI: 10.3389/fonc.2021.754104	6.230	0

Abstract:

Hepatocellular carcinoma (HCC) is a universal health problem that is particularly alarming in Egypt. The major risk factor for HCC is hepatitis C virus (HCV) infection which is a main burden in Egypt. The epithelial cell adhesion molecule (EpCAM) is a stem cell marker involved in the tumorigenesis and progression of many malignancies, including HCC. We investigated the association of -935 C/G single nucleotide polymorphism in EpCAM promoter region (rs62139665) with HCC risk, EpCAM expression and overall survival in Egyptians. A total of 266 patients (128 HCV and 138 HCC cases) and 117 age- and sex-matched controls participated in this study. Genotyping, performed using allelic discrimination and confirmed by sequencing, revealed a significant association between EpCAM rs62139665 and HCC susceptibility, with higher GG genotype and G allele distribution in HCC patients than in non-HCC subjects. Such association was not detected in HCV patients compared to controls. EpCAM gene and protein expression levels, determined by RT-qPCR and ELISA, respectively, were significantly higher in GG relative to GC+CC genotype carriers in HCV and HCC patients in a recessive model. ROC analysis of EpCAM protein levels revealed significant discriminatory power between HCC patients and non-HCC subjects, with improved diagnostic accuracy when combining α-fetoprotein and EpCAM compared to that of α-fetoprotein alone. Altogether, EpCAM rs62139665 polymorphism is significantly associated with HCC and with EpCAM gene and protein expression levels in the Egyptian population. Moreover, serum EpCAM levels may hold promise for HCC diagnosis and for improving the diagnostic accuracy of α-fetoprotein.

No.	Publication	IF	Citations
81.	Darwish, Amira Mohamed Galal, Hebatallah H. Abo Nahas, Yasmin H. Korra, **Alaa A. Osman**, Wedad M. El-Kholy, Maria Reyes-Córdova, Essa M. Saied, and Ahmed M. Abdel-Azeem. "Fungal Lipases: Insights into Molecular Structures and Biotechnological Applications in Medicine and Dairy Industry" *Industrially Important Fungi for Sustainable Development*, 461-514, Springer, Cham, (2021). https://doi.org/10.1007/978-3-030-85603-8_13	----------	0

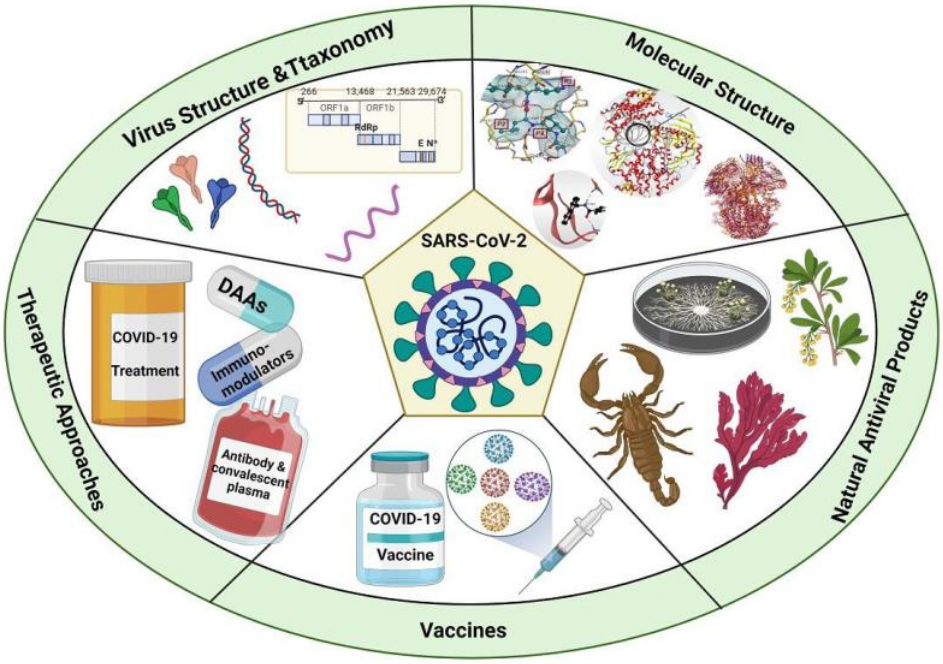
Abstract

Fungal biotechnology can advance the transition to a bio-based circular economy and has the ability to sustainably produce economic food, chemicals, fuels, textiles, and contribute to pharmaceutical and medical applications. Fungal and bacterial lipases as versatile biological catalysts have given a promising prospect in meeting the needs for most industries employing catalytic abilities, hydrolysis, esterification, and transesterification. Fungal lipases exhibit various classes with broad stability to pH ranging from pH 4.0 to 11.0 (alkaline or acidic), temperature ranging from 10 to 96 °C (thermophilic or psychotropic) with diverse catalytic abilities including reversibility of reaction, broad isoelectric points, and substrate specificity. Reduced production costs and easy genetic manipulation supported gaining increased interest. Fungal lipases are extracellular, and their production is influenced by nutritional and physicochemical factors which emphasis the optimization role of fermentation condition for their production. Knowledge of structural features plays an important role in designing and engineering lipases for specific purposes. In silico methods help in the predictions of enzymatic affinity, activity, specificity, and selectivity of newly discovered proteins. This kind of bioinformatics approaches allow the screening of potential target for application in bioremediation and take advantage of fungi enzymes for industrial applications. This chapter describes various sources of lipases, their properties, purification methods, classification, catalytic mechanism, and optimization. We will also shed the light on the3D molecular structures of fungal lipases, bioinformatics approaches, and potential sustainable industrial applications of fungal and bacterial lipases for a green economy which make lipases as biocatalysts of choice for the present and future.

No.	Publication	IF	Citations
82.	Saied EM, El-Maradny YA, **Osman AA**, Darwish AMG, Abo Nahas HH, Niedbała G, Piekutowska M, Abdel-Rahman MA, Balbool BA, Abdel-Azeem AM. "A Comprehensive Review about the Molecular Structure of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): Insights into Natural Products against COVID-19" *Pharmaceutics,* **13(11)**, 1759, (**2021**). https://doi.org/10.3390/pharmaceutics13111759	6.321	0

Abstract

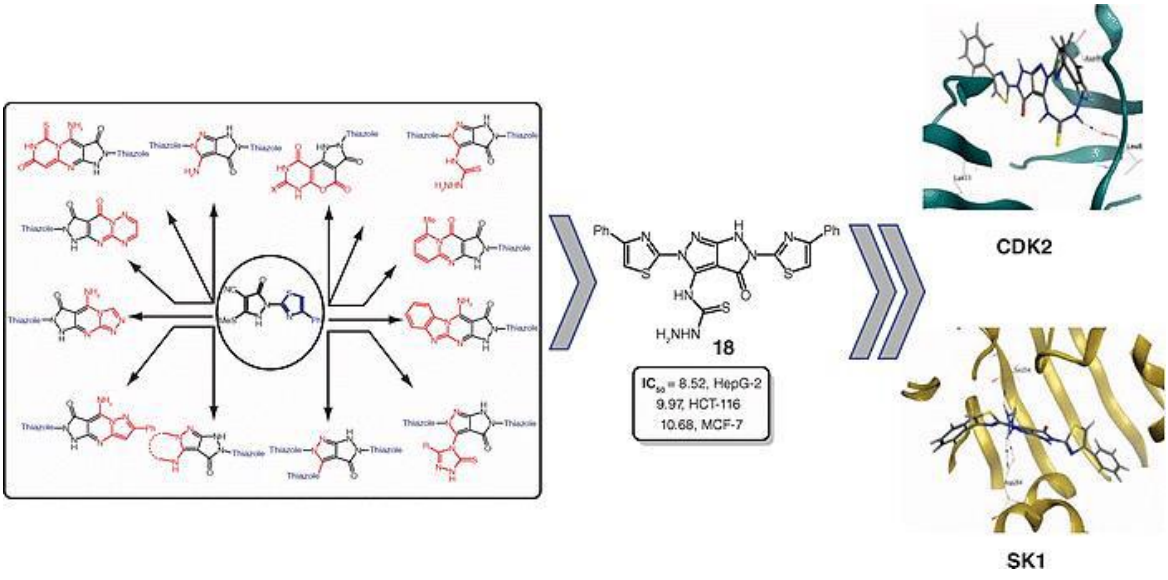
In 2019, the world suffered from the emergence of COVID-19 infection, one of the most difficult pandemics in recent history. Millions of confirmed deaths from this pandemic have been reported worldwide. This disaster was caused by SARS-CoV-2, which is the last discovered member of the family of Coronaviridae. Various studies have shown that natural compounds have effective antiviral properties against coronaviruses by inhibiting multiple viral targets, including spike proteins and viral enzymes. This review presents the classification and a detailed explanation of the SARS-CoV-2 molecular characteristics and structure–function relationships. We present all currently available crystal structures of different SARS-CoV-2 proteins and emphasized on the crystal structure of different virus proteins and the binding modes of their ligands. This review also discusses the various therapeutic approaches for COVID-19 treatment and available vaccinations. In addition, we highlight and compare the existing data about natural compounds extracted from algae, fungi, plants, and scorpion venom that were used as antiviral agents against SARS-CoV-2 infection. Moreover, we discuss the repurposing of select approved therapeutic agents that have been used in the treatment of other viruses.



No.	Publication	IF	Citations
83.	El Azab, Islam H., Essa M. Saied, **Alaa A. Osman**, Amir E. Mehana, Hosam A. Saad, and Nadia AA Elkanzi. "Novel N-bridged pyrazole-1-carbothioamides with potential antiproliferative activity: design, synthesis, in vitro and in silico studies" *Future Medicinal Chemistry*, **13(20)**, 1743-1766, (**2021**). https://doi.org/10.4155/fmc-2021-0066	3.808	1

Abstract

Thiazole-substituted pyrazole is an important structural feature of many bioactive compounds, including antiviral, antitubercular, analgesic and anticancer agents. Herein we describe an efficient and facile approach for the synthesis of two series of 36 novel N-bridged pyrazole-1-phenylthiazoles. The antiproliferative activity of a set of representative compounds was evaluated in vitro against different human cancer cell lines. Among the identified compounds, compound 18 showed potent anticancer activity against the examined cancer cell lines. The in silico molecular docking study revealed that compound 18 possesses high binding affinity toward both SK1 and CDK2. Overall, these results indicate that compound 18 is a promising lead anticancer compound which may be exploited for development of antiproliferative drugs.



NEWGIZA UNIVERSITY
SCHOOL of PHARMACY

International Publications 2020

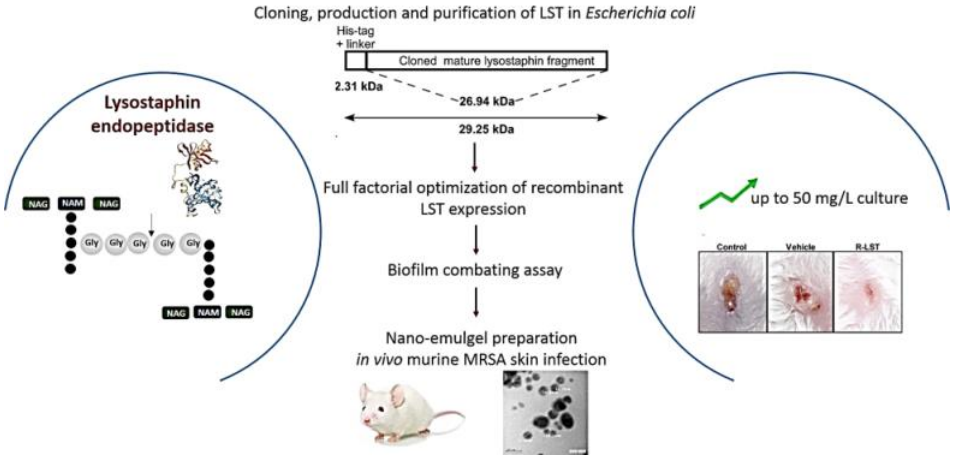
SCHOOL OF PHARMACY INTERNATIONAL PUBLICATIONS 2020

26 International publications with NGU affiliation were published in 2020 with 271 citations.

No.	Publication	IF	Citations
84.	Nour El-Din HT, Elhosseiny NM, El-Gendy MA, Mahmoud AA, **Hussein MMM**, Attia AS. "A Rapid Lysostaphin Production Approach and a Convenient Novel Lysostaphin Loaded Nano-emulgel; As a Sustainable Low-Cost Methicillin-Resistant Staphylococcus aureus Combating Platform", *Biomolecules*. **10(3)**, 435, (**2020**). https://doi.org/10.3390/biom10030435	4.879	6

Abstract

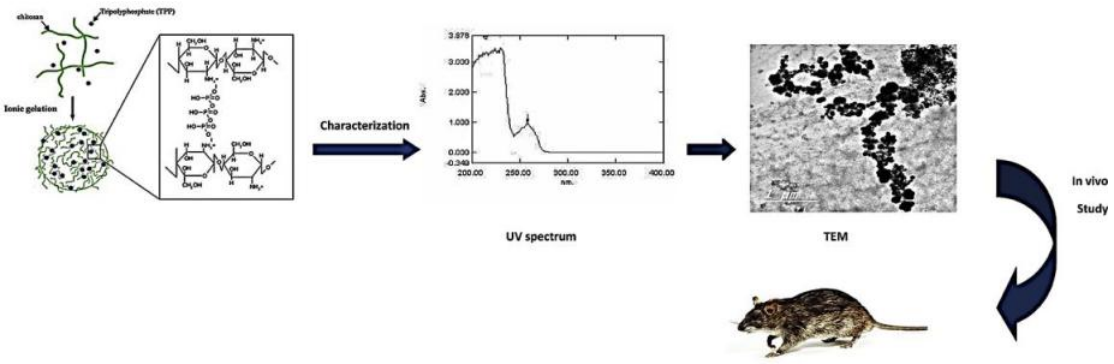
Staphylococcus aureus is a Gram-positive pathogen that is capable of infecting almost every organ in the human body. Alarmingly, the rapid emergence of methicillin-resistant S. aureus strains (MRSA) jeopardizes the available treatment options. Herein, we propose sustainable, low-cost production of recombinant lysostaphin (rLST), which is a native bacteriocin destroying the staphylococcal cell wall through its endopeptidase activity. We combined the use of E. coli BL21(DE3)/pET15b, factorial design, and simple Ni-NTA affinity chromatography to optimize rLST production. The enzyme yield was up to 50 mg/L culture, surpassing reported systems. Our rLST demonstrated superlative biofilm combating ability by inhibiting staphylococcal biofilms formation and detachment of already formed biofilms, compared to vancomycin and linezolid. Furthermore, we aimed at developing a novel rLST topical formula targeting staphylococcal skin infections. The phase inversion composition (PIC) method fulfilled this aim with its simple preparatory steps and affordable components. LST nano-emulgel (LNEG) was able to extend active LST release up to 8 h and cure skin infections in a murine skin model. We are introducing a rapid, convenient rLST production platform with an outcome of pure, active rLST incorporated into an effective LNEG formula with scaling-up potential to satisfy the needs of both research and therapeutic purposes.



No.	Publication	IF	Citations
85.	Sandy N. Aziz, Alia A. Badawy, Demiana I. Nessem, **Nevine S. Abd El Malak**. "Promising nanoparticulate system for topical delivery of diphenhydramine hydrochloride: In-vitro and in-vivo evaluation", *Journal of Drug Delivery Science and Technology*, **55**, 101454, (**2020**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2019.101454	3.981	1

Abstract

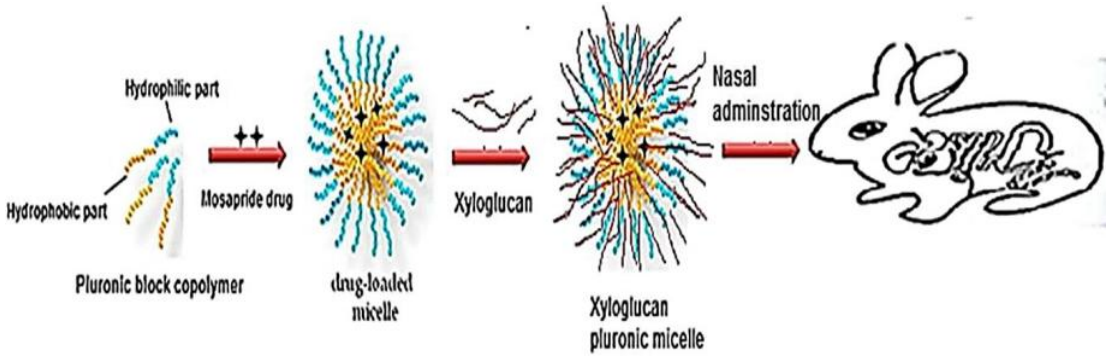
Diphenhydramine hydrochloride is a potent antihistaminic drug; its oral administration often leads to attention disturbance, CNS or anticholinergic adverse effects as dry mouth resulting in a less patient compliance with the therapy. The aim of the current study was to prepare diphenhydramine hydrochloride loaded nanoparticulate system, using chitosan as a natural polymer for topical application. Eight formulae were prepared adopting 23 factorial design. Diphenhydramine hydrochloride loaded nanoparticles were prepared by ionic gelation technique using chitosan and sodium tripolyphosphate (TPP). The formulae were evaluated regarding TEM, entrapment efficiency, particle size, zeta potential, in-vitro release, DSC, XRD, kinetics study, and in-vivo study regarding skin irritation test and histopathological examination using rats. The results revealed that the entrapment efficiency was significantly increased when increasing the chitosan concentration, the drug to polymer ratio and the chitosan to TPP (w/w) ratio. The particle size was significantly increased when increasing the chitosan concentration, the drug to polymer ratio but significantly decreased when increasing the chitosan to TPP (w/w) ratio. The zeta potential was significantly increased by increasing the chitosan concentration, the drug to polymer ratio and the chitosan to TPP (w/w) ratio. The in-vitro release study showed prolongation of drug release up to 6hrs. A comparison was made between the candidate formula (F8) (0.375% of diphenhydramine hydrochloride, drug to polymer 1:2, chitosan concentration 0.75% and chitosan to TPP (w/w) 5:1) and the marketed gel. The skin irritation test of F8 revealed its dermal safety and the statistical analysis revealed significant increase in its antihistaminic activity with reduction in the wheal area (from 150 mm^2 ± 7.8 to 43.6 mm^2 ± 4.9) when compared to the marketed gel (from 155 mm^2 ± 6.1 to 82.1 mm^2 ± 8.54). A value of r = 0.97704 suggested a good correlation between the in vitro-in vivo data of the candidate formula. The results revealed that the developed nanoparticles could have a potential for topical delivery of diphenhydramine hydrochloride.



No.	Publication	IF	Citations
86.	Reham Waheed Hammad, Rania Abdel-Basset Sanad, **Nevine Shawky Abdelmalak**, Faisal A. Torad, Randa Latif. "New intranasal cross-linked mosapride xyloglucan pluronics micelles (MOS-XPMs) for reflux esophagitis disease: In-vitro optimization and improved therapeutic efficacy", *Journal of Advanced Research*, **23**, 83-94, (**2020**), ISSN 2090-1232. https://doi.org/10.1016/j.jare.2020.01.013.	10.479	2

Abstract

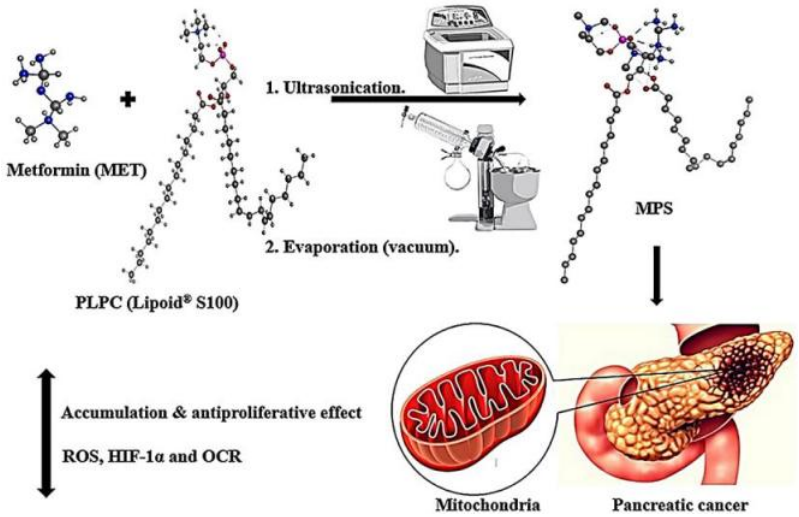
Mosapride belongs to class IV in Biopharmaceutics Classification System and is used in the treatment of reflux esophagitis. It exhibits poor bioavailability due to limited permeability, solubility and extensive first-pass metabolism. In this study, intranasal mosapride-loaded cross-linked xyloglucan Pluronic micelles (MOS-XPMs) was formulated and optimized to improve the low solubility & bioavailability of MOS. The solid dispersion technique using 23 full factorial design was applied. (MOS-XPMs) (F4) had the highest desirability value (0.952) and, therefore, it was selected as an optimal system. Xyloglucan cross-linked in the shell of Pluronic micelles offered improved stability and muco adhesiveness to MOS-XPMs. ^{1}H NMR spectra ensured the cross-linking of xyloglucan with Pluronic micelle shell and micelle stabilization. A Pharmacodynamic study revealed that MOS-XPMs showed 1.5-fold increase in duodenal and cecal motility compared to MOS suspension and 1.7-fold increase compared to the oral marketed product. The new MOS-XPMs were shown to be successful at improving the therapeutic efficacy of mosapride.



No.	Publication	IF	Citations
87.	Farag, Michael M., **Nevine S. Abd El Malak**, Soad A. Yehia, and **Mohammed A. Ahmed.** "Sonocomplexation as an effective tool to enhance the antitumorigenic effect of metformin: Preparation, in vitro characterization, molecular dynamic simulation & MiaPaCa-2 cell line hypoxia evaluation.", *Journal of Drug Delivery Science and Technology*, **59**, 101968, (**2020**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2020.101968.	3.981	2

Abstract

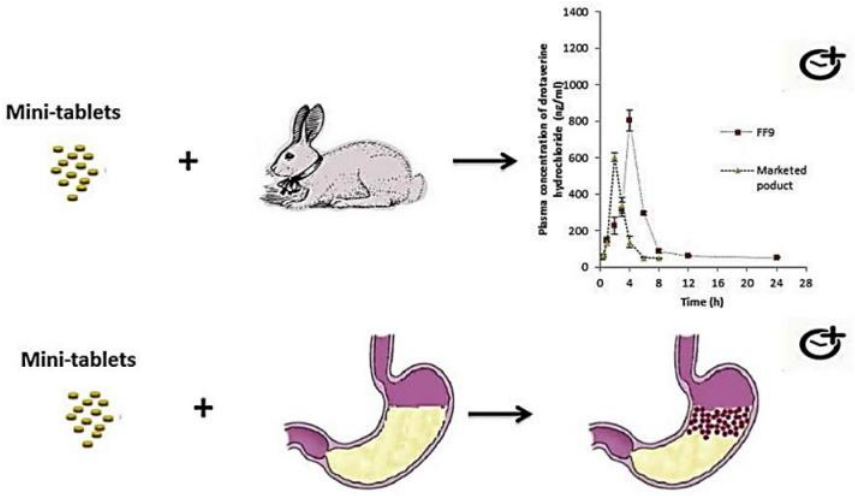
This study aimed to prepare metformin-phospholipid sonocomplexes (MPS) to enhance the lipophilicity, hence the permeability of this highly water-soluble drug. Metformin (MET) is an old antidiabetic drug gaining interest for being recently investigated for its antitumorigenic properties. The polarity of MET makes its cellular uptake dependent on cell membrane transporters which poses a challenging limitation to combat cancer at supraphysiological concentrations unachievable in patients. A D-optimal design was adopted to statistically optimize the formulation variables, namely phospholipid: MET ratio, sonication time and phospholipid type. MPS showed a lipophilicity enhancement up to 19 folds based on the partition coefficient comparative study with pure MET. This vast improvement was explained using the packing parameter theory as we hypothesized the self-assembly of MPS in the lipid phase in the form of inverted micelles. This was confirmed by studying MPS on the molecular level using molecular docking and molecular dynamics simulation. The optimal sonocomplex showed 3.2 folds lower IC_{50}, reduced oxygen consumption rate (OCR), hypoxia-inducible factor (HIF-1α) and reactive oxygen species (ROS) in MiaPaCa-2 cells compared to pure MET. These results revealed the potentiality of MPS to alleviate tumor hypoxia more effectively which could be useful for resistant cancers like pancreatic ductal adenocarcinoma (PDAC).



No.	Publication	IF	Citations
88.	Louis, Mina M., Alia A. Badawy, Demiana I. Nessem, and **Nevine S. Abd Elmalak**. "Drotaverine hydrochloride gastroretentive floating mini-tablets: Formulation, in-vitro and in-vivo evaluation.", Journal of Drug Delivery Science and Technology, **57**, 101733, (**2020**), ISSN 1773-2247. https://doi.org/10.1016/j.jddst.2020.101733	3.981	3

Abstract

Drotaverine hydrochloride (DRH) is an antispasmodic drug which has a short residence in the intestine during diarrhea that prompts poor bioavailability and frequent dosing. The aim of the present study was to increase the gastric residence time and sustain the release of DRH so increasing patient compliance. Nine floating mini-tablets of DRH were prepared employing different amounts of sodium alginate and sodium bicarbonate by wet granulation technique adopting 32 factorial design. The prepared formulae were evaluated for various physical parameters, floating behaviors and in vitro release studies. Formula FF9 (sodium alginate 200 mg and sodium bicarbonate 120 mg) showed optimum floating behavior (floating lag time 49.1 ± 5.3 s and total floating time > 24 h) and optimum sustained release for DRH (7.60 ± 1.25% after 0.5 h and 78.14 ± 3.10% after 12 h). The candidate formula with the highest desirability value (0.942) was evaluated for its bioavailability compared to the marketed product. Statistical analysis revealed significant increase in $AUC_{(0-\infty)}$ 3311.31 ± 182.18 ng h/ml with delayed T_{max} compared to 1589.54 ± 127.97 ng h/ml for the marketed product. The results revealed that FF9 could be a promising candidate for gastroretentive drug delivery system for DRH.



No.	Publication	IF	Citations
89.	Trabik, Yossra A., Eman M. Moenes, **Medhat A. Al-Ghobashy**, Marianne Nebsen, and Miriam F. Ayad. "Analytical comparability study of anti-CD20 monoclonal antibodies rituximab and obinutuzumab using a stability-indicating orthogonal testing protocol: Effect of structural optimization and glycoengineering.", *Journal of Chromatography B*, **1159**, 122359, (**2020**), ISSN 1570-0232. https://doi.org/10.1016/j.jchromb.2020.122359.	1.911	0

Abstract

Glycoengineering and biosimilarity are the key factors for growing, promising and progressive approaches in monoclonal antibodies development. In this study, the physicochemical stability of anti-CD20 rituximab (RTX); originator and biosimilar was compared to its glycoengineered humanized version; obinutuzumab (OBZ). An orthogonal stability-indicating protocol using a set of validated bioanalytical techniques; size exclusion high performance liquid chromatography (SE-HPLC), reversed phase liquid chromatography (RP-HPLC), quantitative gel electrophoresis by TapeStation, receptor binding assay and dynamic light scattering (DLS) was used to investigate the effect of different stress factors on the pattern and kinetics of degradation. SE-HPLC results supported with spectral purity showed similar degradation extent with a different pattern of degradation between RTX and OBZ. A lower tendency to form degraded fragments and a relatively higher favorability for degradation through aggregate formation has been revealed in case of OBZ. Results were in agreement with those of DLS and receptor binding assay which showed specificity to the intact antibodies in the presence of their degradation products. Furthermore, results were additionally confirmed through denaturing quantitative gel electrophoresis which suggested reducible covalent bonds as the mechanism for aggregates formation. RP-HPLC results showed two oxidized forms via excessive oxidation of RTX and OBZ with nearly the same degradation percent. Comparability data of RTX and OBZ using the applied methodologies showed that although glycoengineering; carried out to enhance the therapeutic and biological activity of OBZ altered the pattern of degradation but did not significantly affect the overall stability. Results showed also consistent stability profile between the biosimilar and its originator RTX products.

No.	Publication	IF	Citations
90.	Mohamed, Hadeer G., **Medhat A. Al-Ghobashy**, Mervat A. Fouad, and Hala S. Zaazaa. "Quality Assessment of Lactoferrin in some Marketed Nutraceuticals Derived from Milk using Validated Analytical Methods.", *ChemistrySelect*, **5(46)**, 14816-14825, (**2020**). https://doi.org/10.1002/slct.202003681.	2.109	0

Abstract

In recent years, lactoferrin has received great attention for its nutritional and immunological uses. As minor element its inclusion in milk with other milk proteins hindered its direct determination. So downstream purification of lactoferrin from skimmed milk was optimized using vacuum driven approach. The purity of lactoferrin was monitored using gel electrophoresis along with validated RP-HPLC and SE-HPLC assays. Factors affecting lactoferrin during milk processing, handling and storage were also investigated. These methods were applicable on various products in Egyptian market to withdraw our attention towards careful monitoring during in-process quality control which showed deleterious reactions affecting of the milk proteins during processing causing significant denaturation so as to track concentration, purity and stability of lactoferrin.

No.	Publication	IF	Citations
91.	Nadia G. Zaki, Walaa H. Mahmoud, **Ahmed M. El Kerdawy**, Abanoub Abdullah, Gehad G. Mohamed. "Structural Characterization, Thermal Analyses, Antiproliferative and Antimicrobial Activity of Cocaine Complexes with Mn(II) and Cu(II)", *Egyptian Journal of Chemistry*, **63(5)**, 1857-1868, (**2020**). DOI: 10.21608/ejchem.2019.16748.2019.	0.966	3

Abstract

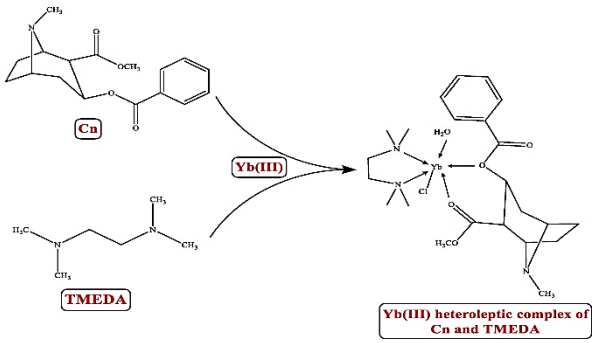
Reaction of cocaine (Cn) with Mn(II) and Cu(II) chloride salts afforded complexes of the [M(Cn)Cl(OH2)3]Cl type which were structurally characterized by elemental analysis, conductance measurements, spectroscopic methods and mass spectroscopy. Their thermal properties were studied. The in vitro antitumor activity of the newly synthesized complexes was investigated by MTT assay on MCF-7 and HepG-2 cell lines. Both complexes exhibited promising cytotoxic activity on both cell lines with high safety on normal human cells. Their antifungal activity against Aspergillus fumigatus and Candida albicans and antibacterial activity against Staphylococcus aureus, Bacillus subtilis, Salmonella typhimurium and Escherichia coli were also included.

No.	Publication	IF	Citations
92.	Nadia G. Zaki, Walaa H. Mahmoud, **Ahmed M. El Kerdawy**, Abanoub Mosaad Abdallah, Gehad G. Mohamed. "Heteroleptic complexes of cocaine/TMEDA with some f block metals: Synthesis, DFT studies, spectral, thermal, cytotoxicity and antimetastatic properties", *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, **229**, 117938, (**2020**), ISSN 1386-1425. https://doi.org/10.1016/j.saa.2019.117938.	3.232	11

Abstract

A series of new three heteroleptic complexes of the general formula [Ln(Cn)(TMEDA)Cl(OH_2)]·2Cl·xH_2O, (where Ln = La(III), Er(III) and Yb(III), Cn = cocaine and TMEDA = N,N,N′,N′-tetramethylethylenediamine) were synthesized, structurally characterized by elemental analysis, spectroscopic methods, molar conductivity and mass spectrometry. Thermal properties of the synthesized complexes and their kinetic thermodynamic parameters were studied. Theoretical calculations including geometry optimization, electronic structure and electronic and thermal energies were carried out using DFT and TD-DFT calculations at B3LYP/LANL2DZ level of theory and the different quantum chemical parameters were calculated. The in vitro antiproliferative activity of the newly synthesized complexes was assessed by MTT assay on MCF-7 and HepG-2 cancer cell lines. Yb(III) complex showed promising cytotoxic activity comparable to that of cisplatin on both cell lines with minimum effect on human normal cells. Further molecular mechanistic investigations showed that Yb(III) complex is an apoptotic inducer as it raises the caspase-3 and caspase-9 cellular level in the MCF-7 cell line. Furthermore, it showed an elevating effect on the level of the tumor suppressor nuclear proteins P21 and P27 concentrations in MCF-7 cells. Moreover, Yb(III) complex hindered the cellular scavenger system of the reactive oxygen species through reducing the glutathione peroxidase (GPx) cellular level imperiling MCF-7 cells by unmanageable oxidative stress. In addition to its cytotoxic effect, Yb(III) complex showed antimetastatic properties as it decreased the cellular levels of matrix metalloproteinases MMP-3 and MMP-9. These results showed that the Yb(III) complex is a promising cytotoxic metal-based agent that exerts its action through various molecular mechanisms with minimum effects on normal cells and with additional antimetastatic properties.

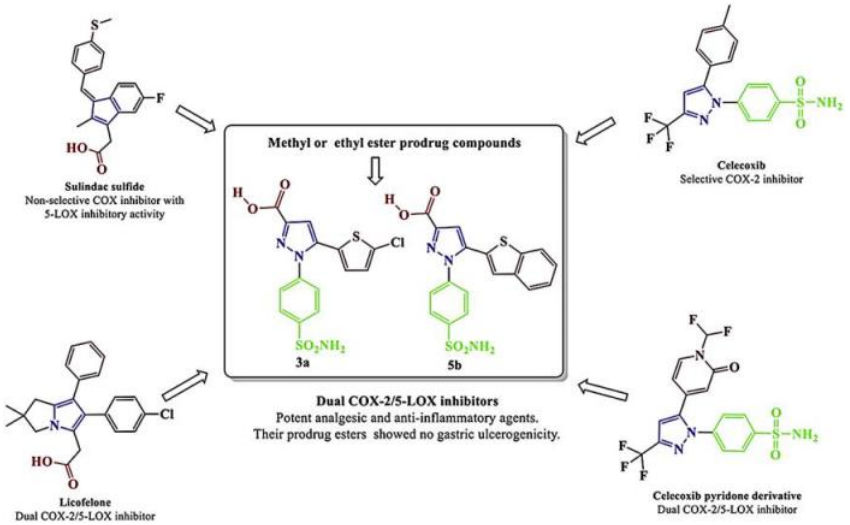
Yb(III) heteroleptic complex of Cn and TMEDA, as a representative example, was synthesized as a potent antiproliferative agent against human HepG-2 and MCF-7 cancer cells and structurally characterized by different spectral and analytical techniques such as elemental analysis, spectroscopic methods, molar conductivity, thermal analysis and DFT studies. Its antiproliferative activity was assessed by studying its cytotoxicity, antimetastatic effect, induction of apoptosis, and its influence on the expression of p21 and p27 tumor suppressor proteins and the glutathione peroxidase (GPx) activity in MCF-7 cells.



No.	Publication	IF	Citations
93.	Ehab M. Gedawy, Asmaa E. Kassab, **Ahmed M. El Kerdawy**. "Design, synthesis and biological evaluation of novel pyrazole sulfonamide derivatives as dual COX-2/5-LOX inhibitors", *European Journal of Medicinal Chemistry*, 189, 112066, (**2020**), ISSN 0223-5234. https://doi.org/10.1016/j.ejmech.2020.112066.	5.573	25

Abstract

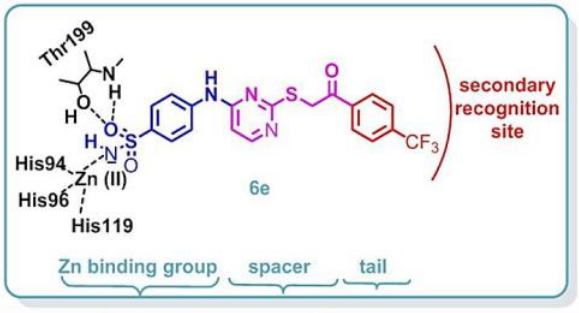
The current therapeutic demand focuses more on the discovery of safer NSAIDs rather than exploring more potent alternatives. The dual COX-2/5-LOX inhibition is a promising strategy for designing compounds with an enhanced efficacy, reduced side-effects and a broader anti-inflammatory spectrum in comparison to classical NSAIDs. In the present study, a hybridization strategy was adopted to combine the binding features of the non-selective COX inhibitor "sulindac" and the selective COX-2 inhibitor "celecoxib" which show 5-LOX inhibitory activity with that of licofelone and a celecoxib pyridone analogue which show dual COX-2/5-LOX inhibitory activity to design new series of pyrazole sulfonamide derivatives which, by design, should possess dual COX-2/5-LOX inhibitory activity. All the newly synthesized compounds were initially tested for their potential analgesic activity, then candidates that showed potential analgesic activity, were selected for the subsequent anti-inflammatory activity evaluation, as well as, ulcerogenicity testing. Moreover, in vitro assessment of their COX-1, COX-2 and 5-LOX inhibitory activities were performed. The benzothiophen-2-yl pyrazole carboxylic acid derivative 5b showed the most potent analgesic and anti-inflammatory activities surpassing that of celecoxib and indomethacin. It showed potent COX-1, COX-2 and 5-LOX inhibitory activity with IC50 of 5.40, 0.01 and 1.78 μM, respectively, showing a selectivity index of 344.56 that was much better than the used reference standards and its parent compounds, confirming its selectivity towards COX-2 over COX-1. The prodrug ester derivatives 6c and 6d showed equipotent activity to their parent compound 5b with no gastric ulcerogenicity. Molecular docking simulations confirmed that the newly synthesized compounds possess the structural features required for binding to the target enzymes COX-2 and 5-LOX.



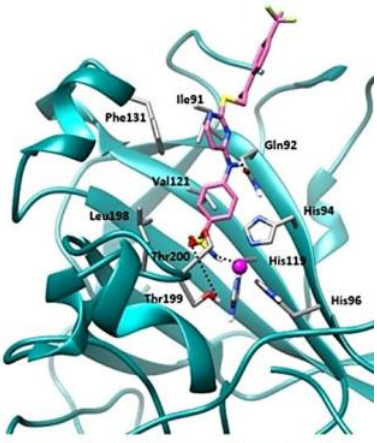
No.	Publication	IF	Citations
94.	Heba T. Abdel-Mohsen, **Ahmed M. El Kerdawy**, Mohamed A. Omar, Emanuela Berrino, Ahmed S. Abdelsamie, Hoda I. El Diwani, Claudiu T. Supuran. "New thiopyrimidine-benzenesulfonamide conjugates as selective carbonic anhydrase II inhibitors: synthesis, in vitro biological evaluation, and molecular docking studies", *Bioorganic & Medicinal Chemistry*, **28(5)**, 115329, (**2020**), ISSN 0968-0896. https://doi.org/10.1016/j.bmc.2020.115329.	3.073	8

Abstract

In the present work, a new series of thiopyrimidine-benzenesulfonamide conjugates was designed, synthesized and tested as carbonic anhydrase (CA, EC 4.2.1.1) inhibitors. Our design strategy was based on the molecular hybridization of the benzenesulfonamide moiety as a zinc binding group (ZBG), an alkylated thiopyrimidine moiety as a spacer and (un)substituted phenyl moieties with various electronic and hydrophobic environments as a tail. The designed and synthesized compounds were evaluated against four human (h) CA isoforms hCA I, hCA II, hCA IX and hCA XII. Series 6 showed promising activity and selectivity toward the cytosolic isoforms hCA I and hCA II versus the membrane bound isoforms hCA IX and hCA XII. Compounds 6e and 6f showed Ki of 0.04 µM against hCA II with a selectivity of 15.8- to 980-fold towards hCA II over hCA I, hCA IX, hCA XII isoforms. Molecular docking in the hCA II active site attributed the promising inhibitory activity of series 6 to the interaction of their sulfonamide moiety with the active site Zn^{2+} ion as well as its hydrogen bonding with the key amino acids Thr199 and Thr200. Through hydrophobic interaction, the benzenesulfonamide and the thiopyrimidine moieties interact with the hydrophobic side chains of the amino acids Val121/Leu198 and Ile91/Phe131, respectively. These results indicated that the designed and synthesized series is an interesting scaffold that can be further optimized for the development of selective antiglaucoma drugs.



Compd	hCA II K_i (µM)	Selectivity ratio for hCA II		
		I/II	IX/II	XII/II
6e	0.04	21.8	980	22.5



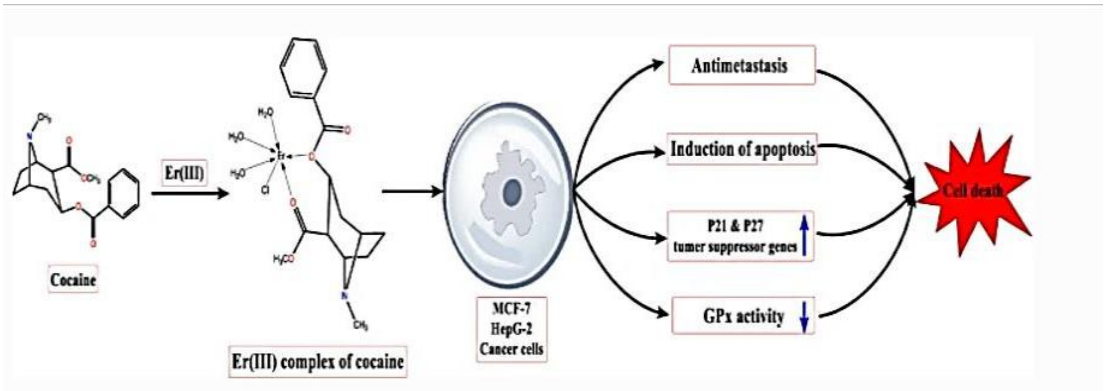
6e in CA II active site

No.	Publication	IF	Citations
95.	Zaki, N.G., Mahmoud, W.H., **El Kerdawy, A.M.** *et al*. "Structural characterization, thermal, DFT, cytotoxicity, and antimetastatic properties of cocaine complexes with La(III), Er(III), and Yb(III)", *Res Chem Intermed,* **46**, 3193–3216, (**2020**). https://doi.org/10.1007/s11164-020-04146-3.	2.262	5

Abstract

Reaction of cocaine (Cn) with Ln(III) chloride salts [where Ln=La(III), Er(III), and Yb(III)] afforded complexes of the [Ln(Cn)Cl(OH2)3].2Cl type which were structurally characterized by elemental analysis, conductance measurements, spectroscopic methods, and mass spectrometry. Their thermal properties and kinetic thermodynamic parameters were studied. Theoretical calculations including geometry optimization, thermal energies, and some quantum chemical parameters were carried out at DFT/B3LYP/LANL2DZ level of theory. TD-DFT calculations were also performed to assign their electronic spectra. The in vitro antitumor activity of the newly synthesized complexes was investigated by MTT assay on MCF-7 and HepG-2 cell lines. Er(III) complex exhibited promising cytotoxic activity comparable to that of cisplatin on MCF-7 cell line with high safety on normal human cells. Further molecular mechanistic investigations revealed that Er(III) complex was an apoptotic inducer as it elevated the cellular levels of caspase-3 and caspase-9 in MCF-7 cells. In addition, it displayed an elevating effect on the concentrations of the P21 and P27 tumor suppressor nuclear proteins in MCF-7 cells. Moreover, Er(III) complex hindered the cellular scavenger system of the reactive oxygen species by reducing the cellular level of glutathione peroxidase (GPx) imperiling MCF-7 cells by uncontrolled oxidative stress. Furthermore, Er(III) complex showed antimetastatic properties as it decreased the cellular levels of matrix metalloproteinases MMP-3 and MMP-9. These results concluded that the Er(III) complex is a promising anticancer metal-based agent that exerts its cytotoxic action through various molecular mechanisms with high safety on normal human cells and with additional antimetastatic properties.

Er(III)complex of Cn, as a representative example, was synthesized as a promising cytotoxic metal-based agent against human HepG-2 and MCF-7 cancer cells and structurally characterized by different spectral and analytical techniques such as elemental analysis, spectroscopic methods, molar conductivity, thermal analysis, and DFT studies. It exerts its action through various molecular mechanisms such as displaying significant antimetastatic effects by decreasing the secretion of MMP-3 and MMP-9, exhibiting remarkable induction of apoptosis by elevating the levels of caspase-3 and caspase-9proteins, inducing the expression of p21 and p27 tumor suppressor genes, and raising the glutathione peroxidase (GPx) activity.



No.	Publication	IF	Citations
96.	Abdel-Mohsen HT, Abd El-Meguid EA, **El Kerdawy AM**, Mahmoud AEE, Ali MM. "Design, synthesis, and molecular docking of novel 2-arylbenzothiazole multiangiokinase inhibitors targeting breast cancer", *Arch Pharm (Weinheim)*, **353(4)**, e1900340, (**2020**). Doi: 10.1002/ardp.201900340.	2.590	9

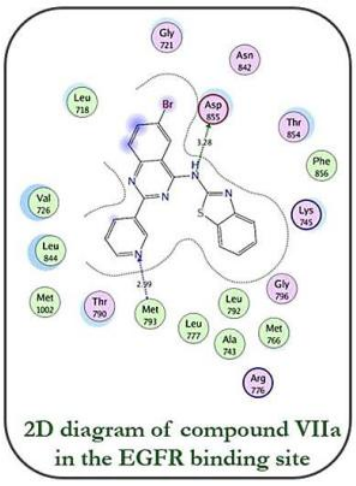
Abstract

A novel series of 2-arylbenzothiazoles 9, 10, and 12 were designed and synthesized as VEGFR-2/FGFR-1/PDGFR-β multiangiokinase inhibitors targeting breast cancer. Structural elongation of the known 2-phenylbenzothiazole scaffold (type I protein kinase inhibitor [PKI]), was carried out to afford series of type II PKIs 9, 10, and 12. Compounds 9d, 9f, 9i, and 9k exhibited potent multikinase inhibitory activity with IC_{50} values of 0.19, 0.18, 0.17, and 0.13 µM, respectively, against VEGFR-2; IC_{50} values of 0.28, 0.37, 0.19, and 0.27 µM, respectively, against FGFR-1; and IC_{50} values of 0.07, 0.04, 0.08, and 0.14 µM, respectively, against PDGFR-β. Moreover, the synthesized benzothiazoles demonstrated promising cytotoxic activity against the MCF-7 cell line. The most potent benzothiazoles 9d and 9i exhibited IC_{50} values of 7.83 and 6.58 µM, respectively, on the MCF-7 cell line in comparison to sorafenib (III), which showed IC_{50} = 4.33 µM. Additionally, 9d and 9i showed VEGFR-2 inhibitory activity in MCF-7 cells of 81% and 83% when compared with sorafenib (III), which showed 88% inhibition. Molecular docking of the designed compounds in the VEGFR-2 and FGFR-1 active sites showed the accommodation of the 2-phenylbenzothiazole moiety, as reported, in the hinge region of the receptor tyrosine kinase (RTK)-binding site, while the amide moiety is involved in hydrogen bond interactions with the key amino acids in the gate area; this in turn directs the aryl group to the hydrophobic allosteric back pocket of the RTKs in a type II-like binding mode. The synthesized benzothiazoles showed satisfactory ADME properties for further optimization in drug discovery.

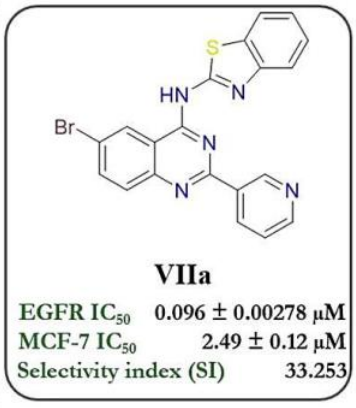
No.	Publication	IF	Citations
97.	Heba Abdelrasheed Allam, Enayat E. Aly, Ahmed K.B.A.W. Farouk, **Ahmed M. El Kerdawy**, Essam Rashwan, Safinaz E.S. Abbass. "Design and Synthesis of some new 2,4,6-trisubstituted quinazoline EGFR inhibitors as targeted anticancer agents", *Bioorganic Chemistry*, **98**, 103726, (**2020**), ISSN 0045-2068. https://doi.org/10.1016/j.bioorg.2020.103726.	4.831	17

Abstract

The present study describes the synthesis of 6-bromo-2-(pyridin-3-yl)-4-substituted quinazolines starting from 4-chloro derivative VI via the reaction with either phenolic compounds to obtain VIIa-f, IXa-d, 2-amino-6-(un)substituted benzothiazole to produce VIIIa-c or hydrazine hydrate to give X. Reaction of the hydrazino functionality of X with appropriate acid anhydride, acid chloride or aldehyde affords XIa-c, XIIa-c and XIVa-i, respectively. The target compounds were screened for their efficacy as EGFR inhibitors compared to gefitinib. Compounds eliciting superior EGFR inhibitory activity were further screened for their in vitro cytotoxicity against two human cancer cell lines namely: MCF7 (breast) and A549 (lung), in addition to normal fibroblast cell WI38 relative to gefitinib as a reference. Furthermore, compounds that showed potent inhibitory activity on wild-type EGFR were screened against mutant EGFR and assayed for their cytotoxicity against mutant EGFR-expressing cell lines PC9 and HCC827. The unsubstituted benzothiazol-2-amine VIIa showing superior EGFR inhibition (IC_{50} = 0.096 µM) and anticancer activity against MCF-7 cell line (IC_{50} = 2.49 µM) was subjected to cell cycle analysis and apoptotic assay. Moreover, a molecular docking study was performed to investigate the interaction of some representative compounds with the active site of EGFR- TK.

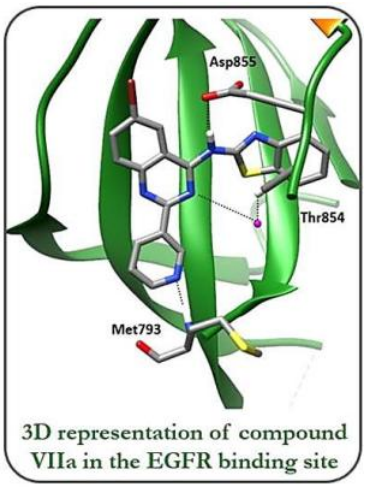


2D diagram of compound VIIa in the EGFR binding site



VIIa

EGFR IC_{50}	0.096 ± 0.00278 µM
MCF-7 IC_{50}	2.49 ± 0.12 µM
Selectivity index (SI)	33.253

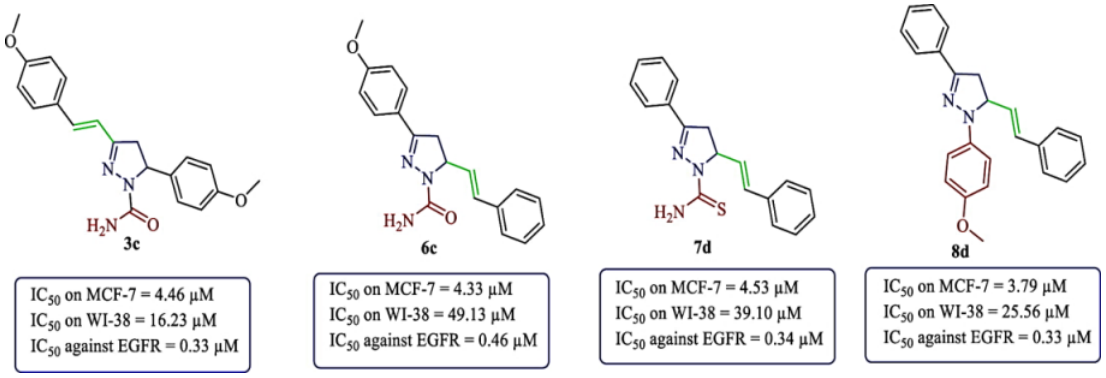


3D representation of compound VIIa in the EGFR binding site

No.	Publication	IF	Citations
98.	Riham F. George, Manal Kandeel, Dina Y. El-Ansary, **Ahmed M. El Kerdawy**. "Some 1,3,5-trisubstituted pyrazoline derivatives targeting breast cancer: Design, synthesis, cytotoxic activity, EGFR inhibition and molecular docking", *Bioorganic Chemistry*, **99**, 103780, (**2020**), ISSN 0045-2068. https://doi.org/10.1016/j.bioorg.2020.103780.	4.831	7

Abstract

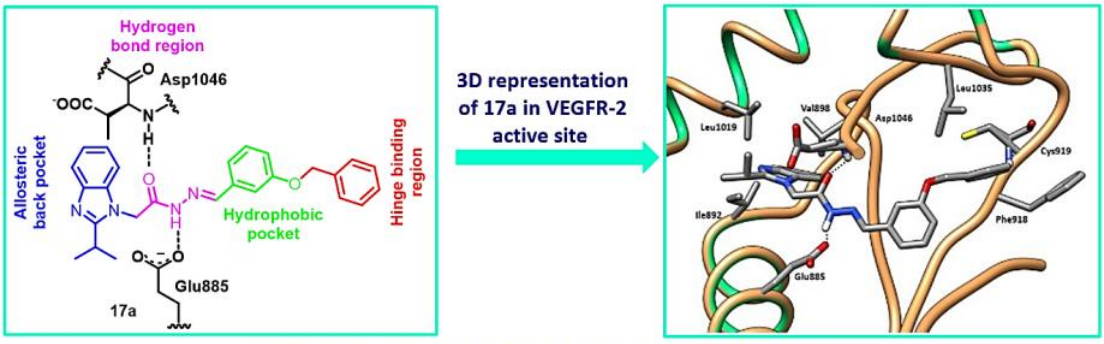
Different 1,3,5-trisubstituted pyrazoline derivatives 2a-c, 3-c, 4a-f, 6a-c, 7a-f and 8a-d were prepared via condensation reaction of the appropriate chalcone 1a-c or 5a-c with various hydrazine derivatives. All compounds were screened for their cytotoxicity against breast MCF-7 cancer cell line and the normal fibroblasts WI-38. Thirteen compounds 2a, 3a, 3c, 4a-d, 6c, 7d, 7e, 8b, 8d and 8f revealed promising cytotoxicity against MCF-7 compared to the reference standard staurosporine and they were safe to the normal fibroblasts WI-38. In addition, compounds 3c, 6c, 7d, 8b and 8d elicited higher cytotoxicity than erlotinib and exhibited promising EGFR inhibitory activity at submicromolar level comparable to that of erlotinib except for compound 8b that may exert its cytotoxicity via another mechanism besides EGFR inhibition. Molecular docking of 3c, 6c, 7d, 8b and 8d in the active site of EGFR confirmed the obtained results.



No.	Publication	IF	Citations
99.	Abdel-Mohsen HT, Abdullaziz MA, **El Kerdawy AM**, Ragab FAF, Flanagan KJ, Mahmoud AEE, Ali MM, El Diwani HI, Senge MO. "Targeting Receptor Tyrosine Kinase VEGFR-2 in Hepatocellular Cancer: Rational Design, Synthesis and Biological Evaluation of 1,2-Disubstituted Benzimidazoles", *Molecules*, **25(4)**, 770, (**2020**). https://doi.org/10.3390/molecules25040770.	3.267	10

Abstract

In this study, a novel series of 1,2-disubstituted benzo[d]imidazoles was rationally designed as VEGFR-2 inhibitors targeting hepatocellular carcinoma. Our design strategy is two-fold; it aimed first at studying the effect of replacing the 5-methylfuryl moiety of the well-known antiangiogenic 2-furylbenzimidazoles with an isopropyl moiety on the VEGFR-2 inhibitory activity and the cytotoxic activity. Our second objective was to further optimize the structures of the benzimidazole derivatives through elongation of the side chains at their one-position for the design of more potent type II-like VEGFR-2 inhibitors. The designed 1,2-disubstituted benzimidazoles demonstrated potent cytotoxic activity against the HepG2 cell line, reaching IC_{50} = 1.98 µM in comparison to sorafenib (IC_{50} = 10.99 µM). In addition, the synthesized compounds revealed promising VEGFR-2 inhibitory activity in the HepG2 cell line, e.g., compounds 17a and 6 showed 82% and 80% inhibition, respectively, in comparison to sorafenib (% inhibition = 92%). Studying the effect of 17a on the HepG2 cell cycle demonstrated that 17a arrested the cell cycle at the G2/M phase and induced a dose-dependent apoptotic effect. Molecular docking studies of the synthesized 1,2-disubstituted benzimidazoles in the VEGFR-2 active site displayed their ability to accomplish the essential hydrogen bonding and hydrophobic interactions for optimum inhibitory activity.



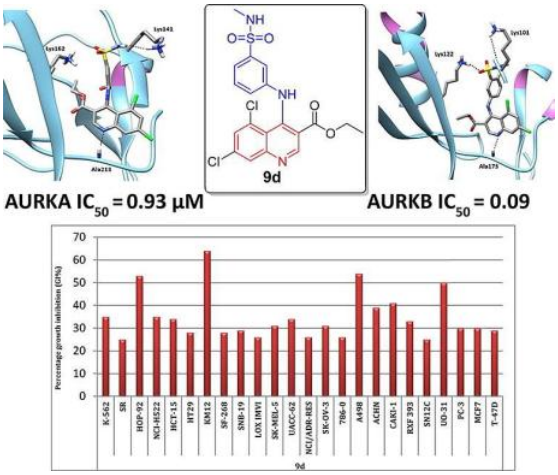
VEGFR-2: IC_{50} = 0.11 µM; FGFR-1: IC_{50} = 0.11 µM; PDGFR-β: IC_{50} = 0.05 µM; IC_{50} against HepG2 cell line = 1.98 µM; VEGFR-2 %inhibition in HepG2 cell line = 82%; 17a arrests HepG2 cell cycle at G2/M phase

No.	Publication	IF	Citations
100	Mohammad M. Al-Sanea, Ahmed Elkamhawy, Sora Paik, Kyeong Lee, **Ahmed M. El Kerdawy**, Bukhari Syed Nasir Abbas, Eun Joo Roh, Wagdy M. Eldehna, Heba A.H. Elshemy, Rania B Bakr, Ibrahim Ali Farahat, Abdulaziz I. Alzarea, Sami I. Alzarea, Khalid S. Alharbi, Mohamed A. Abdelgawad. "Sulfonamide-based 4-anilinoquinoline derivatives as novel dual Aurora kinase (AURKA/B) inhibitors: Synthesis, biological evaluation and in silico insights", *Bioorganic & Medicinal Chemistry*, **28(13)**, 115525, (**2020**), ISSN 0968-0896. https://doi.org/10.1016/j.bmc.2020.115525.	3.073	15

Abstract

Aurora kinases (AURKs) were identified as promising druggable targets for targeted cancer therapy. Aiming at the development of novel chemotype of dual AURKA/B inhibitors, herein we report the design and synthesis of three series of 4-anilinoquinoline derivatives bearing a sulfonamide moiety (5a-d, 9a-d and 11a-d). The % inhibition of AURKA/B was determined for all target quinolines, then compounds showed more than 50% inhibition on either of the enzymes, were evaluated further for their IC_{50} on the corresponding enzyme. In particular, compound 9d displayed potent AURKA/B inhibitory activities with IC_{50} of 0.93 and 0.09 µM, respectively. Also, 9d emerged as the most efficient anti-proliferative analogue in the US-NCI anticancer assay toward the NCI 60 cell lines panel, with broad spectrum activity against different cell lines from diverse cancer subpanels. Docking studies, confirmed that, the sulfonamide SO_2 oxygen was involved in a hydrogen bond with Lys162 and Lys122 in AURKA and AURKB, respectively, whereas, the sulfonamide NH could catch hydrogen bond interaction with the surrounding amino acid residues Lys141, Glu260, and Asn261 in AURKA and Lys101, Glu177, and Asp234 in AURKB. Furthermore, N1 nitrogen of the quinoline scaffold formed an essential hydrogen bond with the hinge region key amino acids Ala213 and Ala173 in AURKA and AURKB, respectively.

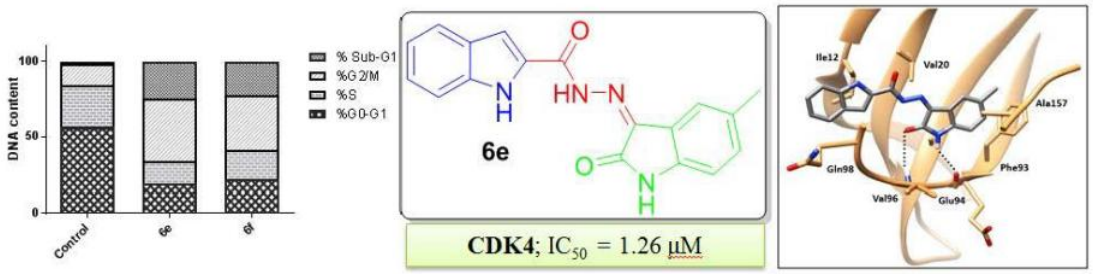
Three series of 4-anilinoquinoline derivatives bearing a sulfonamide moiety (5a-d, 9a-d and 11a-d) were designed and synthesized as potential novel dual Aurora kinase (AURKA/B) inhibitors.



No.	Publication	IF	Citations
101	Al-Warhi T, **El Kerdawy AM**, Aljaeed N, Ismael OE, Ayyad RR, Eldehna WM, Abdel-Aziz HA, Al-Ansary GH. "Synthesis, Biological Evaluation and In Silico Studies of Certain Oxindole–Indole Conjugates as Anticancer CDK Inhibitors", *Molecules*, **25(9)**, 2031, (**2020**). https://doi.org/10.3390/molecules25092031.	3.267	14

Abstract

On account of their overexpression in a wide range of human malignancies, cyclin-dependent kinases (CDKs) are among the most validated cancer targets, and their inhibition has been featured as a valuable strategy for anticancer drug discovery. In this study, a hybrid pharmacophore approach was adopted to develop two series of oxindole–indole conjugates (6a–i and 9a–f) and carbocycle–indole conjugates (11a,b) as efficient antitumor agents with potential inhibitory action toward CDK4. All oxindole–indole conjugates, except 6i, 9b, and 9c efficiently affected the growth of the human breast cancer MCF-7 (IC_{50}: 0.39 ± 0.05–21.40 ± 1.58 µM) and/or MDA-MB-231 (IC_{50}: 1.03 ± 0.04–22.54 ± 1.67 µM) cell lines, whereas bioisosteric replacement of the oxindole nucleus with indane or tetralin rings (compounds 11a,b) diminished the anti-proliferative activity. In addition, hybrids 6e and 6f displayed effective cell cycle disturbance and proapoptotic capabilities in MCF-7 cells. Furthermore, the efficient anti-proliferative agents towards MCF-7 and/or MDA-MB-231 cell lines (6a–h, 9a, and 9e) were investigated for their potential inhibitory action toward CDK4. Hybrids 6a and 6e displayed good CDK4 inhibitory activity with IC50s equal 1.82 and 1.26 µM, respectively. The molecular docking study revealed that oxindole moiety is implicated in two H-bonding interactions via both (NH) and (C=O) groups with the key amino acids Glu94 and Val96, respectively, whereas the indole framework is stably accommodated in a hydrophobic sub-pocket establishing hydrophobic interactions with the amino acid residues of Ile12, Val20, and Gln98 lining this sub-pocket. Collectively, these results highlighted hybrids 6a and 6e as good leads for further optimization as promising antitumor drugs toward breast malignancy and CDK inhibitors.



No.	Publication	IF	Citations
102	Rasha R. Yossef, Mohamed F. Al-Yamany, **Muhammed A. Saad**, Ayman E. El-Sahar. "Neuroprotective effects of vildagliptin on drug induced Alzheimer's disease in rats with metabolic syndrome: Role of hippocampal klotho and AKT signaling pathways", *European Journal of Pharmacology*, **889**, 173612, (**2020**), ISSN 0014-2999. https://doi.org/10.1016/j.ejphar.2020.173612.	3.263	3

Abstract

Growing evidences suggest the presence of several similarities in the molecular mechanisms underlying the neurodegenerative diseases and metabolic abnormalities. Adults who develop Metabolic Syndrome (MS) are at a higher risk of developing Alzheimer's disease (AD). Pharmacological agents, like dipeptidyl peptidase-4 (DPP-4) inhibitors that increase the levels of glucagon like peptide 1 (GLP-1) and ameliorate symptoms of MS, have become an auspicious candidate as disease modifying agents in the treatment of AD. The present study investigates the beneficial effects of Vildagliptin, a DPP-4 inhibitor in counteracting cognitive decline in different models of dementia targeting the AKT, JAK/STAT signaling pathways and hippocampal Klotho expression, to judge the neuroprotective, anti-apoptotic and anti-inflammatory effects of the drug. Cognitive decline was induced by either administration of high fat high sugar (HFHS) diet for 45 days alone, or with oral administration of AlCl3 (100 mg/kg/day) for 60 days. Rats were orally administered Vildagliptin (10 mg/kg) for 60 days along with AlCl3 administration. Vildagliptin treatment improved spatial memory and activities in morris water maze (MWM) test and open field test respectively. Results revealed an increase of both hippocampal klotho and Bcl-2 expressions along with an increase in both AKT and ERK1/2 phosphorylation. In contrast, Vildagliptin treatment decreased hippocampal contents of inflammatory, apoptotic and oxidative stress biomarkers as TNF-α, caspase-3 and FOXO1 along with restoring metabolic abnormalities. A significant decrease in BAX expressions with JAK2/STAT3 inhibition was observed. These findings demonstrate that the neuroprotective role of vildagliptin is possibly via modulating Klotho protein together with AKT pathway.

No.	Publication	IF	Citations
103	Hadir Farouk, **Muhammed A. Saad**, Sawsan S. Mahmoud, Mohammed F. El-Yamany, Ola A. Sharaf, Rania F. Ahmed, Ezz E. El-Denshary. "Effect of (+) and (-) hydroxycitric acid sterio-isomers present in natural products in counteracting insulin resistance", *Egyptian Journal of Chemistry*, **63(11)**, 4341-4354, (**2020**). DOI: 10.21608/ejchem.2020.25054.2493.	0.966	0

Abstract

Metabolic syndrome is a cluster of cardiovascular and metabolic risk factors that include impaired glucose metabolism and obesity. The use of nutraceuticals is an ideal choice for controlling this disorder. The aim of the present study is to investigate the effect (-) hydroxycitric acid present in garcinia fruit rind and (+) hydroxycitric acid present in hibiscus calyx on metabolic syndrome and compare it to that of metformin. Metabolic syndrome was induced in rats by ingestion of high fat high fructose (HFHF) diet for 90 days. Metformin (500 mg/Kg animal b.wt.), garcinia (1000 mg/Kg animal b.wt.) and hibiscus (250 mg/Kg animal b.wt) were orally administered throughout the last 30 days of the HFHF diet regimen. Both garcinia and hibiscus were effective in reducing serum blood glucose and insulin levels. The effect of garcinia on blood glucose was comparable to that of metformin, while the effect of hibiscus on insulin and HOMA-IR was comparable to that of metformin. Both were able to reduce serum leptin level. All treated groups showed a significant decrease in total cholesterol level. Only hibiscus was able to normalize liver function while garcinia failed to reduce the elevated liver function. As a conclusion we would recommend the use of hibiscus over garcinia to overcome the adverse effects of metabolic syndrome.

No.	Publication	IF	Citations
104	Ayman E. El-Sahar, Alyasaa A. Rastanawi, Muhammed F. El-Yamany, **Muhammed A. Saad**. "Dapagliflozin improves behavioral dysfunction of Huntington's disease in rats via inhibiting apoptosis-related glycolysis", *Life Sciences*, **257**, 118076, (**2020**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2020.118076.	3.647	7

Abstract

Aims

Huntington's disease is a rare neurodegenerative disorder which is associated with defected glucose metabolism with consequent behavioral disturbance including memory and locomotion. 3-nitropropionic acid (3-NP) can cause, in high single dose, an acute striatal injury/Huntington's disease. Dapagliflozin, which is one of the longest duration of action of SGLTIs family, may be able to diminish that injury and its resultant behavioral disturbances.

Material and methods

Forty rats were divided into four groups (n = 10 in each group): normal control group (CTRL), dapagliflozin (CTRL + DAPA) group, 3-nitropropionic acid (3-NP) group, and dapagliflozin plus 3-nitropropionic acid (DAPA + 3-NP) group. Behavioral tests (beam walking test, hanging wire test, limb withdrawal test, Y-maze spontaneous alteration, elevated plus maze) were performed with evaluating neurological scoring. In striatum, neurotransmitters (glutamate, aspartate, GABA, ACh and AChE activity) were measured. In addition, apoptosis and glycolysis markers (NF-κB, Cyt-c, lactate, HK-II activity, P53, calpain, PEA15 and TIGAR) were determined. Inflammation (IL-1β, IL-6, IL-8 and TNF-α) and autophagy (beclin-1, LC3 and DRAM) indicators were measured. Additionally, histopathological screening was conducted.

Key findings

3-Nitropropionic acid had the ability to perturb the neurotransmission which was reflected in impaired behavioral outcome. All of glycolysis, apoptosis and inflammation markers were elevated after 3-NP acute intoxication but autophagy parameters, except DRAM, were reduced. However, DAPA markedly reversed the abovementioned parameters.

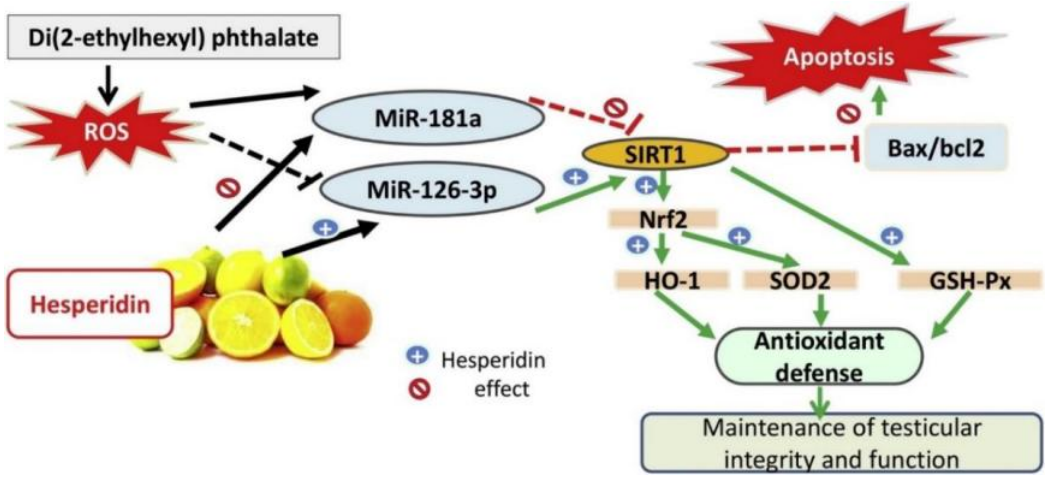
Significance

Dapagliflozin demonstrated anti-glycolytic, anti-apoptotic, anti-inflammatory and autophagic effects on 3-NP-damaged striatal cells and promoted the behavioral outcome.

No.	Publication	IF	Citations
105	Hebatullah S. Helmy, Mahmoud A. Senousy, Ayman E. El-Sahar, Rabab H. Sayed, **Muhammed A. Saad**, Eman M. Elbaz. "Aberrations of miR-126-3p, miR-181a and sirtuin1 network mediate Di-(2-ethylhexyl) phthalate-induced testicular damage in rats: The protective role of hesperidin", *Toxicology*, **433–434**, 152406, (**2020**), ISSN 0300-483X. https://doi.org/10.1016/j.tox.2020.152406.	4.099	8

Abstract

Recently, oxidative stress was implicated in the environmental contaminant Di-(2-ethylhexyl) phthalate (DEHP)-induced testicular toxicity, however the mechanism is unclear. We investigated the role of oxidative stress-responsive microRNAs in DEHP-induced aberrations and the protective effect of the citrus flavonoid, hesperidin (HSP). Male Wistar rats were randomly allocated into four groups as vehicle-treated control, DEHP-alone group (500 mg/kg/day) for 30 days, and HSP (25 or 50 mg/kg) for 60 days; testicular damage was triggered by oral administration of DEHP (500 mg/kg/day) after thirty days of oral administration of HSP (25 or 50 mg/kg). DEHP administration reduced testis weight coefficient, serum testosterone, testicular 3β-hydroxysteroid dehydrogenase and antioxidant enzyme activities, and elevated serum fatty acid-binding protein-9, testicular malondialdehyde, and Bax/Bcl2 ratio. Aberrant testicular miR-126-3p and miR-181a expression was observed, along with decreased expression of sirtuin1 (SIRT1) and its targets; nuclear factor-erythroid 2-related factor2, haeme oxygenase-1, and superoxide dismutase2. HSP administration significantly ameliorated these changes and restored testicular function in a dose-dependent manner. We highlight a novel role of oxidative stress-miR-126/miR-181a-SIRT1 network in mediating DEHP-induced changes which were reversed by the antioxidant HSP.



No.	Publication	IF	Citations
106	Hany H. Arab, **Muhammed A. Saad**, Ayman E. El-Sahar, **Muhammad Y. Al-Shorbagy**. "Mechanistic perspective of morin protection against ketoprofen-induced gastric mucosal injury: Targeting HMGB1/RAGE/NF-κB, DJ-1/Nrf2/HO-1 and PI3K/mTOR pathways", *Archives of Biochemistry and Biophysics*, **693**, 108552, (**2020**), ISSN 0003-9861. https://doi.org/10.1016/j.abb.2020.108552.	3.391	8

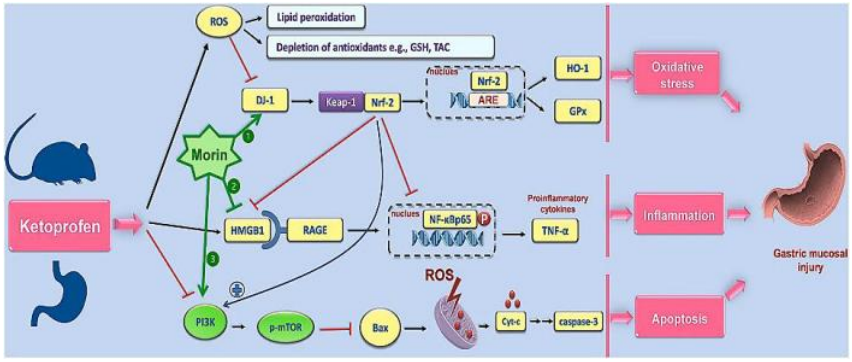
Abstract

Ischemic stroke is a major cause of death and motor disabilities all over the world. It is a muti-factorial disorder associated with inflammatory, apoptotic, and oxidative responses. Nateglinide (NAT), an insulinotropic agent used for the treatment of type 2 diabetes mellitus, recently showed potential anti-inflammatory and anti-apoptotic effects. The aim of our study was to elucidate the unique neuroprotective role of NAT in the middle cerebral artery occlusion (MCAO)-induced stroke in rats. Fifty-six male rats were divided to 4 groups (n = 14 in each group): the sham-operated group, sham receiving NAT (50 mg/kg/day, p.o) group, ischemia/reperfusion (IR) group, and IR receiving NAT group (50 mg/kg/day, p.o). MCAO caused potent deficits in motor and behavioral functions of the rats. Significant increase in inflammatory and apoptotic biomarkers has been observed in rats' hippocampi. Janus kinase 2 (JAK2)/signal transducer and activator of transcription 3 (STAT3) pathway was significantly stimulated causing activation of series inflammatory biomarkers ending up neuro-inflammatory milieu. Pretreatment with NAT preserved rats' normal behavioral and motor functions. Moreover, NAT opposed the expression of hypoxia-inducible factor-1α (HIF-1α) resulting in downregulation of more inflammatory mediators namely, NF-κB, tumor necrosis factor-β (TNF-β), and the anti-survival gene PMAIP-1. NAT stimulated caveolin-1 (Cav-1) which prevented expression of oxidative biomarkers, nitric oxide (NO), and myeloperoxidase (MPO) and hamper the activation of apoptotic biomarker caspase-3. In conclusion, our work postulated that NAT exhibited its neuroprotective effects in rats with ischemic stroke via attenuation of different unique oxidative, apoptotic, and inflammatory pathways.

No.	Publication	IF	Citations
107	**Saad MAE**, Fahmy MIM, **Al-Shorbagy M**, Assaf N, Hegazy AAE, El-Yamany MF. "Nateglinide Exerts Neuroprotective Effects via Downregulation of HIF-1α/TIM-3 Inflammatory Pathway and Promotion of Caveolin-1 Expression in the Rat's Hippocampus Subjected to Focal Cerebral Ischemia/Reperfusion Injury", *Inflammation,* **43(2)**, 401-416, (**2020**). Doi: 10.1007/s10753-019-01154-3.	3.212	5

Abstract

Ketoprofen is a widely used NSAID which incurs gastric mucosal damage. The high mobility group Box 1 (HMGB1) protein is a DNA-binding protein which exerts robust inflammatory actions, however, its role in ketoprofen-induced gastric damage has not been explored. Additionally, no previous studies have linked HMGB1/RAGE/NF-κB, DJ-1/Nrf2/HO-1 and PI3K/mTOR pathways in ketoprofen-induced gastropathy. The current work aimed to explore the potential of morin, a flavonoid with marked antioxidant/anti-inflammatory actions, to protect against ketoprofen-evoked gastric damage. Moreover, the underlying mechanisms, including the impact of morin on HMGB1/RAGE/NF-κB, DJ-1/Nrf2/HO-1 and PI3K/mTOR pathways were addressed. Immunoblotting and ELISA were used to examine the expression of target signals. Morin (50 mg/kg, p. o.) attenuated the severity of gastric injury via lowering of ulceration/hemorrhage and macroscopic damage scores. Meanwhile, it attenuated the histopathologic aberrations/damage scores. In the context of inflammation, morin suppressed TNF-α and myeloperoxidase levels and enhanced IL-10. Furthermore, it inhibited HMGB1/RAGE/NF-κB pathway through downregulating HMGB1, RAGE and phospho–NF–κBp65 protein expression. Morin successfully inhibited gastric mucosal oxidative stress through lowering of lipid peroxides and boosting of reduced glutathione, glutathione peroxidase and total antioxidant capacity. It also boosted DJ-1/Nrf2/HO-1 pathway via upregulating DJ-1, Nrf2 and HO-1 protein expression. Additionally, morin counteracted the apoptotic events by downregulating the proapoptotic Bax and Bax/Bcl-2 ratio and augmenting the PI3K/mTOR pathway through upregulating PI3Kp110α and phospho-mTOR protein expression. In conclusion, the current study demonstrates, for the first time, that morin shows a promise for the management of ketoprofen-induced mucosal insult through targeting of HMGB1/RAGE/NF-κB, DJ-1/Nrf2/HO-1 and PI3K/mTOR pathways.



No.	Publication	IF	Citations
108	Osman SM, Ayoub NA, Hafez SA, Ibrahim HA, El Raey MA, El-Emam SZ, Seada AA, **Saadeldeen AM.** "Aldose reductase inhibitor form Cassia glauca: A comparative study of cytotoxic activity with Ag nanoparticles (NPs) and molecular docking evaluation", *PLoS ONE*, **15(10)**, e0240856, (**2020**). https://doi.org/10.1371/journal.pone.0240856.	3.240	0

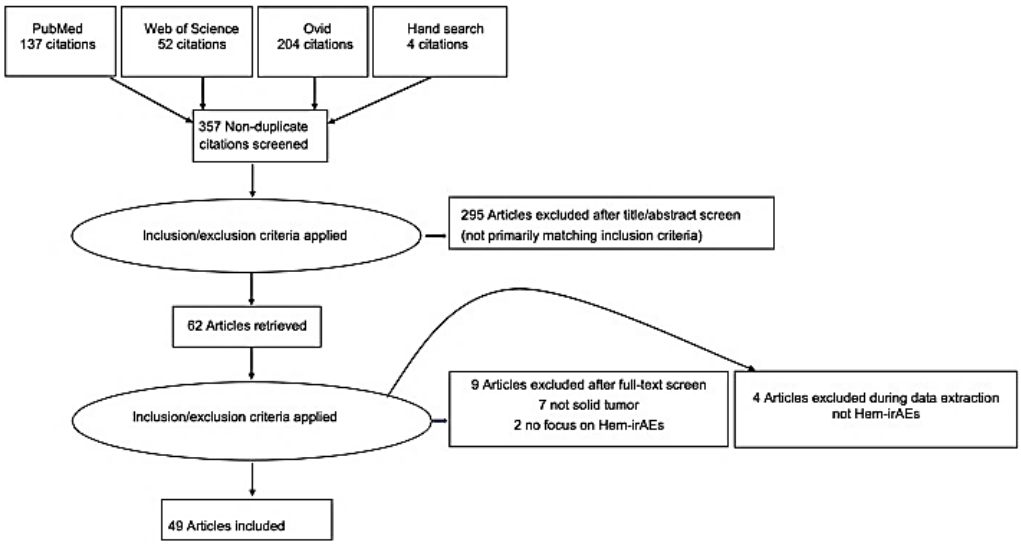
Abstract

UPLC-MS/MS profiling of Cassia glauca leaves extract revealed the identification of 10 flavonoids. Kaempferol 3-O-β-D-rutinoside was isolated and studied for its cytotoxic activity. It showed high cytotoxic effects against MCF-7 (IC_{50} of 4.6±0.038 µg/ml) and HepG-2 (IC_{50} of 8.2±0.024 µg/ml) cancer cell lines, compared to the leaves extracts, their Ag nanoparticles, and doxorubicin. Moreover, Kaempferol 3-O-β-D-rutinoside exerted a synergistic cytotoxic effect with doxorubicin on MCF-7 cell lines. It was discovered as kinases and aldose reductase inhibitor while rationalizing its cytotoxic activity through molecular docking study. Thus, it is expected that the cardiotoxic effects of doxorubicin can be also decreased by using Kaempferol 3-O-β-D-rutinoside due to its aldose reductase inhibitory effect. These findings suggested that Kaempferol 3-O-β-D-rutinoside could be used in combination with chemotherapeutic drugs to increase the sensitivity to their cytotoxic activity and protect against their side effects.

No.	Publication	IF	Citations
109	Omar NE, El-Fass KA, Abushouk AI, **Elbaghdady N**, Barakat AEM, Noreldin AE, Johar D, Yassin M, Hamad A, Elazzazy S, Dermime S. "Diagnosis and Management of Hematological Adverse Events Induced by Immune Checkpoint Inhibitors: A Systematic Review", *Front Immunol.*, **11**, 1354, (**2020**). Doi: 10.3389/fimmu.2020.01354.	5.085	2

Abstract

There has been less volume of literature focusing on the Immune-related Hematological Adverse Drug Events (Hem-irAEs) of Immune Checkpoint Inhibitors (ICPis) in cancer patients. Furthermore, there has been no consensus about the management of hematological toxicity from immunotherapy in the recently published practice guidelines by the European Society for Medical Oncology (ESMO). We conducted a systematic review of case reports/series to describe the diagnosis and management of potentially rare and unrecognized Hem-irAEs. We searched Medline, OVID, Web of Science for eligible articles. Data were extracted on patient characteristics, Hem-irAEs, and management strategies. We performed quality assessment using the Pierson-5 evaluation scheme and causality assessment using the Naranjo scale. Our search retrieved 49 articles that described 118 cases. The majority of patients had melanoma (57.6%) and lung cancer (26.3%). The most common Hem-irAEs reported with ICPis (such as nivolumab, ipilimumab, and pembrolizumab) were thrombocytopenia, hemolytic and aplastic anemias. Less reported adverse events included agranulocytosis and neutropenia. Steroids were commonly used to treat these adverse events with frequent success. Other used strategies included intravenous immunoglobulins (IVIG), rituximab, and transfusion of blood components. The findings of this review provide more insights into the diagnosis and management of the rarely reported Hem-irAEs of ICPis.



NEWGIZA UNIVERSITY
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International Publications 2019

SCHOOL OF PHARMACY INTERNATIONAL PUBLICATIONS 2019

17 International publications with NGU affiliation were published in 2019 with 271 citations.

No.	Publication	IF	Citations
110	Shendy, A.H., Eltanany, B.M., **Al-Ghobashy, M.A**. *et al*. "Coupling of GC-MS/MS to Principal Component Analysis for Assessment of Matrix Effect: Efficient Determination of Ultra-Low Levels of Pesticide Residues in Some Functional Foods", *Food Anal. Methods*, **12**, 2870–2885, (**2019**). https://doi.org/10.1007/s12161-019-01643-z.	3.366	4

Abstract

Functional foods provide nutritional and health benefits, yet they could be contaminated with residues like pesticides and polychlorobiphenyls. These residues affect the safety, quality, and consequently the commercial value of functional foods. Therefore, the validity and efficiency of residue determination methods constitute a major analytical concern. Reduction of matrix effect (ME) has always been the golden key for guaranteed sensitivity, selectivity, and high throughput analysis. This study aims for accurate determination and streamlined quantification of 200 pesticide residues in 16 matrices. Hence, QuEChERS protocol coupled to GC-MS/MS was then employed and separations were obtained in 25 min. Dilution of the final extracts of fresh and herbal samples was carried out to achieve an acceptable balance between sensitivity and peak characteristics. Dilution factors of 1x and 5x were selected for fresh and herbal samples, respectively. Principal component analysis (PCA) was then independently applied on the digitally exported total ion chromatograms (TICs) of the studied matrices and the calculated ME%. PCA score/loading plots of TICs demonstrated the key matrix constituents that influenced the obtained trends. Similarly, three main clusters were obtained after PCA of ME% indicating a dependent relationship between matrix type and the obtained effects. Out of the obtained three clusters, an appropriate representative matrix-matched calibration (R-MMC) was selected for ME compensation. Based on the EU validation guidelines, the proposed protocol was validated at 2 and 10 µg Kg^{-1} with acceptable method performance. Four proficiency testing (PT) and commercial samples were successfully analyzed. The proposed protocol would help laboratories to increase sample processing capacity and to ensure the safety of functional food products. This work should serve in setting standards that warranty the quality/safety of functional foods by national regulatory authorities.

No.	Publication	IF	Citations
111	El-Sayed, Ghada M., **Medhat A. Al-Ghobashy**, Ali K. Attia, and Samah M. Kamal. "Nanoparticle-Enhanced Potentiometric Ion-Selective Electrodes for Therapeutic Drug Monitoring of Linezolid.", *Journal of The Electrochemical Society,* **166 (14)**, 1-9, (**2019**). DOI: 10.1149/2.1221913jes.	4.316	5

Abstract

Nosocomial infections caused by multidrug-resistant (MDR) bacteria is treated with Linezolid (LIN) either alone or with other medications such as; Meropenem (MERO) or Theophylline (THEO). LIN has variable pharmacokinetics which makes it an ideal candidate for therapeutic drug monitoring (TDM). Ion selective electrode (ISE) is a promising tool that can be used in hospitals by medical practitioners to adjust the dose of LIN which will eventually improve the therapeutic outcomes. Four potentiometric PVC sensors were fabricated for the determination of LIN in plasma in the presence of co-administered medications (MERO and THEO). Sensor I; cationic exchanger phosphotungstate sensor covering a concentration range of 1.0×10^{-7}–1.0×10^{-4} M. while Sensor II; 2–hydroxypropyl-β-cyclodextrin (HP-βCD) sensor covered a concentration range of 1.0×10^{-9}–1.0×10^{-3} M. The last two sensors were fabricated using metal nanoparticles (NPs). Sensor III; Copper NP-incorporated HP-βCD sensor was used over a concentration range 1.0×10^{-9}–1.0×10^{-3} M, while Sensor IV; Cobalt NP-incorporated HP-βCD sensor attained the highest sensitivity of all the prepared sensors with the quantification range of 1.0×10^{-10}–1.0×10^{-4} M. Britton-Robinson buffer at pH 3.5 ± 0.5 was chosen for optimization of experimental conditions of the four sensors. The proposed sensors performance was validated according to IUPAC\FDA guidelines and was applied successfully for the determination of LIN in its pharmaceutical formulation and for TDM in incurred plasma samples. No interference was noted in the presence of (MERO) and (THEO) that are commonly co-administered with LIN as a part of the treatment protocol for healthcare-associated pneumonia (HCAP).

No.	Publication	IF	Citations
112	Hassan LA, **Al-Ghobashy MA**, Abbas SS. "Evaluation of the pattern and kinetics of degradation of adalimumab using a stability-indicating orthogonal testing protocol", *Biomed Chromatogr.*, **33(12)**, e4676, (**2019**). Doi: 10.1002/bmc.4676.	1.902	3

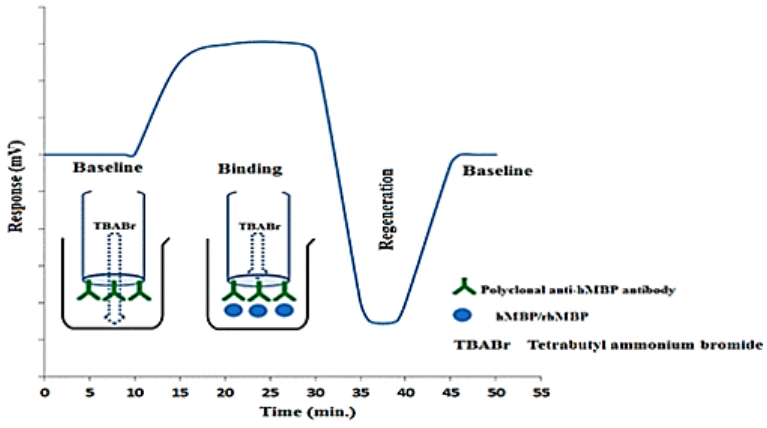
Abstract

Forced degradation studies are crucial for the evaluation of the stability and biosimilarity. Here, adalimumab was subjected to oxidation, pH, temperature, agitation and repeated freeze–thaw in order to generate all possible degradation products. An orthogonal stability-indicating testing protocol comprising SE-HPLC, RP-HPLC, TapeStation gel electrophoresis, dynamic light scattering (DLS), and functional receptor binding assay was developed and validated. The assay protocol was used for the assessment of the pattern and kinetics of aggregation/degradation of adalimumab. SE-HPLC and DLS were used to show the formation of aggregates/fragments of adalimumab under nondenaturing conditions. TapeStation electrophoresis was performed under denaturing conditions to reveal the nature of aggregates. Results of the receptor binding assay agreed to those of SE-HPLC and DLS which indicated that it can be used as an activity-indicating assay for adalimumab. RP-HPLC demonstrated excellent selectivity for adalimumab in the presence of its oxidized forms. The kinetics of degradation was studied in each case and the results showed that it followed the first-order reaction kinetics. Correlation between the results supported the quality assessment of the tested product in industrial and clinical settings. This orthogonal protocol is a useful tool in stability assessment of monoclonal antibodies and a key criterion for the biosimilarity assessment.

No.	Publication	IF	Citations
113	**Al-Ghobashy MA**, Nadim AH, El-Sayed GM, Nebsen M. "Label-Free Potentiometric Ion Flux Immunosensor for Determination of Recombinant Human Myelin Basic Protein: Application to Downstream Purification from Transgenic Milk", *ACS Sens.,* **4(2)**, 413-420, (**2019**). Doi: 10.1021/acssensors.8b01315.	**7.711**	**8**

Abstract

Recombinant human myelin basic protein (rhMBP) produced in the milk of transgenic cows was found exclusively associated with milk caseins. This hindered its direct determination without extensive sample pretreatment. Here, a label-free potentiometric immunosensor was developed and validated for the determination of rhMBP. An ion flux was generated under zero-current based on surface blocking of the polymeric membrane ion-selective electrode by anti-hMBP antibody and tetrabutylammonium bromide as a marker ion. The immunosensor was successfully employed in the quantitative determination of hMBP in the range of 0.10-20.00 µg/mL with a limit of detection of 50.00 ng/mL. The applicability of the passive ion flux immunosensor for determination of target analyte in complex matrices was investigated. Downstream purification of rhMBP from the milk of transgenic cows was achieved using cation exchange chromatography, immobilized metal affinity chromatography, and immunoaffinity chromatography. The specificity of the immunosensor along with matrix effect of milk proteins were demonstrated. Results obtained using the rhMBP immunosensor were further cross-validated using an orthogonal testing protocol assembled of RP-HPLC and SE-HPLC. It should be noted that the proposed ion flux immunosensor provided a feasible and specific tool for monitoring rhMBP concentration/purity, immunogenic activity, and stability. Such approach provides an attractive economic alternative to sophisticated biosensors required for in-process quality control of biopharmaceutical products.



No.	Publication	IF	Citations
114	Hassan, Lamiaa A., Sara M Shatat, Basma M Eltanany, **Medhat A Al-Ghobashy**, and Samah S Abbas. "Stability and biosimilarity assessment of infliximab using an orthogonal testing protocol and statistically-guided interpretation of peptide mapping", *Analytical methods*, **11 (25)**, 3198-3211, (**2019**). Doi: 10.1039/c9ay00903e.	2.896	6

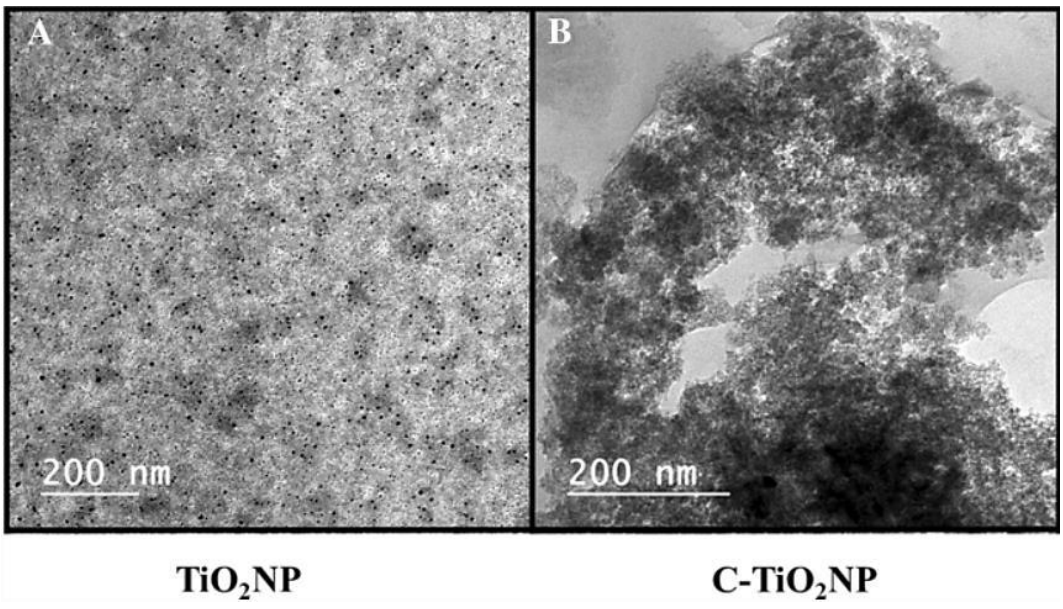
Abstract

With the growing number of biosimilars, healthcare providers opt to switch costly originator products with biosimilars. However, extensive data are required to support biosimilarity and interchangeability. In this study, factors affecting physical and chemical stability of infliximab were assessed under various stress conditions to reveal possible degradation products. A set of orthogonal stability- and purity-indicating assays involving size exclusion, reversed phase and ion exchange chromatography in addition to quantitative TapeStation gel electrophoresis, dynamic light scattering, and functional receptor binding assay was developed and used for validation. An objective, statistically-guided interpretation of peptide mapping data using principal component analysis (PM-PCA) was performed to establish a “biosimilarity fingerprint”. SE-HPLC and dynamic light scattering were used to evaluate the formation of aggregates and/or small molecular weight fragments under non-denaturing conditions. Results were correlated with those obtained under denaturing conditions using TapeStation gel electrophoresis. Results indicated that aggregates were formed via non-reducible covalent bonds. RP-HPLC showed no oxidized forms, yet the infliximab biosimilar was relatively more hydrophilic than its innovator counterpart. Ion exchange chromatography revealed slight differences in abundance of the charge variants that were not revealed using other techniques. PM-PCA and receptor binding assay showed differences, yet they were statistically non-significant (P 0.05). Results confirmed similarity in the primary structure, higher order structure and receptor-binding pattern. In-depth investigations of the critical quality attributes of infliximab along with setting up the similarity and range were required. These helped with assessment of the impact of such slight differences on the biosimilarity and interchangeability of the studied product. The developed PM-PCA along with the orthogonal assays helped locate variability that could potentially hinder both biosimilarity and interchangeability of other complex biopharmaceuticals.

No.	Publication	IF	Citations
115	Ibrahim, F.A., **Al-Ghobashy, M.A.** & Abo-Elmagd, I.F. "Energy-efficient carbon-doped titanium dioxide nanoparticles: synthesis, characterization, and catalytic properties under visible LED irradiation for degradation of Gemifloxacin", *SN Appl. Sci.,* **1**, 631, (**2019**). https://doi.org/10.1007/s42452-019-0644-8	----------	0

Abstract

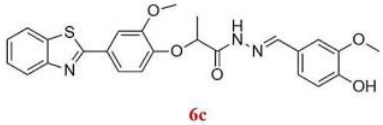
Synthesis and characterization of energy-efficient visible-light-responsive carbon-doped titanium dioxide nanoparticles (C-TiO_2NP) is reported. The characterization results of C-TiO_2NP using BET, TEM, DLS, and XRD indicate the following: (1) the C-TiO_2NP have high surface area (77.02 m^2/g), (2) size range of 5.00–10.00 nm and (3) zeta potential of 19 (pH 4.0), 4 (pH 7.0) and −21 (pH 10.0) while (4) the XRD results shows a peak pattern indicating that C-TiO_2NP is mostly in the anatase phase. The photocatalytic properties of C-TiO_2NP is investigated in this study using gemifloxacin antibiotic under LED in the visible region (λ_{max}~450 nm). Results shows that C-TiO_2NP have significant catalytic properties under LED visible light (up to~74% within 60 min). On the other hand, no degradation is observed for control C-TiO_2NP using LED visible light under equivalent experimental conditions. Using control C-TiO_2NP with H_2O_2under LED visible light results in a percentage degradation of ~33.0%. Upon using C-TiO_2NP with H_2O_2, the %degradation increases from ~33.0 to 64.0%. Although H_2O_2generally enhances the activity of bare C-TiO_2NP under UV irradiation, the %degradation under LED in the presence of C-TiO_2NP and H_2O_2 (~64%) is smaller than that in the presence of C-TiO_2NP only (~74%). Results demonstrates the applicability of C-TiO_2NP as an energy-efficient and cost-effective photocatalyst under LED visible light for pharmaceutical wastewater treatment.



No.	Publication	IF	Citations
116	Iman A.Y. Ghannam, Eman A. Abd El-Meguid, Islam H. Ali, Donia H. Sheir, **Ahmed M. El Kerdawy**. "Novel 2-arylbenzothiazole DNA gyrase inhibitors: Synthesis, antimicrobial evaluation, QSAR and molecular docking studies", *Bioorganic Chemistry*, **93**, 103373, (**2019**), ISSN 0045-2068. https://doi.org/10.1016/j.bioorg.2019.103373.	3.926	6

Abstract

A series of new 2-arylbenzothiazole derivatives (4, 5, 6a-j, 7a-i and 8a,b) was synthesized and tested for their antimicrobial activity against different Gram-positive, Gram-negative bacteria and yeast using ciprofloxacin and fluconazole as positive controls for the antibacterial and antifungal activities, respectively. The target compounds showed stronger inhibitory activity against Gram-negative than Gram-positive bacteria. The minimum inhibitory concentration (MIC) values were determined for those compounds showed zone of inhibition ≥ 13 mm. Based on the MIC values for the tested compounds against E. coli, compounds (4, 5, 6c, 6d, 6g, 6i, 6j, 7b, 7c, 7g and 8a) were selected and tested for their E. coli gyrase inhibitory activity. The tested compounds showed moderate inhibitory activity against E. coli gyrase. Compounds 5, 6c, 6i, 6j and 7b displayed high inhibitory activity against E. coli gyrase with IC_{50} values below 10 µM, however, they were less active than ciprofloxacin (E. coli gyrase IC_{50} = 1.14 µM). The p-hydroxy-m-methoxy benzothiazole analogue 6c was the most active tested compound (E. coli gyrase IC_{50} = 4.85 µM). Quantitative structure–activity relationship (QSAR) study was also implemented for the newly synthesized compounds. The QSAR study indicated that the structural feature that governs the anti-microbial activity for the newly synthesized benzothiazole derivatives is their structural hydrophilic-lipophilic balance what agrees with the chemical intuition where this balance governs their cellular absorption and so their antimicrobial activity. Molecular docking showed that the newly synthesized compounds possess the required structural feature for E. coli gyrase B inhibition through interaction with the key amino acids Asp73 and Gly77.

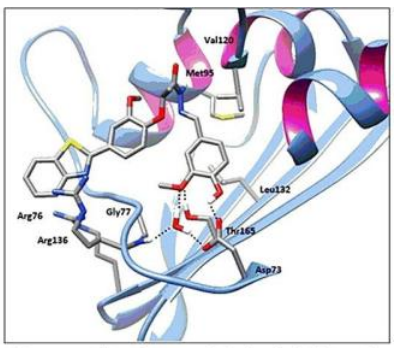


6c

E. coli DNA gyrase IC_{50} = 4.85 µM

E. faecalis, *P. aeruginosa* MIC = 1.02 µM

S. aureus, *E. coli*, *K. pneumoniae*, *C. albicans* MIC = 2.03 µM

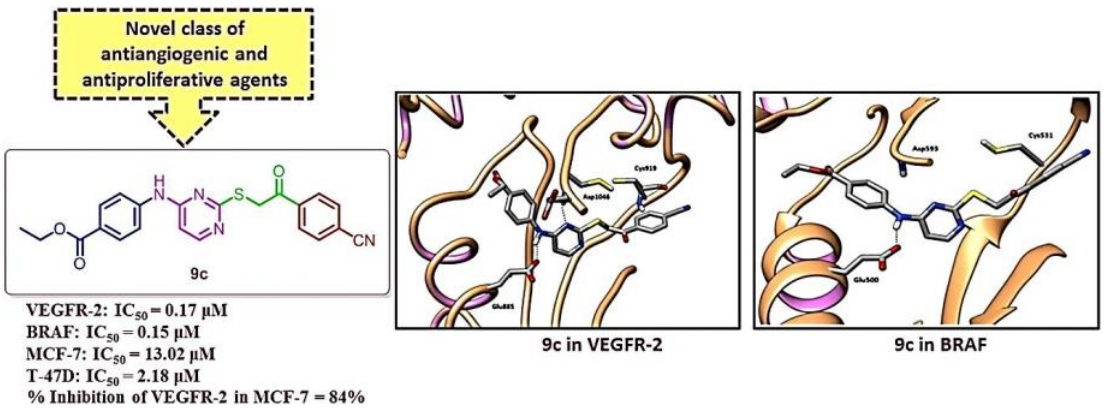


3D representation of compound 6c showing its interactions with the ATP binding site of DNA gyrase B

No.	Publication	IF	Citations
117	Heba T. Abdel-Mohsen, Mohamed A. Omar, **Ahmed M. El Kerdawy**, Abeer E.E. Mahmoud, Mamdouh M. Ali, Hoda I. El Diwani. "Novel potent substituted 4-amino-2-thiopyrimidines as dual VEGFR-2 and BRAF kinase inhibitors", *European Journal of Medicinal Chemistry*, **179**, 707-722, (**2019**), ISSN 0223-5234. https://doi.org/10.1016/j.ejmech.2019.06.063.	5.573	15

Abstract

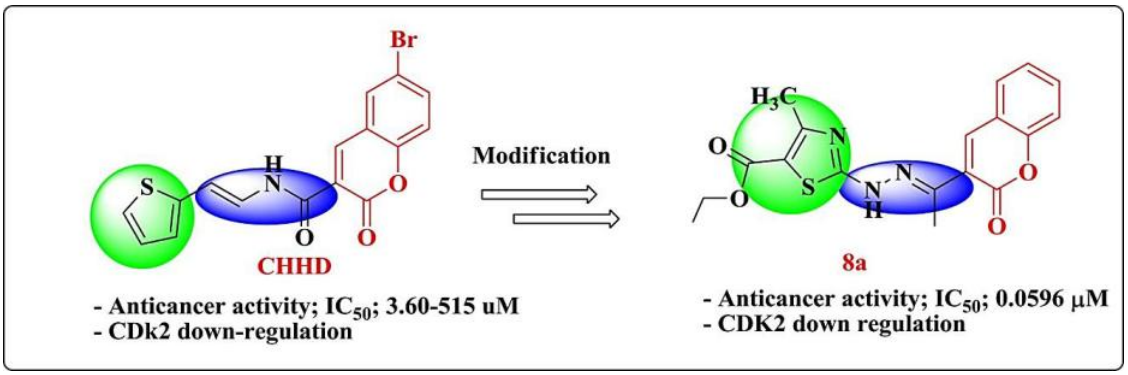
In the present study, we report the discovery of a novel class of substituted 4-amino-2-thiopyrimidines as antiangiogenic and antiproliferative agents. Structural hybridization between 4-substituted aminopyrimidines (VEGFR-2 inhibitors) and 2-thioxopyrimidines (BRAF inhibitors) was carried out to afford substituted 4-amino-2-thiopyrimidines as type II dual VEGFR-2/BRAF inhibitors. Our design strategy was tailored such that the 4-amino-2-thiopyrimidine scaffold is to be accommodated in the central gate area of the inactive DFG-out conformation of both enzymes. On one side, the hydrophobic substituent on the 4-amino group would occupy the hydrophobic back pocket and on the other side the substituent on the sulfide moiety should extend to fit in the hinge region (front pocket). Molecular docking simulations confirmed the ability of the designed compounds to accomplish the key interactions in VEGFR-2 and BRAF active sites. Most of the synthesized substituted 4-amino-2-thiopyrimidines demonstrated potent VEGFR-2 inhibitory activity at submicromolar concentrations. Compounds 8a, 8d, 9c and 9e showed IC_{50} = 0.17, 0.12, 0.17 and 0.19 µM, respectively against VEGFR-2 in comparison to sorafenib (I) IC_{50} = 0.10 µM and regorafenib (II) IC_{50} = 0.005 µM. While compounds 9c, 9d and 10a showed IC_{50} = 0.15, 0.22 and 0.11 µM, respectively against BRAF-WT. At 10 µM concentration 9c revealed promising in vitro broad-spectrum antiproliferative activity against cancer cell lines with growth inhibition percent ranging from 10 to 90%. Moreover, compounds 7b, 8d, 9a, 9b, 9c and 9d showed potent activity against MCF7 cell line (IC_{50} = 17.18, 17.20, 19.98, 19.61, 13.02 and 16.54 µM, respectively). On the other hand, compounds 9c, 9d and 10d were found to be the most potent compounds against T-47D cell line (IC50 = 2.18, 8.09 and 4.36 µM, respectively).



No.	Publication	IF	Citations
118	Somaia S. Abd El-Karim, Yasmin M. Syam, **Ahmed M. El Kerdawy**, Tamer M. Abdelghany. "New thiazol-hydrazono-coumarin hybrids targeting human cervical cancer cells: Synthesis, CDK2 inhibition, QSAR and molecular docking studies", *Bioorganic Chemistry*, **86**, 80-96, (**2019**), ISSN 0045-2068. https://doi.org/10.1016/j.bioorg.2019.01.026.	3.926	25

Abstract

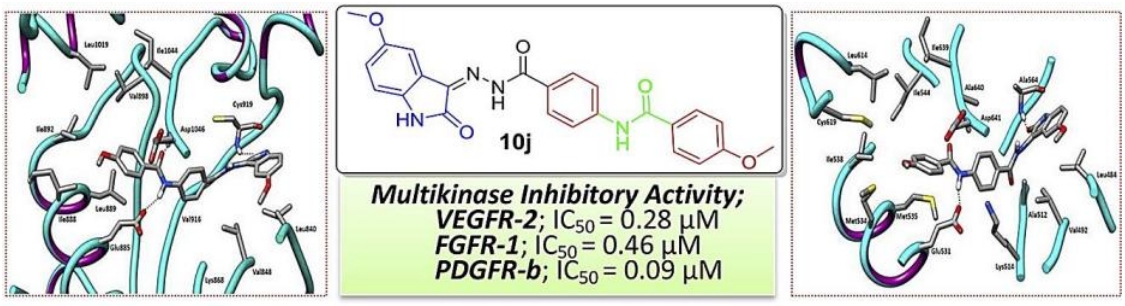
Motivated by the potential anticancer activity of both coumarin and 2-aminothiazole nuclei, a new set of thiazol-2-yl hydrazono-chromen-2-one analogs were efficiently synthesized aiming to obtain novel hybrids with potential cytotoxic activity. MTT assay investigated the significant potency of all the target compounds against the human cervical cancer cell lines (HeLa cells). Cell cycle analysis showed that the representative compound 8a led to cell cycle cessation at G0/G1 phase indicating that CDK2/E1complex could be the plausible biological target for these newly synthesized compounds. Thus, the most active compounds (7c and 8a-c) were tested for their CDK2 inhibitory activity. The biological results revealed their significant CDK2 inhibitory activity with IC_{50} range of 0.022–1.629 nM. Moreover, RT-PCR gene expression assay showed that compound 8a increased the levels of the nuclear CDK2 regulators P21 and P27 by 2.30 and 5.7 folds, respectively. ELISA tequnique showed also that compound 8a led to remarkable activation of caspases-9 and -3 inducing cell apoptosis. QSAR study showed that the charge distribution and molecular hydrophobicity are the structural features affecting cytotoxic activity in this series. Molecular docking study for the most potent cytotoxic compounds (7c and 8a-c) rationalized their superior CDK2 inhibitory activity through their hydrogen bonding and hydrophobic interactions with the key amino acids in the CDK2 binding site. Pharmacokinetic properties prediction of the most potent compounds showed that the newly synthesized compounds are not only with promising antitumor activity but also possess promising pharmacokinetic properties.



No.	Publication	IF	Citations
119	Wagdy M. Eldehna, **Ahmed M. El Kerdawy**, Ghada H. Al-Ansary, Sara T. Al-Rashood, Mamdouh M. Ali, Abeer E. Mahmoud. "Type IIA - Type IIB protein tyrosine kinase inhibitors hybridization as an efficient approach for potent multikinase inhibitor development: Design, synthesis, anti-proliferative activity, multikinase inhibitory activity and molecular modeling of novel indolinone-based ureides and amides", *European Journal of Medicinal Chemistry*, **163**, 37-53, (**2019**), ISSN 0223-5234. https://doi.org/10.1016/j.ejmech.2018.11.061.	5.573	34

Abstract

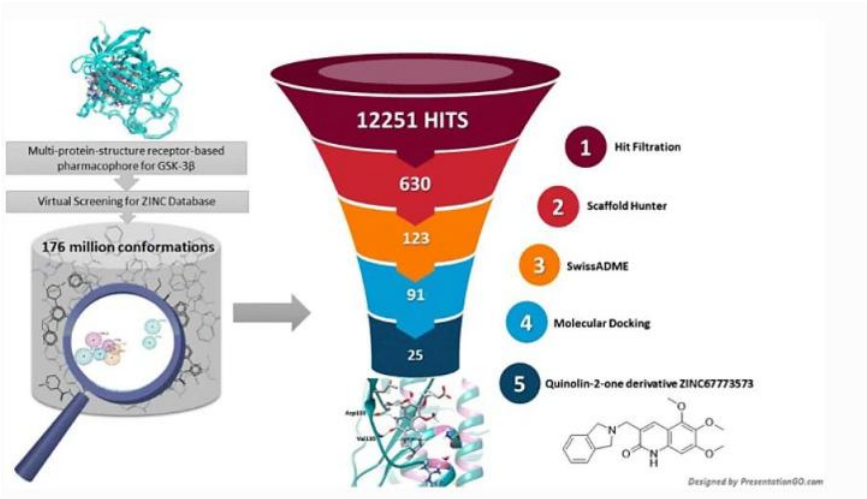
Pursuing on our efforts regarding development of novel multikinase inhibitors, herein we report the design and synthesis of novel 2-indolinone-based ureides 6a-u and amides 10a-j. In this work we adopt a hybridization strategy between type IIA PTK inhibitor (sorafenib) and type IIB PTK inhibitors (sunitinib and nintedanib). This was implemented via linking the indolinone core, in both sunitinib and nintedanib, which is well-fitted in the hinge region in the kinase domain front cleft and the biaryl urea extension, in sorafenib, which is accommodated in the gate area and the hydrophobic back pocket. Molecular docking of the designed hybrid compounds in VEGFR-2 and FGFR-1 active sites revealed, as planned, their ability to establish the binding interactions achieved by both original type IIA and type IIB inhibitors. The designed compounds were evaluated for their multikinase inhibitory activity towards VEGFR-2, PDGFR-b and FGFR-1 and anti-proliferative activity towards HepG2, MCF-7, A549 and A498 cancer cell lines. The ureido analogue 6u emerged as the most potent multikinase inhibitor in the ureido series with VEGFR-2, FGFR-1 and PDGFR-b IC_{50} of 0.18, 0.23 and 0.10 µM, respectively. Whereas, the amido congener 10j emerged as the most potent multikinase inhibitor in the amide series with VEGFR-2, FGFR-1 and PDGFR-b IC50 of 0.28, 0.46 and 0.09 µM, respectively. While, indolinone 6u was the most potent derivative towards HepG2 cells (IC_{50} = 2.67 ± 0.14 µM), 6r stood out as the most potent indolinone against A498 cells (IC_{50} = 0.78 ± 0.02 µM). Additionally, the target indolinones displayed non-significant cytotoxic impact towards human normal melanocyte (HFB4). ADME prediction study of the designed compounds showed that they are not only with promising multikinase inhibitory activity but also with favorable pharmacokinetic and drug-likeness properties. Compounds 6r and 10j are revealed to be the best compounds in terms of multikinase activity and pharmacokinetics.



No.	Publication	IF	Citations
120	**El Kerdawy, A.M.**, **Osman, A.A.** & Zaater, M.A. "Receptor-based pharmacophore modeling, virtual screening, and molecular docking studies for the discovery of novel GSK-3β inhibitors", *J Mol Model,* **25(6)**, 171, (**2019**). https://doi.org/10.1007/s00894-019-4032-5.	1.346	11

Abstract

Considering the emerging importance of glycogen synthase kinase 3 beta (GSK-3β) inhibitors in treatment of Alzheimer's disease, multi-protein structure receptor-based pharmacophore modeling was adopted to generate a 3D pharmacophore model for (GSK-3β) inhibitors. The generated 3D pharmacophore was then validated using a test set of 1235 compounds. The ZINCPharmer web tool was used to virtually screen the public ZINC database using the generated 3D pharmacophore. A set of 12,251 hits was produced and then filtered according to their lead-like properties, predicted central nervous system (CNS) activity, and Pan-assay interference compounds (PAINS) fragments to 630 compounds. Scaffold Hunter was then used to cluster the filtered compounds according to their chemical structure framework. From the different clusters, 123 compounds were selected to cover the whole chemical space of the obtained hits. The SwissADME online tool was then used to filter out the compounds with undesirable pharmacokinetic properties giving a set of 91 compounds with promising predicted pharmacodynamic and pharmacokinetic properties. To confirm their binding capability to the GSK-3β binding site, molecular docking simulations were performed for the final 91 compounds in the GSK-3β binding site. Twenty-five compounds showed acceptable binding poses that bind to the key amino acids in the binding site Asp133 and Val135 with good binding scores. The quinolin-2-one derivative ZINC67773573 was found to be a promising lead for designing new GSK-3β inhibitors for Alzheimer's disease treatment.



No.	Publication	IF	Citations
121	Muhammed A. Saad, Ayman E. El-Sahhar, Hany H. Arab, **Muhammad Y. Al-Shorbagy**. "Nicorandil abates arthritic perturbations induced by complete Freund's adjuvant in rats via conquering TLR4-MyD88-TRAF6 signaling pathway", *Life Sciences*, **218**, 284-291, (**2019**), ISSN 0024-3205. https://doi.org/10.1016/j.lfs.2019.01.002	5.037	11

Abstract

Background and purpose

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune inflammatory disease which poses a need to explore effective yet safe pharmacotherapeutic options. The current work aimed to study the therapeutic role of nicorandil in controlling RA.

Experimental approach

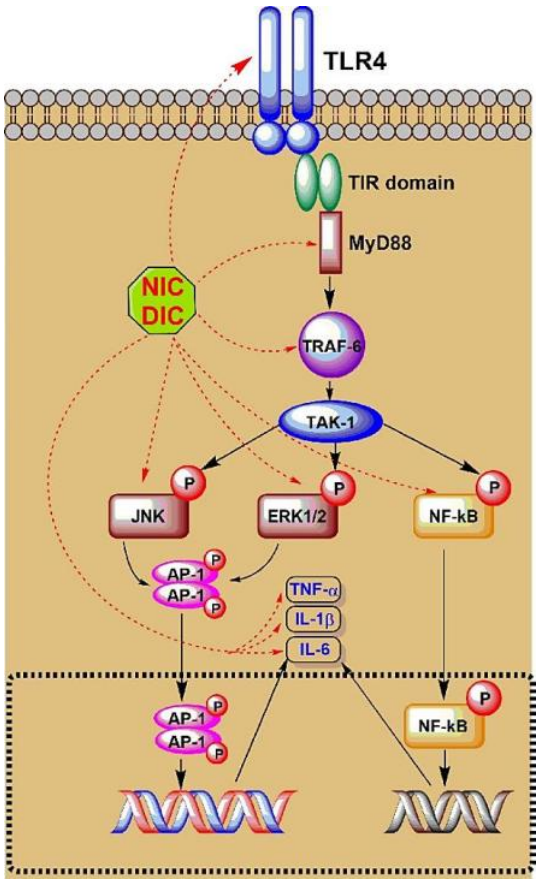
Complete Freund's adjuvant (CFA)-induced arthritis model was applied by injecting 400 µL of CFA in the right hind paw at day 0 and day 7. Four groups of rats were used as follows: normal-control (CTRL), CFA-induced arthritis (ART), CFA-induced arthritis treated with diclofenac (DIC) and CFA-induced arthritis treated with nicorandil (NIC). Both NIC and DIC were administered at day 14 for two weeks. Paw volume, knee joint diameter, pain behavior assessment as well as body weight were all periodically recorded throughout the experimental period. Following the sacrifice of animals at day 28, gene expressions of TLR-4, MyD88 and TRAF6 as well as extracellular signal-regulated kinase (ERK), c-Jun N-terminal kinase (JNK), nuclear factor Kappa B (NF-κB) were quantified in hind paws tissue. Finally, the serum levels of the inflammatory biomarkers (tumor necrosis factor-α (TNF-α), interleukin-1β (IL-1β) and interleukin-6 (IL-6) together with the histopathological examination of sections in the rat hind paw were recorded.

Results

Both NIC and DIC proved promising anti-arthritic potential mediated, at least in part through switching off TLR4-MyD88-TRAF6 axis as well as downstream TRAF6 dependent activated MAP kinases and NF-κB.

Conclusion and implications

Nicorandil, via interfering with TLR4 signaling, sheds light on a potential clinical role of the drug in pursuit for safe and effective regimens for RA.



No.	Publication	IF	Citations
122	Radwan, A., El-Lakkany, N. M., William, S., El-Feky, G. S., **Al-Shorbagy, M. Y.**, Saleh, S., & Botros, S. A. "Novel praziquantel solid lipid nanoparticle formulation shows enhanced bioavailability and antischistosomal efficacy against murine S. mansoni infection", *Parasites Vectors*, **12(1)**, 304, (**2019**). https://doi.org/10.1186/s13071-019-3563-z.	3.876	10

Abstract

Background

Schistosomiasis is responsible for a considerable global disease burden. This work aimed to improve the therapeutic outcome of the only available antischistosomal drug worldwide, praziquantel (PZQ), by incorporating it into a novel carrier, "solid lipid nanoparticles (SLNs)", to enhance its solubility, bioavailability and efficacy. A simple, cost-effective method was used to prepare SLN-PZQ.

Results

Compared to market PZQ (M-PZQ), SLN-PZQ was more bioavailable, as denoted by higher serum concentrations in both normal and infected mice where elevated Ka, AUC0–24, C_{max}, and $t_{1/2e}$ with a decrease in k_{el} were demonstrated. The $AUC_{0–24}$ for SLN-PZQ in normal and Schistosoma mansoni-infected groups was almost nine- and eight-fold higher, respectively, than that for M-PZQ in corresponding groups. In normal and S. mansoni-infected mice, SLN-PZQ was detectable in serum at 24 h, while M-PZQ completely vanished 8 h post-treatment. Additionally, enhanced absorption with extended residence time was recorded for SLN-PZQ. Compared to M-PZQ, SLN-PZQ revealed superior antischistosomal activity coupled with enhanced bioavailability in all treated groups where higher percentages of worm reduction were recorded with all dosages tested. This effect was especially evident at the lower dose levels. The ED95 of SLN-PZQ was 5.29-fold lower than that of M-PZQ, with a significantly higher reduction in both the hepatic and intestinal tissue egg loads of all treated groups and almost complete disappearance of immature deposited eggs (clearly evident at the low dose levels).

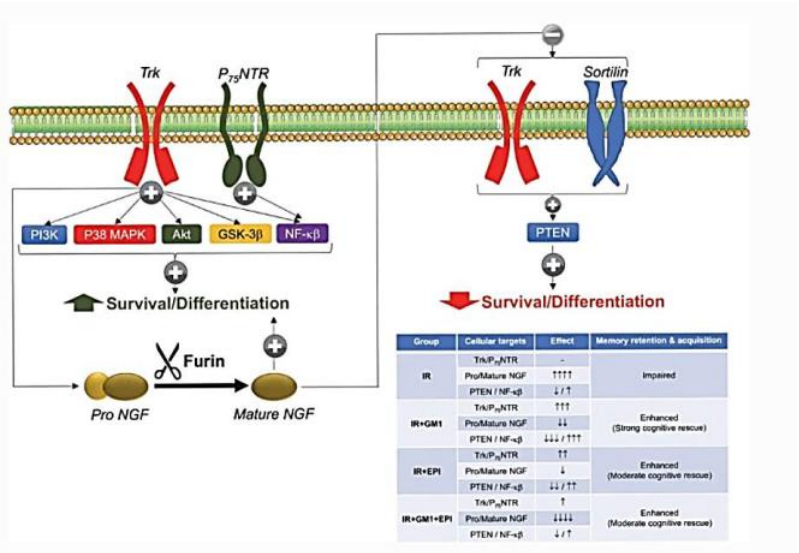
Conclusions

SLN-PZQ demonstrated enhanced PZQ bioavailability and antischistosomal efficacy with a safe profile despite the prolonged residence in the systemic circulation.

No.	Publication	IF	Citations
123	Choucry, A.M., **Al-Shorbagy, M.Y.**, Attia, A.S. *et al*. "Pharmacological Manipulation of Trk, p75NTR, and NGF Balance Restores Memory Deficit in Global Ischemia/Reperfusion Model in Rats", *J Mol Neurosci,* **68(1)**, 78–90, (**2019**). https://doi.org/10.1007/s12031-019-01284-1.	3.444	7

Abstract

Long-term memory impairment is reported in more than 50% of cardiac arrest survivors. Monosialoganglioside (GM1) provided neuroprotection in experimental models of stroke but failed to replicate its promise clinically for unknown reasons. GM1 stimulates the release of nerve growth factor (NGF), which is synthesized as a precursor protein (pro-NGF) that either mediates apoptosis through the p75 neurotrophin receptor (p75NTR) or is cleaved by the protease furin (FUR) to yield mature NGF, the latter supporting survival through tropomyosin kinase receptor (Trk). The flavanol epicatechin (EPI) inhibits p75NTR-mediated signaling and apoptosis by pro-NGF. The aim of the current work is to test whether these two drugs affect, or communicate with, each other in the setting of CNS injuries. Using the two-vessel occlusion model of global ischemia/reperfusion (I/R), we tested if pharmacological modulation of Trk, p75NTR, and NGF balance with GM1, EPI, and their combination, can correct the memory deficit that follows this insult. Finally, we tested if FUR insufficiency and/or p75NTR-mediated apoptosis negatively affect the neurotherapeutic effect of GM1. Key proteins for Trk and p75NTR, FUR, and both forms of NGF were assessed. All treatment regiments successfully improved spatial memory retention and acquisition. A week after the insult, most Trk and p75NTR proteins were normal, but pro/mature NGF ratio remained sharply elevated and was associated with the poorest memory performance. Pharmacological correction of this balance was achieved by reinforcing Trk and p75NTR signaling. GM1 increased FUR levels, while concomitant administration of EPI weakened GM1 effect on pro-survival Trk and p75NTR mediators. GM1 neuroprotection is therefore not limited by FUR but could be dependent on p75NTR.



No.	Publication	IF	Citations
124	Hassan NF, Nada SA, Hassan A, El-Ansary MR, **Al-Shorbagy MY**, Abdelsalam RM. "Saroglitazar Deactivates the Hepatic LPS/TLR4 Signaling Pathway and Ameliorates Adipocyte Dysfunction in Rats with High-Fat Emulsion/LPS Model-Induced Non-alcoholic Steatohepatitis", *Inflammation,* **42(3)**, 1056-1070, (**2019**). Doi: 10.1007/s10753-019-00967-6.	4.092	16

Abstract

The most epidemic liver disorder non-alcoholic steatohepatitis (NASH) is characterized by hepatic steatosis and inflammation with hepatocellular damage. Recently, it is predictable to be the extensive cause for liver transplantation. The absence of an approved therapeutic agent for NASH is the reason for investigating saroglitazar (SAR) which showed promising effects as a dual PPAR-α/γ agonist in recent studies on NASH. Here, we aimed to investigate the effect of SAR on NASH induced in rats by the administration of high-fat emulsion (HFE) and small doses of lipopolysaccharides (LPS) for 5 weeks. Rats were divided into three groups: negative control group (saline and standard rodent chow), model group (HFE(10 ml/kg/day, oral gavage) + LPS(0.5 mg/kg/week, i.p)), and SAR-treated group (HFE(10 ml/kg/day, oral gavage) + LPS(0.5 mg/kg/week, i.p.) + SAR(4 mg/kg/day, oral gavage) starting at week 3.Treatment with SAR successfully ameliorated the damaging effects of HFE with LPS, by counteracting body weight gain and biochemically by normalization of liver function parameters activity, glucose, insulin, homeostasis model of assessment (HOMA-IR) score, lipid profile levels, and histopathological examination. Significant changes in adipokine levels were perceived, resulting in a significant decline in serum leptin and tumor necrosis factor-α (TNF-α) level concurrent with adiponectin normalization. The positive effects observed for SAR on NASH are due to the downregulation of the LPS/TLR4 pathway, as indicated by the suppression of hepatic Toll-like receptor 4 (TLR4), NF-κB, TNF-α, and transforming growth factor-β1 (TGF-β1) expression. In conclusion, this work verified that SAR ameliorates NASH through deactivation of the hepatic LPS/TLR4 pathway and inhibition of adipocyte dysfunction.

No.	Publication	IF	Citations
125	Eman M. Elbaz, Hebatullah S. Helmy, Ayman E. El-Sahar, **Muhammed A. Saad**, Rabab H. Sayed. "Lercanidipine boosts the efficacy of mesenchymal stem cell therapy in 3-NP-induced Huntington's disease model rats via modulation of the calcium/calcineurin/NFATc4 and Wnt/β-catenin signalling pathways", *Neurochemistry International*, **131**, 104548, (**2019**), ISSN 0197-0186. https://doi.org/10.1016/j.neuint.2019.104548.	**3.881**	**8**

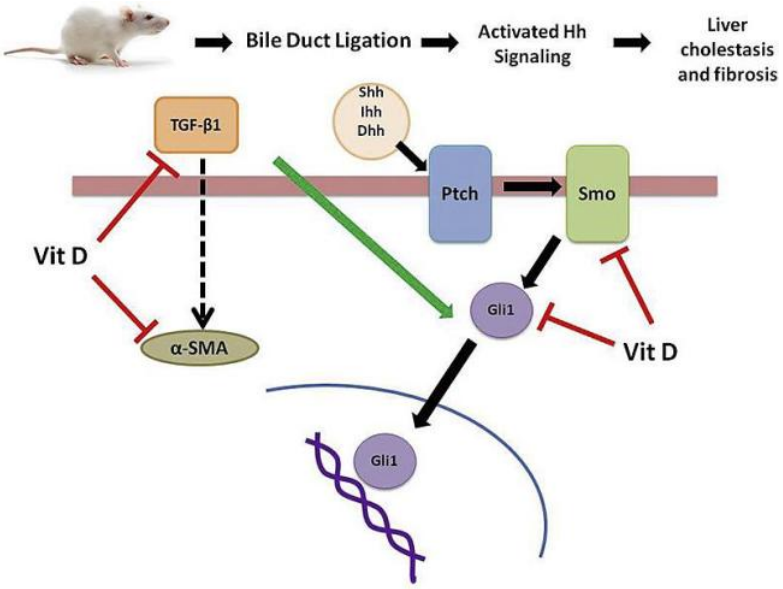
Abstract

3-Nitropropionic acid (3-NP) induces a spectrum of Huntington's disease (HD)-like neuropathologies in the rat striatum. The present study aimed to demonstrate the neuroprotective effect of lercanidipine (LER) in rats with 3-NP-induced neurotoxicity, address the possible additional protective effect of combined treatment with bone marrow-derived mesenchymal stem cells (BM-MSCs) and LER, and investigate the possible involvement of the Ca2+/calcineurin (CaN)/nuclear factor of activated T cells c4 (NFATc4) and Wnt/β-catenin signalling pathways. Rats were injected with 3-NP (10 mg/kg/day, i.p.) for two weeks and were divided into four subgroups; the first served as the control HD group, the second received a daily dose of LER (0.5 mg/kg, i.p.), the third received a single injection of BM-MSCs (1 x 106/rat, i.v.) and the last received a combination of both BM-MSCs and LER. The combined therapy improved motor and behaviour performance. Meanwhile, this treatment led to a marked reduction in striatal cytosolic Ca2+, CaN, tumour necrosis factor-alpha, and NFATc4 expression and the Bax/Bcl2 ratio. Combined therapy also increased striatal brain-derived neurotrophic factor, FOXP3, Wnt, and β-catenin protein expression. Furthermore, haematoxylin-eosin and Nissl staining revealed an amelioration of striatum tissue injury with the combined treatment. In conclusion, the current study provides evidence for a neuroprotective effect of LER and/or BM-MSCs in 3-NP-induced neurotoxicity in rats. Interestingly, combined LER/BM-MSC therapy was superior to cell therapy alone in inhibiting 3-NP-induced neurological insults via modulation of the Ca2+/CaN/NFATc4 and Wnt/β-catenin signalling pathways. LER/BM-MSC combined therapy may represent a feasible approach for improving the beneficial effects of stem cell therapy in HD.

No.	Publication	IF	Citations
126	**Noha Abdel-Rahman**, Maha H. Sharawy, Nirmeen Megahed, Mohammed S. El-Awady. "Vitamin D3 abates BDL-induced cholestasis and fibrosis in rats via regulating Hedgehog pathway", *Toxicology and Applied Pharmacology*, **380**, 114697, (**2019**), ISSN 0041-008X. https://doi.org/10.1016/j.taap.2019.114697.	4.219	2

Abstract

Liver cholestasis is a complex disease of broad etiologies. Hedgehog (Hh) signaling has been shown to play a pivotal role in modulating liver repair post cholestatic liver injury. We here investigated the role of vitamin D in experimental liver cholestasis induced by bile-duct ligation (BDL) in rats. Male Sprague Dawley rats underwent BDL surgery and two weeks post-surgery; vitamin D was administered daily for two weeks. Serum markers of hepatocellular integrity were measured and fibrosis was detected by measuring α-SMA and hepatic TGF-β1 as well as hepatic collagen content. Hh signaling was evaluated by measuring Smo and Gli1 levels. Histopathological examination of hepatic tissue was performed. Vitamin D alleviated obstructive cholestatic damage as illustrated by total bilirubin as well as gamma glutamyl transferase (γ-GT) serum levels. It also alleviated hepatocellular damage as suggested by reducing elevated serum aminotransferases induced by BDL. Antifibrotic activity of vitamin D was confirmed by decrease in mRNA and protein expression of α-SMA, as well as collagen content in hepatic tissue. Furthermore, vitamin D suppressed BDL-induced elevated hepatic TGF-β1 mRNA and protein levels. BDL activated Hh signaling and upregulated its upstream component smoothened (Smo) and downstream target gene Gli1. Treatment with vitamin D reduced Smo mRNA levels and suppressed hepatic Gli1 mRNA and protein levels. Molecular docking of vitamin D to Smo revealed that vitamin D binds similarly to its endogenous cholesterol ligand and blocks its activation. These results demonstrate that vitamin D mitigated cholestatic liver injury through inhibiting Hh signaling.



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SOP International Publications 2018

SCHOOL OF PHARMACY INTERNATIONAL PUBLICATIONS 2018

12 International publications with NGU affiliation were published in 2018 with 193 citations.

No.	Publication	IF	Citations
127	Attallah, O.A., **Al-Ghobashy, M.A.**, Nebsen, M. *et al*. "Assessment of pectin-coated magnetite nanoparticles in low-energy water desalination applications", *Environ Sci Pollut Res*, **25**, 18476–18483 (**2018**). https://doi.org/10.1007/s11356-018-2060-9.	**4.223**	5

Abstract

Novel magnetite nanoparticles (NPs) modified with pectin coating were fabricated, characterized, and evaluated as potential draw solute in a forward osmosis (FO) process for water desalination applications. The prepared NPs had a spherical shape with an average diameter of 200 nm and saturation magnetization of 23.13 emu/g. Thermogravimetric analysis (TGA) and FTIR spectra elucidated the successful pectin coating on magnetite surface. The potential use of the fabricated NPs in water desalination was conducted via a newly developed lab-scale FO system. Deionized water, saline water (0.2, 0.5, and 1 g% NaCl solution), and real well water (TDS=0.9 g%) were used as feed solutions. In all experiments, the water flux gradually decreased along with the extension of experimental time and NaCl rejection rate by the FO membrane was measured to be higher than 95%. Moreover, it was found that the pectin-coated magnetite NPs demonstrated to be able to draw clean water across the FO membrane from well water with a remarkable salt rejection of 97%. Thus, it is believed that the proposed FO system using pectin-coated magnetite NPs as draw solute can be a promising technique for desalination of well waters in an environmental-friendly and energy-saving manner.

No.	Publication	IF	Citations
128	**Medhat A. Al-Ghobashy**, Samah M. Kamal, Ghada M. El-Sayed, Ali K. Attia, Mohamed Nagy, Ahmed ElZeiny, Marwa T. Elrakaiby, Mohammed M. Nooh, Maggie Abbassi, Ramy K. Aziz. "Determination of voriconazole and co-administered drugs in plasma of pediatric cancer patients using UPLC-MS/MS: A key step towards personalized therapeutics", *Journal of Chromatography B*, **1092**, 489-498, (**2018**), ISSN 1570-0232. https://doi.org/10.1016/j.jchromb.2018.06.043	1.911	5

Abstract

Untreated invasive aspergillosis results in high mortality rate in pediatric cancer patients. Voriconazole (VORI), the first line of treatment, requires strict dose monitoring because of its narrow therapeutic index and individual variation in plasma concentration levels. Commonly co-administered drugs; either Esomeprazole (ESO) or Ondansetron (OND) have reported drug-drug interaction with VORI that should adversely alter therapeutic outcomes of the latter. Although VORI, ESO and OND are co-administered to pediatric cancer patients, the combined effect of ESO and OND on the plasma concentration levels of VORI has not been fully explored. In this study, an accurate, reliable, and sensitive liquid chromatography-tandem mass spectrometry (LC-MS/MS) assay was developed and validated for simultaneous determination of VORI, ESO, and OND in ultra-low sample volumes (25 µL) of plasma of pediatric cancer patients. Based on the physicochemical properties of the studied drugs and internal standard, liquid-liquid extraction was successfully adopted with methyl t-butyl ether. Consistent and reproducible recovery of the three drugs and the internal standard were calculated using plasma and matrix matched samples (RE% > 72.97%, RSD < 8.29%). Chromatographic separation was carried out using UPLC with C18 column and a mobile phase of acetonitrile:water:methanol (70:25:5 V/V/V) at 0.3 mL/min. Mass spectrometric determination at positive electrospray ionization in the MRM mode was employed. The analysis was achieved within 4 min over a linear concentration range of 1.00–200.00 ng/mL for the three drugs. The assay validity was assessed as per the Food and Drug Administration guidelines for bioanalytical method validation, and satisfactory results were obtained. The accuracy and precision were within the acceptable limits for the three drugs in both quality control and incurred plasma samples. Matrix effect and process efficiency were investigated in neat solvent, post-extraction matrix, and plasma. Correlation of the plasma concentration levels of the three drugs revealed differences from the reported drug-drug interactions. This confirmed the need for simultaneous determination of VORI and co-administered drugs in order to achieve optimal therapeutic outcomes.

No.	Publication	IF	Citations
129	Olivia A. Attallah, **Medhat A. Al-Ghobashy**, Ahmed Taha Ayoub, Marianne Nebsen. "Magnetic molecularly imprinted polymer nanoparticles for simultaneous extraction and determination of 6-mercaptopurine and its active metabolite thioguanine in human plasma", *Journal of Chromatography A*, **1561**, 28-38, (**2018**), ISSN 0021-9673. https://doi.org/10.1016/j.chroma.2018.05.038	4.759	22

Abstract

Cytotoxic drugs used in cancer chemotherapy require the continuous monitoring of their plasma concentration levels for dose adjustment purposes. Such condition necessitates the presence of a sensitive technique for accurate extraction and determination of these drugs together with their active metabolites. In this study a novel solid phase extraction technique using magnetic molecularly imprinted nanoparticles (MMI-SPE) is combined with liquid chromatography tandem mass spectrometry (LC–MS/MS) to extract and determine the anti-leukemic agent; 6-mercaptopurine (6-MP) and its active metabolite thioguanine (TG) in human plasma. The magnetic molecularly imprinted nanoparticles (Fe3O4@MIP NPs) were synthesized via precipitation polymerization technique and were characterized using different characterization methods A computational approach was adopted to help in the choice of the monomer used in the fabrication process. The Fe3O4@MIPs NPs possessed a highly improved imprinting efficiency, fast adsorption kinetics following 2nd order kinetics and good adsorption capacity of 1.0 mg/g. The presented MMI-SPE provided the optimum approach in comparison to other reported ones to achieve good extraction recovery and matrix effect of trace levels of 6-MP and TG from plasma. Chromatographic separation was carried out using a validated LC–MS/MS assay and recovery, matrix effect and process efficiency were evaluated. Recovery of 6-MP and TG was in the range of 85.94 –103.03%, while matrix effect showed a mean percentage recovery of 85.94 –97.62% and process efficiency of 85.54–96.18%. The proposed extraction technique is simple, effective and can be applicable to the extraction and analysis of other pharmaceutical compounds in complex matrices for therapeutic drug monitoring applications.

No.	Publication	IF	Citations
130	Attallah OA, **Al-Ghobashy MA**, Ayoub AT, Tuszynski JA, Nebsen M. "Computer-aided design of magnetic molecularly imprinted polymer nanoparticles for solid-phase extraction and determination of levetiracetam in human plasma", *RSC Advances*, **8(26),** 14280-92, (**2018**). https://doi.org/10.1039/C8RA02379D.	**3.361**	**7**

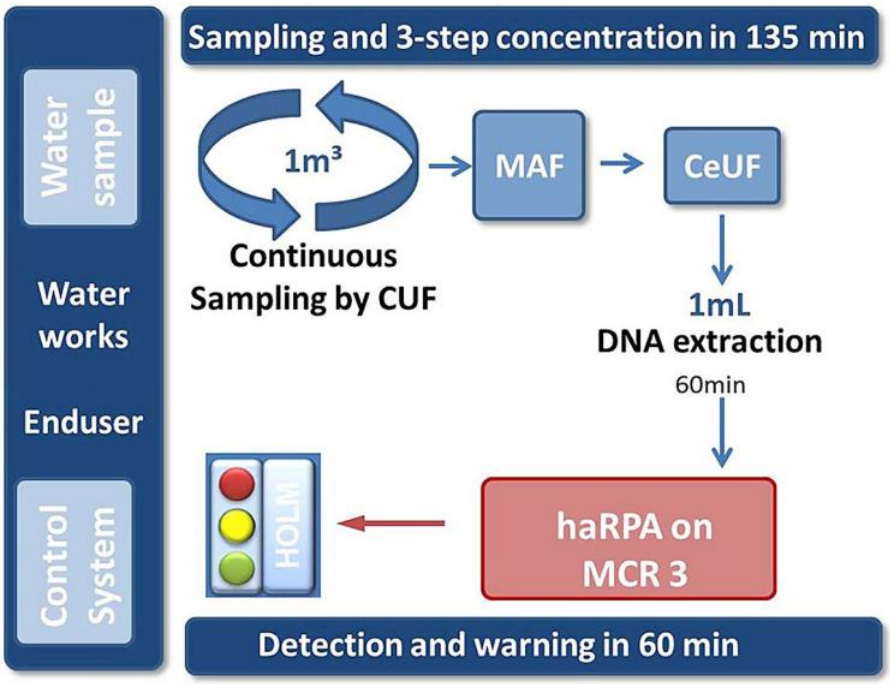
Abstract

Analytical methods should be accurate and specific to measure plasma drug concentration. Nevertheless, current sample preparation techniques suffer from limitations, including matrix interference and intensive sample preparation. In this study, a novel technique was proposed for the synthesis of a molecularly imprinted polymer (MIP) on magnetic Fe_3O_4 nanoparticles (NPs) with uniform core–shell structure. The Fe_3O_4@MIPs NPs were then applied to separate and enrich an antiepileptic drug, levetiracetam, from human plasma. A computational approach was developed to screen the functional monomers and polymerization solvents to provide a suitable design for the synthesized MIP. Different analysis techniques and re-binding experiments were performed to characterize the Fe_3O_4@MIP NPs, as well as to identify optimal conditions for the extraction process. Adsorption isotherms were best fitted to the Langmuir model and adsorption kinetics were modeled with pseudo-second-order kinetics. The Fe_3O_4@MIP NPs showed reasonable adsorption capacity and improved imprinting efficiency. A validated colorimetric assay was introduced as a comparable method to a validated HPLC assay for the quantitation of levetiracetam in plasma in the range of 10–80 μg mL^{-1} after extraction. The results from the HPLC and colorimetric assays showed good precision (between 1.08% and 9.87%) and recoveries (between 94% and 106%) using the Fe_3O_4@MIP NPs. The limit of detection and limit of quantification were estimated to be 2.58 μg mL^{-1} and 7.81 μg mL^{-1}, respectively for HPLC assay and 2.32 μg mL^{-1} and 7.02 μg mL^{-1}, respectively for colorimetric assay. It is believed that synthesized Fe_3O_4@MIP NPs as a sample clean-up technique combined with the proposed assays can be used for determination of levetiracetam in plasma.

No.	Publication	IF	Citations
131	Ali K. Attia, **Medhat A. Al-Ghobashy**, Ghada M. El-Sayed, Samah M. Kamal. "Voltammetric monitoring of linezolid, meropenem and theophylline in plasma", *Analytical Biochemistry*, **545**, 54-64, (**2018**), ISSN 0003-2697. https://doi.org/10.1016/j.ab.2018.01.009.	3.365	5

Abstract

Treatment of healthcare associated Pneumonia (HCAP) caused by Methicillin-resistant Staphylococcus aureus (MRSA) requires therapeutic protocols formed of linezolid (LIN) either alone or in combination with meropenem (MERO) and theophylline (THEO). The inter-individual pharmacokinetic variations require the development of reliable therapeutic drug monitoring (TDM) tools especially in immunocompromised patients. A sensitive square wave voltammetric sensor using multiwalled carbon nanotubes (MWCNTs) modified carbon paste electrode in Britton-Robinson buffer was developed and validated. Experimental parameters such as pH, percentage of MWCNTs, and pre-concentration time were optimized. The sensor was employed at pH 11.0 for the determination of LIN in plasma within a concentration range of 2.5×10^{-8} - 8.0×10^{-6} mol L^{-1} without interference from co-administered medications. On the other hand, simultaneous monitoring of LIN, MERO and THEO in plasma was feasible at pH 3.0 over concentration ranges of 4.0×10^{-7}- 9.0×10^{-5}, 8.0×10^{-7}- 9.0×10^{-5} and 8.0×10^{-7} - 9.0×10^{-5} mol L^{-1}, respectively. The performance of the proposed sensor was validated and the applicability for TDM has been demonstrated in plasma of healthy volunteers.



No.	Publication	IF	Citations
132	Hoda E. Mohamed, Abeer A. Mohamed, **Medhat A. Al-Ghobashy**, Faten A. Fathalla, Samah S. Abbas. "Stability assessment of antibody-drug conjugate Trastuzumab emtansine in comparison to parent monoclonal antibody using orthogonal testing protocol", *Journal of Pharmaceutical and Biomedical Analysis*, **150**, 268-277, (**2018**), ISSN 0731-7085. https://doi.org/10.1016/j.jpba.2017.12.022.	3.935	19

Abstract

Antibody-drug conjugates (ADC) represent an emerging, novel class of biopharmaceuticals. The heterogeneity originating from the sophisticated structure requires orthogonal analytical techniques for quality and stability assessment of ADC to ensure safety and efficacy. In this study, the stability of Trastuzumab (recombinant humanized IgG1 mAb, targeting HER2 receptor) and its ADC with DM1 (anti-tubulin anticancer drug), Trastuzumab emtansine (T-DM1) were studied. SE-HPLC was used to monitor formation of aggregates and/or fragments of the monoclonal antibodies (mAb). Correlation with the results of reducing and non-reducing sodium dodecyl sulphate – polyacrylamide gel electrophoresis (SDS-PAGE) and dynamic light scattering (DLS) were performed to interpret the obtained results. RP-HPLC was used for assessment of the stability of DM1 in ADC while spectrophotometry was employed to determine drug antibody ratio (DAR) . The studied drugs were subjected to several stress conditions including pH, temperature, mechanical agitation and repeated freeze and thaw to generate possible degradation products and ensure suitability of the assay protocol. The degradation pattern and extent were demonstrated under the indicated stress conditions. The correlation between the results of SE-HPLC and those of SDS-PAGE and DLS ensured the validity of the orthogonal assay protocol and indicated aggregates that were not detected using SE-HPLC. Results showed clearly that T-DM1 is relatively less stable than its parent mAb. This was attributed to the presence of the drug-linker part that is attached to the mAb. RP-HPLC showed that the cytotoxic drug moiety is liable for degradation under the studied conditions resulting in alteration of DAR as well as formation of degradation products. This confirmed the need for more robust coupling chemistries for production of safe and effective ADC and highlighted the importance of orthogonal testing protocols for quality assessment. The assay protocol should be applicable for quality and stability assessment of various ADC.

No.	Publication	IF	Citations
133	Sara M. Shatat, Basma M. Eltanany, Abeer A. Mohamed, **Medhat A. Al-Ghobashy**, Faten A. Fathalla, Samah S. Abbas. "Coupling of on-column trypsin digestion–peptide mapping and principal component analysis for stability and biosimilarity assessment of recombinant human growth hormone", *Journal of Chromatography B*, **1072**, 105-115, (**2018**), ISSN 1570-0232. https://doi.org/10.1016/j.jchromb.2017.11.007	1.911	9

Abstract

Peptide mapping (PM) is a vital technique in biopharmaceutical industry. The fingerprint obtained helps to qualitatively confirm host stability as well as verify primary structure, purity, and integrity of the target protein. Yet, in-solution digestion followed by tandem mass spectrometry is not suitable as a routine quality control test. It is time consuming and requires sophisticated, expensive instruments and highly skilled operators. In an attempt to enhance the functionality of PM and extract multi-dimentional data about various critical quality attributes and comparability of biosimilars, coupling of PM generated using immobilized trypsin followed by HPLC-UV to principal component analysis (PCA) is proposed. Recombinant human growth hormone (rhGH); was selected as a model biopharmaceutical since it is available in the market from different manufacturers and its PM is a well-established pharmacopeial test. Samples of different rhGH biosimilars as well as degraded samples: deamidated and oxidized were subjected to trypsin digestion followed by RP-HPLC-UV analysis. PCA of the entire chromatograms of test and reference samples was then conducted. Comparison of the scores of samples and investigation of the loadings plots clearly indicated the applicability of PM-PCA for: i) identity testing, ii) biosimilarity assessment and iii) stability evaluation. Hotelling's T2 and Q statistics were employed at 95% confidence level to measure the variation and to test the conformance of each sample to the PCA model, respectively. Coupling of PM to PCA provided a novel tool to identify peptide fragments responsible for variation between the test and reference samples as well as evaluation of the extent and relative significance of this variability. Transformation of conventional PM that is largely based on subjective visual comparison into an objective statistically-guided analysis framework should provide a simple and economic tool to help both manufacturers and regulatory authorities in quality and biosimilarity assessment of biopharmaceuticals.

No.	Publication	IF	Citations
134	Ibrahim, S.M., **Al-Shorbagy, M.Y.**, Abdallah, D.M. *et al*. "Activation of α7 Nicotinic Acetylcholine Receptor Ameliorates Zymosan-Induced Acute Kidney Injury in BALB/c Mice", *Sci Rep*, **8(1)**, 16814, **(2018)**. https://doi.org/10.1038/s41598-018-35254-1.	4.380	15

Abstract

Zymosan, a natural compound, provokes acute peritonitis and multiple organ dysfunction that affects the kidney, beside other organs via exaggerated inflammatory response. The aim of the present study is to test the role of cholinergic anti-inflammatory pathway (CAP) in alleviating acute kidney injury (AKI) induced by zymosan in BALB/c mice, using galantamine, a cholinesterase inhibitor, known to act via α7 nicotinic acetylcholine receptor (α7 nAChR) to stimulate CAP. Galantamine verified its anti-inflammatory effect by elevating acetylcholine (ACh) level, while abating the interleukin-6/ janus kinase 2 (Y1007/1008)/ signal transducer and activator of transcription 3 (Y705) (IL-6/ pY(1007/1008)-JAK2/ pY705-STAT3) inflammatory axis, with a consequent inhibition in suppressor of cytokine signaling 3 (SOCS3). This effect entails also the nuclear factor-kappa B (p65)/ high mobility group box protein-1/ (NF-κB (p65)/ HMGB-1) signaling pathway. Furthermore, the reno-curattive effect of galantamine was associated by a reduction in plasma creatinine (Cr), cystatin (Cys)-C, IL-18, and renal neutrophil gelatinase-associated lipocalin (NGAL), as well as an improved histopathological structure. Blocking the α7 nAChR by methyllycaconitine abolished the beneficial effect of galantamine to document the involvement of this receptor and the CAP in the amelioration of AKI induced by zymosan.

No.	Publication	IF	Citations
135	Rabab M. Ali, **Muhammad Y. Al-Shorbagy**, Maged W. Helmy, Hanan S. El-Abhar. "Role of Wnt4/β-catenin, Ang II/TGFβ, ACE2, NF-κB, and IL-18 in attenuating renal ischemia/reperfusion-induced injury in rats treated with Vit D and pioglitazone", *European Journal of Pharmacology*, **15(831)**, 68-76, (**2018**), ISSN 0014-2999. https://doi.org/10.1016/j.ejphar.2018.04.032.	4.432	24

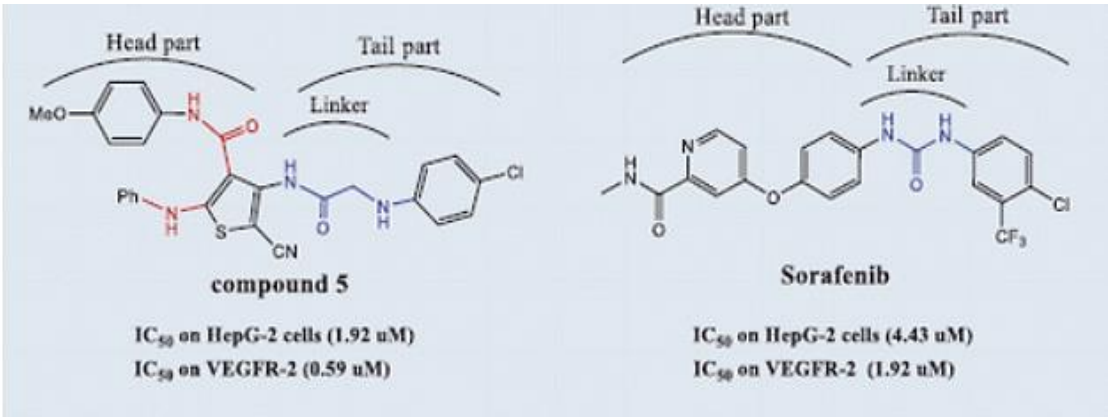
Abstract

Renal ischemia-reperfusion injury (I/RI) remains a critical clinical situation. Several evidence revealed the potential reno-protective effects of Vitamin D and/or pioglitazone, on renal I/RI. This study addresses the possible involvement of the Wnt4/β-catenin signaling, p-S536NF-κBp65, PPARγ, Ang II/TGF-β, and ACE2 as potential effectors to vitamin D and pioglitazone-mediated renoprotective effects. Two sets of Sprague-Dawley rats (n = 30 rat each), were randomized into sham, I/R, Vit D "alfacalcidol" (5 ng/kg/day), pioglitazone (5 mg/kg/day), and Vit D + pioglitazone groups. In all groups renal biochemical parameters, as well as inflammatory and structural profiles were assessed, besides the expression/contents of Wnt4/β-catenin and pS536-NF-κBp65. All treatments started 7 days before I/RI and animals were killed 24 h after I/RI in the first set, while those in the 2nd set continued their treatments for 14 days. After 24 h, all pre-treatments impeded the I/R effect on neutrophils recruitment, p-S536NF-κBp65, IL-18, NGAL, caspase-3, AngII, ACE-2, PPARγ and TGF-β, besides the expression of Wnt4 and ACE-2 with notable reflection on histological changes. Two weeks after I/RI, except a marked-up regulation in Wnt4 expression and a striking elevation in the β-catenin content, the magnitude of the injurious events was relatively less pronounced, an effect that was mostly augmented by the different treatments. The current study pledges a promising and novel reno-protective role of the administration of Vit D and pioglitazone entailing a potential involvement of ICAM-1, MPO, NF-κB, Ang II, ACE2, TGFβ, and a modulation of Wnt4/β-catenin pathway.

No.	Publication	IF	Citations
136	Mohammed K. AbdElhameid, Madlen B. Labib, Ahmed T. Negmeldin, **Muhammad Al-Shorbagy** & Manal R. Mohammed, "Design, synthesis, and screening of ortho-amino thiophene carboxamide derivatives on hepatocellular carcinoma as VEGFR-2Inhibitors", *Journal of Enzyme Inhibition and Medicinal Chemistry*, **33(1)**, 1472-1493, (**2018**). DOI: 10.1080/14756366.2018.1503654.	5.051	11

Abstract

In this work, design, synthesis, and screening of thiophene carboxamides 4–13 and 16–23 as dual vascular endothelial growth factor receptors (VEGFRs) and mitotic inhibitors was reported. All compounds were screened against two gastrointestinal solid cancer cells, HepG-2 and HCT-116 cell lines. The most active cytotoxic derivatives 5 and 21 displayed 2.3- and 1.7-fold higher cytotoxicity than Sorafenib against HepG-2 cells. Cell cycle and apoptosis analyses for compounds 5 and 21 showed cells accumulation in the sub-G1 phase, and cell cycle arrest at G2/M phase. The apoptotic inducing activities of compounds 5 and 21were correlated to the elevation of p53, increase in Bax/Bcl-2 ratio, and increase in caspase-3/7.Compounds 5 and 21 showed potent inhibition againstVEGFR-2 (IC_{50}=0.59 and 1.29 µM) and β-tubulin polymerization (73% and 86% inhibition at their IC_{50} values).Molecular docking was performed with VEGFR-2 and tubulin binding sites to explain the displayed inhibitory activities.



No.	Publication	IF	Citations
137	Abd Elhameid MK, Ryad N, **Al-Shorbagy MY**, Mohammed MR, Ismail MM, El Meligie S. "Design, Synthesis and Screening of 4,6-Diaryl Pyridine and Pyrimidine Derivatives as Potential Cytotoxic Molecules", *Chem Pharm Bull*, **66(10)**, 939-952. (**2018**). Doi: 10.1248/cpb.c18-00269.	1.645	5

Abstract

A new series of pyridine and pyrimidine derivatives is designed and synthesized as potential antitumor molecules. The tested compounds show promising in vitro cytotoxic activity against HL-60 cell line as eight compounds: 4, 6, 11, 13, 14, 15, 18 and 21 exhibit potent cytotoxic activity in sub-micromolar concentration higher than the combretastatin A4 (CA-4). Compound 21 shows a cytotoxic activity 5-fold more potent than CA-4 on HL-60 cells. DNA-Flow cytometry cell cycle analysis and annexin-V assay on HL-60 cells show that compounds 4, 18 and 21 exhibit potent cell growth inhibition, cell cycle arrest at G2/M phase and pro-apoptotic inducing activities. The percentage inhibition assay of β-tubulin polymerization on HL-60 cells shows that the antitumor activity of the tested compounds appears to correlate well with its ability to inhibit β-tubulin polymerization. In addition, enzyme-linked immunosorbene assay (ELISA) measurement for compound 21 shows apoptotic inducing activities through significant up regulation of p53, Bax/Bcl-2 ratio and caspase-3 proteins parallel to down regulation of the level of survivin proteins.

No.	Publication	IF	Citations
138	Marwa A. Fouad, Enas H. Tolba, Manal A. El-Shal, **Ahmed M. El Kerdawy**. "QSRR modeling for the chromatographic retention behavior of some β-lactam antibiotics using forward and firefly variable selection algorithms coupled with multiple linear regression", *Journal of Chromatography A*, **1549**, 51-62, (**2018**), ISSN 0021-9673. https://doi.org/10.1016/j.chroma.2018.03.042.	3.858	12

Abstract

The justified continuous emerging of new β-lactam antibiotics provokes the need for developing suitable analytical methods that accelerate and facilitate their analysis. A face central composite experimental design was adopted using different levels of phosphate buffer pH, acetonitrile percentage at zero time and after 15 min in a gradient program to obtain the optimum chromatographic conditions for the elution of 31 β-lactam antibiotics. Retention factors were used as the target property to build two QSRR models utilizing the conventional forward selection and the advanced nature-inspired firefly algorithm for descriptor selection, coupled with multiple linear regression. The obtained models showed high performance in both internal and external validation indicating their robustness and predictive ability. Williams-Hotelling test and student's t-test showed that there is no statistical significant difference between the models' results. Y-randomization validation showed that the obtained models are due to significant correlation between the selected molecular descriptors and the analytes' chromatographic retention. These results indicate that the generated FS-MLR and FFA-MLR models are showing comparable quality on both the training and validation levels. They also gave comparable information about the molecular features that influence the retention behavior of β-lactams under the current chromatographic conditions. We can conclude that in some cases simple conventional feature selection algorithm can be used to generate robust and predictive models comparable to that are generated using advanced ones.

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SOP International Publications 2017

SCHOOL OF PHARMACY INTERNATIONAL PUBLICATIONS 2017

3 International publications with NGU affiliation were published in 2017 with 19 citations.

No.	Publication	IF	Citations
139	Ibrahim, F.A., **Al-Ghobashy, M.A.**, Abd El-Rahman, M.K. *et al*. "Optimization and in line potentiometric monitoring of enhanced photocatalytic degradation kinetics of Gemifloxacin using TiO2 nanoparticles/H2O2". *Environ Sci Pollut Res*, **24**, 23880–23892 (**2017**). https://doi.org/10.1007/s11356-017-0045-8.	**4.223**	7

Abstract

Gemifloxacin (GEM) is a broad-spectrum quinolone antibiotic. The presence of GEM residuals in industrial and hospital wastewater has been associated with genotoxicity and antibiotic resistance. In this contribution, the photodegradation of GEM using titanium dioxide nanoparticles (TiO_2NPs)/H_2O_2 as a catalyst was optimized to eliminate residual drug and its photodegradates with antibacterial activity. A half-factorial design was implemented, investigating the effects of pH, initial concentration, H_2O_2 concentration, TiO_2NP loading, and irradiation time. Owing to the time-dependent, multi-transformation of GEM into a wide range of structurally related photodegradation products, the monitoring of GEM throughout the experiments was achieved using both HPLC and potentiometric ion-selective electrodes (ISE). The sensor enabled in-line tracking of residual GEM in the presence of its photodegradates in real time. Results indicated that the pH, irradiation time, and GEM initial concentration were the most significant factors. At the optimum set of experimental conditions, the reaction followed first-order reaction kinetics with a mean percentage degradation of ~ 95% in less than 30 min of irradiation time and almost complete loss of antibacterial activity against Escherichia coli. The promising results demonstrated the efficiency of UV/TiO_2NP/H_2O_2 as a photocatalyst for the breakdown of the pharmacophore of fluoroquinolones from water samples. The high selectivity, minimal solvent consumption, and lack of harmful waste generation confirmed the superiority of in-line monitoring using ISE. Optimization and in-line monitoring protocol should be applicable also at the pharmaceutical industry scale to eliminate the risk of antibiotic resistance.

No.	Publication	IF	Citations
140	Heba S. Abed, **Medhat A. Al-Ghobashy,** Faten A. Fathalla, Maissa Y. Salem. "Evaluation of the combined effects of pegylation and glycosylation on the stability of erythropoietin using a stability-indicating SE-HPLC", *Biologicals*, **50**, 129-136, (**2017**), ISSN 1045-1056. https://doi.org/10.1016/j.biologicals.2017.08.012.	1.856	3

Abstract

Recombinant human erythropoietin (rhEPO) is a commonly used biopharmaceutical for the treatment of anemia-associated disorders. Epogen; glycosylated erythropoietin (G-EPO) has short half-life and poor stability. Pegylated Epogen (Peg-G-EPO) was introduced to the market to overcome these limitations. The combined effects of pegylation and glycosylation on the stability of Peg-G-EPO was studied. Determination of Peg-G-EPO in the presence of its degradation products was achieved using SE-HPLC. The assay was validated according to ICH guidelines over concentration range of 50.00–320.00 μg/mL (r 0.9999). A mobile phase of 50 mM phosphate buffer (pH 6.5) with 300 mM sodium chloride and 20% ethanol was employed. Isocratic elution was carried out at 0.5 mL/min over run time of 30 min. Peg-G-EPO was found stable towards mechanical agitation only at low concentrations while it was stable towards repeated freeze/thaw: regardless of the concentration. Effect of temperature and pH were also investigated, and Peg-G-EPO was found stable within narrow ranges. Results indicated formation of small molecular weight and very high molecular weight aggregates that have been filtered-off the column. Although Peg-G-EPO was found relatively more stable than its non-pegylated but glycosylated version, results indicated the need for careful stability-assessment of Peg-G-EPO.

No.	Publication	IF	Citations
141	Moenes, Eman M., **Medhat A Al-Ghobashy**, Abeer A Mohamed, and Maissa Y Salem. "Comparative Assessment of the Effect of Glyco-engineering on the Pattern and Kinetics of Aggregate Formation of Darbepoetin Alfa using a Stability-Indicating Orthogonal Testing Protocol", *Journal of Chromatography B*, **1072**, 405-414, (**2017**), ISSN 1570-0232. Doi: 10.1016/j.jchromb.2017.10.057.	1.911	6

Abstract

Darbepoetin alfa (DA); hyper-glycosylated Erythropoietin alfa (EPO) is an essential treatment of anemia in patients with chronic kidney failure and cancer. In this study, DA and EPO were subjected to physicochemical stress factors that might be encountered during production, transport, and storage (pH, temperature, agitation, repeated freeze-thaw and oxidation). An orthogonal stability-indicating assay protocol comprised of SE-HPLC, RP-HPLC, ELISA and SDS-PAGE was developed and validated to investigate the effect of further glycosylation of DA on the pattern and kinetics of degradation. Results showed a relatively higher stability and lower tendency to form high molecular weight aggregates in the case of DA when compared to EPO, under equivalent stress conditions. Dimers and aggregates were formed for both drugs across the whole pH range and following incubation at temperatures higher than 2–8°C or repeated freeze/thaw. The same observation was noted upon agitation of standard samples prepared in the formulation buffers at high speed and upon oxidation with hydrogen peroxide. The agreement between SE-HPLC, supported with spectral purity data and ELISA confirmed the specificity of both techniques for the intact drugs. Results of RP-HPLC and SDS-PAGE indicated that dimerization occurred through disulfide and bi-tyrosine covalent bonds in the case of pH and oxidation, respectively. It was evident that aggregation was significantly suppressed upon increasing the glycan size and under any of the studied stress factors loss of the glycan has not been observed. These observations supported with the slow kinetics of degradation confirmed the superiority of glyco-engineering over chemical pegylation to enhance the stability of EPO. Formation of such potentially immunogenic product-related impurities at all tested stress factors confirmed the need for orthogonal testing protocols to investigate the complex pattern of degradation of such sensitive products.

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Funded Research Projects 2017-2022

FUNDED RESEARCH PROJECTS 2017 - 2022

School of Pharmacy staff has contributed in **10** Funded research projects since 2017

1. **ASRT**, Academy of Scientific Research and Technology, Egypt
   Ahmed S. Attia (PI), **Medhat Al-Ghobashy** & Noha Elhosseiny
   "The production of nanobodies using the yeast display technology as a non-conventional tool for precision medicine in infective diseases & beyond"
   December 2020 – Running

2. **ASRT**, Academy of Scientific Research and Technology, Egypt
   Grant Code: KTA-C4-4267
   Ahmed ElKerdawy
   "Towards the Establishment of a Globally Compliant Egyptian Active Pharmaceutical Ingredient Facility for Critical Diseases"
   April 2020 – Running

3. **STDF-RSG**, Science & Technology Development Fund, Egypt
   Grant Code: 34848
   Ahmed ElKerdawy
   "Development of Novel EGF Receptor Inhibitors Targeting Non-Small Cell Lung Cancer (NSCLC)"
   October 2019 – Running

4. **STDF-RSG**, Science & Technology Development Fund, Egypt
   Grant Code: 30069
   Ahmed ElKerdawy
   "Design, Synthesis, and Biological Evaluation of Novel Raf -1/VEGFR-2 Inhibitors as Antiangiogenic Agents"
   October 2019 – Running

5. **STDF-RSG**, Science & Technology Development Fund, Egypt
   Grant Code: 34859
   Ahmed ElKerdawy
   "Synthesis and biological evaluation of novel fibrates as antihyperlipidemic agents"
   October 2019 – Running

6. STDF, Science & Technology Development Fund, Egypt
   Medhat Al-Ghobashy (PI), Ahmed Attia (Co-PI), Basma Eltanany & Mohamed Abdullah
   "Assessment of biosimilarity and interchangeability of locally produced biopharmaceuticals using statistically-guided orthogonal testing protocols at industrial scale"
   May 2019 – Running

7. ASRT, Academy of Scientific Research and Technology, Egypt
   Nesrine Salah El Dine El-Sayed (PI), Salwa Ahmed Elgebaly, Medhat Al-Ghobashy, Galal Elgemeie & Mamdouh A. Abu-Zaied
   "To Determine the Capability of the Cardioprotective Cyclocreatine Phosphate to Reduce the Progression of Myocardial Infarction to Heart Failure in the Standard ISO Rat Model"
   November 2018 – Running

8. Bilateral project: NRC, National Research Centre & CNR, Istituto di Chimica del Riconoscimento Molecolare
   Project code: IT II 020702
   Ahmed ElKerdawy
   "Design, Synthesis and Biological Evaluation of Novel Chalcone-based Fibrates as Novel PPAR-α Agonists"
   March 2018 – Closed.

9. STDF, Science & Technology Development Fund, Egypt
   Project code: STDF 15063
   Ahmed ElKerdawy
   "Development of Novel VEGF Tyrosine Kinase Receptor Antagonists Utilizing Molecular Modeling Techniques"
   March 2017 – Closed.

10. STDF, Science & Technology Development Fund, Egypt
    Medhat Al-Ghobashy (PI), Aliaa El-Meshad (Co-PI), Ahmed Attia, Wael Mamdouh, Muhammad Al-Shorbagy, & Mohamed Abduallah
    "Formulation and Evaluation of Surface Functionalized Nanoparticles Enclosing Myelin Basic Protein for Treatment of Multiple Sclerosis"
    April 2016 – Closed.

SCHOOL OF PHARMACY SCIENTIFIC RESEARCH FACILITIES AND RESOURCES

The School of Pharmacy, Newgiza University, offers research facilities and resources needed for faculty members and teaching assistants

1. HPLC Apparatus

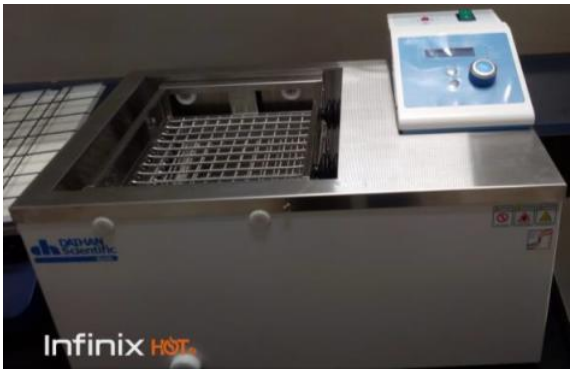
2. Tablet machine (single punch)

3. Rotary evaporator

4. UV/Vis Spectrophotometer

5. Flow Cytometer

6. Lyovapor



7. Shaking Water Bath

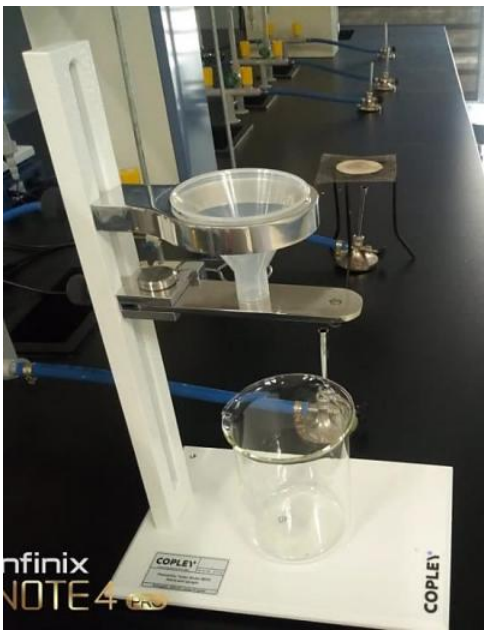
8. Electrophoresis Apparatus

9. Shaking incubator

10. Autoclave

11. Friability tester

12. Disintegration tester



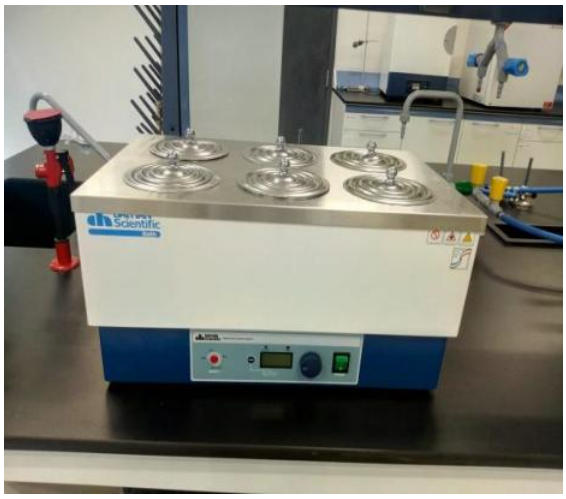
13. Flowability tester

14. Homogenizer

15. Colorimeter (single beam)

16. Water distillation system

17. Ultrasonic Bath



18. Water Bath

19. Incubator

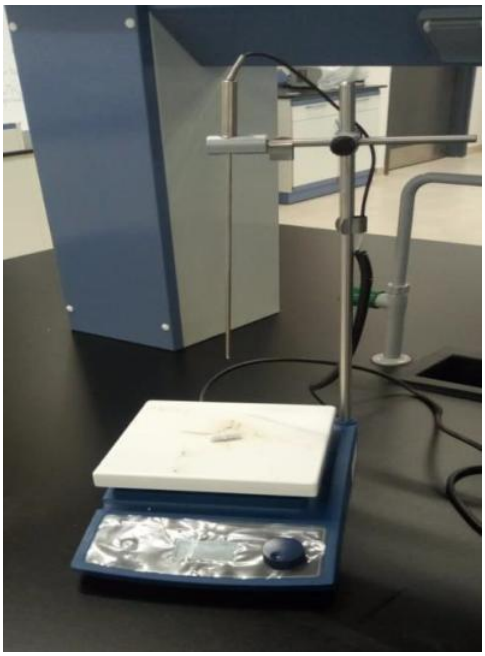
20. Oven (hot air)

21. Microfuge

22. Centrifuge (benchtop)

23. Balance (analytical - 4dp)

24. Balance (digital - 2dp)



25. Hot plate (digital - stirrers)

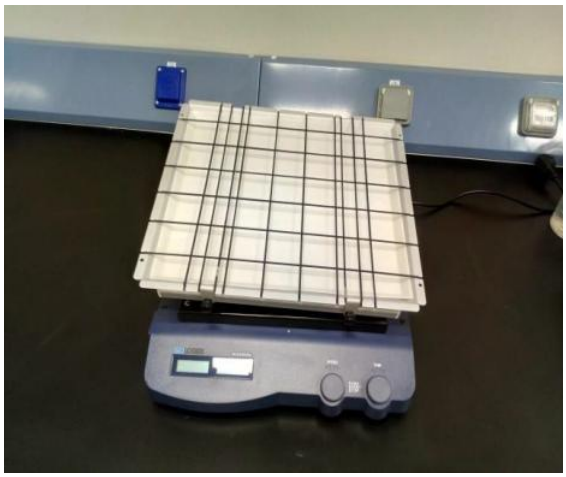
26. Hot plate (analogue - stirrers)

27. UV Lamp

28. Melting point apparatus

29. Vacuum (pump)

30. Oven (microwave)



31. Rocking shaker

32. Heating block

33. Microscope

34. Recording drum

35. Conductometer

36. pH meter

37. Vortex mixer

38. Balance (with stadiometer)

39. Sphygmomanometer (BP measuring)

40. Digital automated pipettes

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