Faculty of Pharmacy

Spring 2021

MSA UNIVERSITY
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Established by Dr.Nawal El Degwi
MSA UNIVERSITY
جامعة أكتوبر للعلوم الحديثة والآداب

Graduation Projects' Abstract Book

2020/2021

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"MSA University would like to recognize and celebrate the outstanding achievements of pharmacy students and their great participation in the development of the pharmaceutical field. We are very proud of our students. They excelled in their field and positively contributed to their community."

Graduation Project Committee
Spring 2021

Dear Graduating Students,

Congratulations Dear Pharmacy seniors, it is such a pleasure to celebrate your success and outstanding achievements. You have set the highest goals and realized great progress. As you start your journey, the first thing you should do is throw away that store-bought map and begin to draw your own.

Wishing you all a future filled with brightest blessings.

Dr. Nawal El-Degwi
Head of board of trustees of MSA University

Now it's time for you to move on to what's next. But you must not let anything deter you from taking those first steps. Don't spend so much time trying to choose the perfect opportunity, that you miss the right opportunity. Recognize that there will be failures, and acknowledge that there will be obstacles. But you will learn from your mistakes and the mistakes of others, for there is very little learning in success.

This year, you have completed your journey as a students, but the journey will never end at MSA University, as we support our graduated students and will always be there celebrating your success. Your success makes MSA's worldwide recognition a reality; as you will all be receiving a British equivalent degree from our partner "University of Greenwich", you have undoubtedly took a leap and have an edge over your counterparts.

MSA University is so proud of your hard work and great achievements therefore we decided to launch an abstract book for graduation project. A book that includes essence of your hard work, and document your progress to encourage future seniors. At MSA University there are no Goodbyes, as we wholeheartedly looking forward to witness your success. All the best my dear students, we are so proud of you!

Dear Graduating Students,

On the behalf of all MSA University and all of you lecturers and teaching assistants, I congratulate you deeply on your approaching graduation. Our focus here has been to enable you to succeed on all aspects that a multitude of hardware and software technologies, exclusive to MSA Pharmacy students, have been readily available to you, along with our well-equipped facilities and highly qualified staff that have helped us bolster your skills and post your capabilities.

Prof. Dr. Khayri Abd El Hamid
President of MSA University

We'd also like to sincerely thank all of our faculty members who are always there, not only to handle the academic aspect of student life, but also to tackle social issues and offer there whenever needed. I have to say they have been working tirelessly to ensure your success.

Our mission is to ensure that the latest trends are applied to core curricula and the academic facilities. MSA also takes pride in its diversified cultural accomplishments that aim to help new after graduation, such as the initiated-by-students Career placement Center (CPC). The CPC paves the way before our students and networks you to the outer world and prepares you for the job market locally and internationally. Utilize it. I truly believe you well witness a great demand due to the quality of your education and hands-on experience.

I'm very proud of all of you and of all your achievements, and am confident that there are more achievements to come from you.

Dear Seniors 2021,

Prof. Dr. Hanan El-Leithy
Dean of Faculty of Pharmacy
MSA University

"I am honored to witness the end of an educational journey and the beginning of a new one. We share a bitter sweet moment. Not long ago our graduates came here for the first time as freshmen students and we watched them grow into responsible young adults.

Class of 2021, you will be greatly missed.

Our graduates have worked hard throughout 5 years to reach the level we are proud to present in this year's graduation projects.
MSA curricula provide the latest scientific theories alongside the necessary practical training. We were also keen on enhancing computer, presentation and communication skills through interactive assignments, awareness campaigns and scientific events. What our students have done in their projects resembles what many postgraduate programs offer.

I believe that our graduates leave us armed with the knowledge, the experience and the drive to make an impact.

Finally, I would like to say to class 2021, Follow your passion, proceed with confidence, your future awaits. You have made your parents, university and yourself proud, CONGRATULATIONS!"

Congrats!
CLASS OF 2021
MSA
Congrats
CLASS OF 2020
GRAD

UNIVERSITY of GREENWICH

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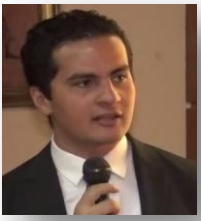
Acknowledgments

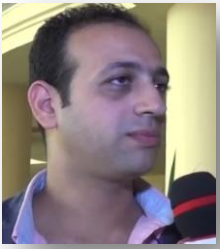
On Behalf of MSA University, we wish to thank the following respectable institutes for their generous Contributions to the graduation projects. We are indeed grateful to you for your enthusiastic support

External Examiners and Guests Quotes



"MSA University is one of few universities that offer many training opportunities to its students which is crucial to prepare them for the work field"

Dr. Amr Naggar
Head of Clinical Pharmacy Department
Araby Hospital & Maadi Military Hospital

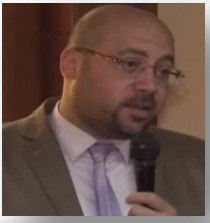


"I commend MSA for providing professional training to its students, not only do these students learn theoretical basics but they can apply their knowledge in real life situations"

Dr. Mohammed Farouk
Head of Clinical Pharmacy & Clinical Nutrition Department
Moallemeen Hospital

"I thank MSA for hosting such an important conference highlighting the latest in the field of pharmacology"

Prof. Dr. Mohey Mazar
Dean of Faculty of Pharmacy-BUE
Member of the Board of Directors of ESPET



"It was a pleasure having MSA students as trainees in our pharmacies. They were dedicated young pharmacists always willing to learn more".

Dr. Walaa Attia
Manager of Abo Ali Pharmacies

External Examiners and Guests Quotes

"Training is an important aspect of learning, so by allowing these students to be exposed to practical experience will make them standout in the competitive work field".

Dr. Yasser El Sayed
EPICO Labs

Egyptian plans to fight antimicrobial resistance by different ways and everyone should be a part of that plan. Community service by MSA students and awareness effort should be a model for others to follow.

Dr. Omar Abo El Atta
WHO Office

It is great how MSA organizes conferences with distinguished speakers that share their knowledge with the students, raising their awareness and surely will lead to innovative graduates keen on research and a bright careen in the work field pharmacological searches.

Prof. Dr. Nadia Zakhary
Professor of Biochemistry
Former Minister of Scientific Research

The conference held in MSA is an important event as it raises awareness amongst students about the importance of medical input and pharmaceutical revolution in improving human health and treating challenging diseases

Prof. Dr. Hussein Khaled
Professor of Medical Oncology
Former Minister of Higher Education

External Examiners and Guests Quotes

" I think MSA is a great university, it offers its students many opportunities, both in terms of their education and career development".

Dr. Katerina Lalatsa
Lecturer of Pharmaceutics & Drug delivery
Greenwich University

The quality and the actual methodologies the students are applying, the results they are getting, the possibility of publishing in international journals, and most of them actually do. These are all very good qualities that are reflected on the development of these students. It reflects on the very good standards that are applied by the teaching teams, the university and their systems.

Dr. Samer El Daher
Head of the Sciences Department
Greenwich University

"The academic staffs in MSA are so keen to learn and see what other people are doing and to learn from other people examples and think how they can use it to improve themselves. Their commitment to their students is impressive"

Dr. Sally Alsford
Deputy Head of Educational Development Unit
Greenwich University

Because MSA has been very brave, I think MSA is going to be a leader in Egypt not only Cairo.

Dr. Melanie Thorley
Accessibility Team Coordinator
Greenwich University

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The Alumni

MSA University
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"Day one will lead you to One day", was on the walls of MSA University, I read this quote on my first day and it was my main motivation to achieve what I am now; working in AstraZeneca. The different courses that I studied throughout the five years have built my capabilities to be unique and differentiated among the other graduates in the market. Now MSA graduates have a very strong reputation in pharmaceutical companies. Thanks to MSA for making me able to say "Am MSAian and proud"

"Choosing MSA as my University has been one of the best decisions I have ever made. It shaped me into becoming someone I aspired to be and led me to become a Trade Marketing Manager for Egypt+ for Bayer consumer Healthcare at such a young age. Studying pharmacy while attending extra-curricular activities helped me create a work balance that I still benefit from till this day. A lot of what I accomplished was because of MSA, thanks to MSA, and I will always be grateful."

"I clearly see that the five years I spent at MSA University were my preparation journey to my career specifically and generally in life. I appreciate the hard times and the good times that helped me gain more confidence in myself to reach where I am now."

"The Faculty of Pharmacy at MSA University was where I Excelled in Pharmaceutical courses that are given exclusively by MSA University. When I began my career as a medical representative at one of the biggest multinational companies, my level of skills and readiness was higher than my other colleagues, this helped me to differentiate myself from others and got me promoted because my experience during the university has already filled the gaps that one has when starting their own career. At MSA you get ready not to be the same but to be the BEST!"

I would like to thank MSA University for everything it taught me which led me now to be one of the best pharmacists at Novartis as I was ranked as one of the top 5 in my team. I graduated from the Faculty of Pharmacy (Class of 2019) and I am currently working at Novartis Pharmaceutical Company. The quality of Education at MSA University is incomparable when am compared with my colleagues. We (MSA graduates) are very well recognized among all employees in the wide sector of the pharmacy field as we can easily compete regionally, nationally, and internationally and still will be very recognized.

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MSA University
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TheAlumni

"On the first day I set foot in this place, my father told me: "If I were you, I would do my best to complete my career here." In fact, the environment at MSA University was great and everything helped me to learn and shine. Too many courses and activities related to the labor market built my capabilities and gave me the confidence to be unique and distinguished among all graduates. Years of fun and academic learning went by and guess what! Now I'm working in Abbott as a medical representative for cardiometabolic lines."

"MSA University was more like my home with a big family rather than my University. I was honored to be a student in the Faculty of Pharmacy with the great staff of doctors and T.As who helped us to be qualified enough to work in multinational companies with the most updated curriculum, summer internships which were provided by the University, and different student activities. I'm very proud to be one of MSA students, one of its great family members."

"I had the best chances and scores when I applied for my master's degree at the University of Kent, and that was due to the high level of efficient professional and yet friendly level of Education at MSA University School of Pharmacy. I was always supported by all the Staff. We acted as one big family, and this family still supports me even after I had an opportunity abroad as a medical Advisor."

"It's like starting a race already a few meters at the lead. This is how you feel when you are compared to your peers in the job market. The way of teaching, projects, and assignments. Even the stress sometimes made me more than ready for many things in the professional life. They made people say "yes you are that much professional and well-prepared because you're an MSA graduate".

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Graduation Projects

Intense hard work along with great skills shall help you win one success after another. Well done on your spectacular achievement!

Analytical Chemistry

UNIVERSITY of GREENWICH

MSA University
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RSPAC2.1: Advanced Analytical Techniques for Determination of Some Anti-Cancer

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Mayar Khaled
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Nourhan Yaser
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Yasmin Mostafa
171649

ANALYTICAL CHEMISTRY

ABSTRACT

Nowadays, green chemistry is considered the main focused interest for scientists according to the United States Environmental Protection Agency; to innovate the most creative methods of analysis; supporting the waste reduction, energy conservation and less usage of hazardous substances. In this work, a novel, eco-friendly, accurate, selective, and sensitive ion selective electrode was developed for the critical determination of the antibiotic anticancer Tigecycline; as well as in presence of its acidic and basic degradation products either in bulk powder or in its pharmaceutical formulation. The fabrication of advanced SC electrode was based on potassium tetrakis (4-chlorophenyl) borate as anionic exchanger in presence of cobalt (II, III) oxide nanoparticles. This was achieved after the poor linearity obtained from different fabricated liquid contact electrodes trials; and shifting to the solid contact designing proves a superior modification choice. A comparative study was conducted using two fabricated solid contact electrodes; a traditional one contains only the anionic exchanger; sensor 1, and an advanced one which contains both the ion exchanger and cobalt oxide nanoparticles; sensor 2. Sensor 1 showed a linearity range of 3 x 10-5 mol/L to 1 x10-2 mol/L; with a Nernstian slope of 30.9 mV/decade and a detection limit of 3.01 x 10-5 mol/L. However, Sensor 2 showed high linear dynamic range over 5 x 10-6 to 1 x10-2 mol/L; with a Nernstian slope of 31.4 mV/decade and a limit of detection of 5.01 x 10 -6 mol/L. High resolution TEM characterization was performed for graphite powder, cobalt oxide nanoparticles, and when both were mixed together. HR-TEM results ensured the optimum homogenization, uniformity, well dispersion, low particles diameter, and higher surface area; when the graphite powder was mixed with cobalt oxide nanoparticle together; since it plays an important role in the improved electro-catalytic linearity; regarding sensor 2. The proposed solid contact sensors were finally validated according to IUPAC 2000.

Supervisors

Prof. Dr. Manal Fouad / TA. Nourhan Alaa

RSPAC2.2: Simultaneous Quantification of Gestodene and Ethinyl Estradiol

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Ahmed Mostafa
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Eslam Ibrahim
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Menna Tarek
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ABSTRACT

Simultaneous determination of Gestodene (GST) and ethinyl estradiol (EE) was done using three " univariate spectrophotometric methods" and a " high performance thin layer chromatographic method" (HPTLC) method. Two of these methods were manipulating ratio spectra which are " ratio difference" (RD), and " derivative ratio" (DR). Moreover, absorption subtraction (AS) method was developed based on the presence of isosbestic point. The proposed methods were capable of resolving the overlapped spectra of GST and EE with linearity in the concentration range 1- 40µg/mL and 1-95µg/mL for GST and EE, respectively. In addition, these methods are considered advantageous as they can simultaneously determine of the target drugs without prior separation steps. The established HPTLC separated the drugs with high capability through using Nano Silica Gel on TLC plates with fluorescence at 254 nm as the stationary phase while the mobile phase was composed of chloroform: methanol (95:5, v/v). The proposed HPTLC method revealed good sensitivity, with linearity ranges of 0.02-2 µg/band and 0.5-20 µg/band, for GST and EE, respectively. The newly developed methods were competently utilized for analyzing laboratory prepared mixtures and the combined pharmaceutical preparation. Validation was performed in accordance to the ICH guidelines demonstrating selectivty, linearity, precision and accuracy of the methods. The methods were also statistically compared with the reported HPLC method, where the attained results did not show any significant difference regarding accuracy and precision.

Supervisors

Prof. Dr. Dalia Mamdouh / TA. Lamice Mohamed

RSPAC 2.3: Green Analysis of Fluconazole In Presenceof Its Related Compounds

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Mariam Adel
171227

Marina Awny
173713

Merna Rames
171291

ABSTRACT

Fluconazole is antifungal drug used for treatment of both systemic and superficial fungal infections in different tissues. It is an azole antifungal. The fluconazole is cytochrome P450 dependent enzyme lanosterol 14-α-demethylase selective inhibitor. This enzyme normally works to convert lanosterol to ergosterol which is essential for fungal cell wall synthesis. The aim of this project is to determine the fluconazole in presence of its two relat ed compounds (Impurity B) and (Impurity C) using simple, precise and accurate green analytical methods. The objective of this project is determination of fluconazole concentration and its impurities B and C using green, precise and simple chromatographic methods and the developed methods will be assessed for their green character using different tools as National Environmental Method Index (NEMI), Green Analytical Procedure Index (GAPI) and Eco Scale. Our plan of work is divided into two parts; part one is considered the theoretical part in which we gather information about fluconazole and its related compounds B and C as well as literature review the analytical methods applied for determination of fluconazole alone and/or in presence of its impurities. Then in part two which is the practical part, it involves the analysis of the drug in presence of its related compounds by thin layer chromatography (TLC) and high performance liquid chromatography (HPLC) in a greener manner then comparing both methods together.

Supervisors

Dr. Christine Maged/ TA. Passant Medhat

RSPAC2.4: DNA Interaction Studies of Antiviral Drugs Using Analytical Method(s).

Ahmed Mahmoud
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Asmaa Ashraf
172705

Noura Mohamed
172417

Shoroq Aboalnaga
173937

ABSTRACT

Humanity has faced plenty of diseases which resulted in the loss of numerous lives for this reason, developing antivirals was a dire need The following paper includes a brief information about viral infection, antiviral drug classes, their structures, and their effect on DNA sequence Moreover, antiviral agents target any stage in the viral life cycle the ideal antiviral agent should be highly efficient against both actively replicating and latent viruses A micelle enhanced spectrofluorimetric method was developed for determination of penciclovir and entecavir based on its native fluorescence behavior The stock standard solutions were prepared of concentration 1 00×10 2 M) acetate buffer, phosphate buffer, tween 80 and CMC was prepared The proposed method was successfully applied to the determine the RFI of ETV in 0 1 M H 2 SO 4 solution, and in the presence of tween 80 RFI of ETV was successfully enhanced by 44 The RFI of PCV in Ac buffer at pH 3 5 and CMC The RFI was enhanced by 23 5 ETV was linear in 0 1 M H 2 SO 4 in the presence of tween 80 (y 82 394 x 5 419 R ² 0 998 and with Ac buffer in the presence of CMC (y 8 29 x 23 265 R ² 0 9983 PCV has no effect in 0 1 M H 2 SO 4 and in the presence of tween 80 While it gives straight line with Ac buffer in the presence of CMC according to this equation y 19 58 x 29 434 R ² 0 9996 LOD of the proposed method for PCV was found to be 0 065944049 µg /ml while the LOQ was 0 199830452 µg /ml in case of LOD of ETV was found to be 0 141141484 µg /ml while the LOQ was 0 427701465 µg /ml For evaluating Single Strand of DNA we will use Terbium Fluorescence as a New Probe in this study shown effect of thermal denaturation of DNA on Tb^{3+}

Supervisors

Dr. Sara Salah / TA. Dina Atef

RSPAC2.5: Current trends in extraction protocols for environmental and/ or biological sample

Eman Hossam
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Mina Bakhom
173243

Christina Amir
173011

Mariam Wael
170713

ABSTRACT

There are several classes of pharmaceutical products which requires development of efficient extraction techniques as solid phase extraction, liquid-liquid extraction, dispersive liquid –liquid microextraction, solidification of organic droplet microextraction and molecular imprinted polymer. A solid phase and liquid phase are used in solid phase extraction to isolate analyte from solution. Liquid-liquid extraction is one of the oldest methods of extraction in which two immiscible liquids, aqueous solution and organic solvent are used. Hollow fibers are thin fibers of various pore sizes which are used for water purification and antibiotics. DLLME is subtype of microextraction in which extraction and dispersion solvent in micro-volumes are used, so risk of toxicity is minimized. SFDME is also type of microextraction in which the amount of solvent used is lesser than other types, the time is independent but it has long extraction time. MIP is new technique involves formation of polymer has similar target molecule properties, due to its selectivity, specificity and high physical stability. Objectives are review of chemistry of antibiotics, different methods of analysis used for drugs determination and proposed method for determination of those drugs in plasma sample. There are different methods of extraction used such as protein precipitation (using methanol as solvent) and liquid-liquid extraction (using ethyl acetate as a solvent.

Supervisors

Dr. Sarah Salah/ TA. Rana Waleed

RSPAC2.6: A Fluorescent Probe using DNA-Antiviral Drugs Interactions

Ranim Moataz
170387

Omnia Abouelhamd
170425

Karim Ahmed
174923

Nada Hussein
173165

ABSTRACT

Fluorescence is a form of luminescence where emission of light that has been absorbed by substance occur at longer wavelengths than absorbed ones. When radiations fall on molecules, vibration occur in 10-13 seconds. During vibration, period energy loss occurs due to: intermolecular collision and some energy is lost to solvent molecules that is used for dissolution of sample then the Emitted radiations are measured using fluorimetry. The main Aim of our Project is spectrofluorimetric determination of antiviral drugs as Penciclovir and Entecavir that will be achieved by using sensitive and advanced spectrofluorimetric methods as using complexation with Calf Thymus DNA, terbium, and different surfactants. The practical work of our project will be based on interacting calf thymus DNA with selected antivirals when mixed together in a buffer solution containing HCL or H2 SO4 acid to customize PH of a solution in a following range (7.5-8) forming a fluorescent complex. We expect that the fluorescence properties of a resulting DNA- Antiviral complex may be affected or enhanced by addition of various surfactants such Sodium Dodecyl Sulphate (SDS) and Sodium Carboxy Methylcellulose (CMC) or fluorescence probes such as Terbium. The obtained complex will be investigated by spectrofluorometer and a calibration curve will be applied for the definite drugs.. Application will be carried out on pharmaceutical dosage form, artificial urine and plasma. The results will be assessed using bioanalytical method validati… accuracy, precision, linearity, range, and selectivity.

ANALYTICAL CHEMISTRY

Supervisors

Dr. Omnia Ali/ TA. Amira Ismail

RSPAC2.7: Evaluation of modern extraction techniques for the recovery of drug residues in environmental samples and/or animal tissues

Mazen Yasser
171069

Mohamed Abdelmonem
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Mario Nashaat
171333

Martin Mamdouh
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ABSTRACT

This study aims to develop advanced and validated analytical techniques for the qualitative and quantitative extraction purposes of some drugs such as Simvastatin (SIM), Cilastatin (CIL) and Imipenem (IMP). Extraction of these drugs may be carried out of biological samples or environmental samples. Two extraction methods were validated in this study; protein precipitation extraction method and liquid liquid extraction method. Three quality control samples were prepared which are high quality control concentration (HQC), medium quality control concentration (MQC), and low quality control concentration (LQC), each of them was prepared in three forms; pre extraction preparation, post extraction preparation and the invitro preparation. Then, HPLC analysis was carried out. Comparative studies between the two previously mentioned extraction methods were carried out for the three drugs. Two main parameters were used in these comparative studies; the recovery percentage, the amount of the compound found in the extract in comparison to the total amount of same compound in both the extract and the raffinate, and the matrix effect, the ratio between the mean peak area of the analyte in post-extraction spiked samples to the mean peak area of the same analyte in standard solution. Finally, results of the liquid liquid extraction method showed higher efficiency than that of the protein precipitation extraction method regarding the three studied drugs SIM, CIL, and IMP.

Supervisors

Dr. Omnia Ali/ TA. Nourhan Alaa

RSPAC2.8: Electrochemical methods for detection of Erythromycin in water samples.

Mostafa Hany
172695

Mostafa Zaghlol
171953

Mustafa Mahmoud
170793

Zyad Mohamed
173167

ABSTRACT

Although pharmaceutical products are essential in our life and can be used in treating human and animal diseases, their presence in the environment has serious and concerned hazards. Some of these hazards are antibiotic resistance, effects on wildlife, and effects on fish and aquatic life, so the aim of the present study is to establish a new analytical method for the determination of pharmaceutical compounds traces in water samples. The electrochemical methods either potentiometry or voltammetry are considered the methods of choice in tracing of pollutants in environmental samples. We are targeting to develop a simple and sensitive electrochemical method for the determination of Erythromycin in spiked water samples by fabrication traditional electrodes (liquid contact – solid contact). And by using advanced electrodes (modified liquid contact – modified solid contact – molecular imprinted polymer electrode) for better results of measurement.

Supervisors

Dr. Heba Tarek / TA. Sara Ishaq

Biochemistry

RSPB2.1: Molecular Mechanisms Underlying Immunomodulatory PDT of Dermatological Melanoma

Asaad Nour
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Hadi Tarek
171377

Ibrahim Ahmed
171739

Asmaa Mostafa
172569

Biochemistry

ABSTRACT

Increased exposure to the ultra violet radiation (UVR) from the sun, as well as lack of proper consciousness, has led to fatal malignancy with an increased mortality rate in the last ten years due to skin melanoma development, especially in people with fair and light skin. The current treatment scheme for melanoma includes chemotherapy, radiotherapy and surgery. Tumorigenesis is complex and dynamic at three levels: initiation, progression, metastasis. In addition, there is a tight connection with the tumors, the tumor microenvironment (TME) and the extracellular matrix, in each level (ECM). Photodynamic therapy (PDT) is a minimum-invasive therapy, which combines the use of a photosensitizer (PS) with laser exposure. When the laser beam of a specific wavelength is exposed to photosensitizers, it produces reactive oxygen free radicals which can kill the exposed cells in the vicinity. A specific wavelength enables each photosensitizer to produce its action. This wavelength can determine the extent to which the light can pass through the body. Moreover, PDT is associated with immune-stimulation that inhibits cancer progression through apoptosis and tumor cell necrotization. Immune system stimulation can be detected with several biomarkers like IL10, IL12, TGF-s and TNF-α. This work aims at studying some of the genetic markers involved in the molecular mechanisms of PDT mediated immunomodulatory treatment of skin melanoma. Our target is to explore the relation between PDT as a recent efficient method for treating oncogenic tumors and the role of a tumor microenvironment in monitoring the development of skin cancer.

Key Words: Photodynamic Therapy, Skin Cancer, Tumor Microenvironment, Molecular Markers

Supervisors

Dr. Iman Gomaa / TA. Mariam Sabry

RSPB2.2: Evaluation of the anti-inflammatory effect of *Prunes persica* extract in rats

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Moustafa Mahmod
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Sara Atef
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Biochemistry

ABSTRACT

The aim of this study to evaluate the anti-inflammatory effect and the mechanism of action of *Prunus persica* which belongs to the family Rosacea, It is widely cultivated in China and very rich in phytochemicals like phenolic compounds, carotenoids, vitamins, volatiles and organic acids. In this study, rats are injected by carrageenan which causes inflammation through stimulation of inflammatory mediators such as histamine and bradykinins to be released, then treated with the extract of *Prunus persica* and assay the inflammatory markers .Inflammation is the biological response to a number of factors including pathogenic agents, damaged cells and toxic substances in the immune system. COX-2 is constitutively found in the whole forebrain and in discrete neuronal groups of cortex and hippocampus, it is largely responsible for causing inflammation. IL-6 has been linked to a variety of inflammatory-related chronic diseases. Monocytes and macrophages produce IL-6 in response to inflammatory cytokines such as IL-11 and tumour necrosis factor (TNF)-alpha. The IL-6 receptor is found on resting T-lymphocytes, activated B-cells, and myeloid and hepatic cell lines. Inflammation will be induced by a single dose of carrageenan in twenty four rats which will be randomly divided into four groups: Group 1: six normal rats, Group 2: six rats have inflammation .Group 3: six rats which have inflammation and control with Diclofenac, Group 4: 6 six rats which have inflammation will be injected with 100mg/dl of Prunus persica extract. When the paw edema is examined in the rat the standard group which have inflammation and treated with Diclofenac and Test which they have inflammation and treated with Purnus Persica extract are compared the standard and test to injured in 0 hour , 1 hour , 2 hours , 3 hours and 4 hours they are significantly decreased compared with injured. In the Histopathological examination, Tissue section of rat paw skin treated by diclofenac sodium showing marked reduction of inflammatory reaction score 1 and tissue section of rat paw skin treated with a topical gel formulation containing Prunus Persica extract shows a low level of inflammation. When Interleukin 6 and Nitric oxide levels are assessed in Diclofenac (Voltaren) and extract-treated rats, they are substantially lower than in carrageenan-treated rats.

Supervisors

Dr. Ahmed Maher / TA. Esraa Ibrahim

RSPB2.3: The role of miRNA in skin wound healing using different plants in rats




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Biochemistry

ABSTRACT

A wound is a form of injury that occurs relatively quickly when the skin is ripped, cut, or punctured (an open wound), or when a contusion is caused by blunt force trauma (a closed wound). Wounds are classified into two types according to the period of healing (chronic and acute wound), and six types according to the wound thickness. Wound healing pathology consists of four alternating phases, which are homeostasis, inflammation, proliferation, and remodeling. The aim of the study is to improve the healing percentage and decrease the inflammation. This research based on using two types of extracted plants which are Ambrosia Maritima and Carthamus Tinctorius in two different doses (50mg-100mg). Forty albino male rats approximately from the similar weight (100gm-120gm) were purchased and they were divided into 7 groups each group consists of 4 rats and each rat has 2 wounds except the negative control group has no wounds, which are used in order to test the extracts anti-inflammatory effect on the induced wound. The experimental design consists of: group (1): negative control, group (2): positive control, group (3): Wounded rats treated with standard treatment, group (4): Wounded rats treated with Carthamus tinctorius extract (low dose), group (5): Wounded rats treated with Carthamus tinctorius extract (high dose), group (6): Wounded rats treated with Ambrosia maritima extract (low dose), and group (7): Wounded rats treated with Ambrosia maritima extract (high dose). After eight days, documented photos were taken to compare between groups then s the rats were scarified and the tissue samples were collected for the colorimetric determination of MDA and SOD levels The results had shown that the treated groups with the studied extracts improved the wound healing by analyzing them using One-way ANOVA followed by Tukey's multiple comparisons test was performed using GraphPad Prism version 9.1.2. A significant change in the detected biomarkers included in the study (MDA, SOD, IL-10, MIR96-P, BINP3, FAK, and TGFB), While MDA, MIP96-p were decreased and SOD, IL10, BINP3, FAK and TGFB were significantly increased $P < 0.0001$ in groups treated with Ambrosia and Carthamus compared to control Group. So, there was a significant increase in the healing percentage of treated groups compared to the control group.

Supervisors

Dr. Nora Aborehab / TA. Radwa Saeed

RSPB2.4: Anti-inflammatory Activity of Glycosylated Kaempferol Isolated from *Prunus persica* Via Inhibiting NF-κB Pathway

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Biochemistry

ABSTRACT

Background: Acylated kaempferol glucopyranoside, a novel compound that is isolated from Prunus persica, family of species are known to have anti-inflammatory action. Kaempferol considered to be an anti-inflammatory agent but the impact of its glycosylation to enhance the anti-inflammatory action is still not understood. The aim of the study is to investigate whether the acylated kaempferol glucopyranoside with rare structure which is (6-3,4-dihydroxyphenyl o-acetyl glucopyranoside) has an anti-inflammatory action, and the possible mechanism of action if it supposed to have anti-inflammatory action.

Methods: We investigate the levels of TNF-α using ELISA and NO production using Griess reagent, in addition to the cytotoxicity of PP extract using MTT assay on RAW 246.7 macrophages. The results were compared with standardized compound which is curcumin.

Results: Cytotoxicity test revealed that PP showed an IC50 of 0.254 mg/mL and curcumin an IC50 of 0.171mg/mL. /mL). Using the highest concentration (1 mg/ml) of Prunus persica extract and curcumin decreased the production of NO by 62.95% ± 3.94% and 71.25% ± 3.65%, respectively. Furthermore, Prunus persica extract and curcumin decreased the overexpression of TNF-α, in RAW 246.7 into 12.925 and 16.6 (pg/ml), respectively.

Conclusion: Upon taken these results together, the results contain a proof that the PP extract is bioactive in inflammatory diseases and show that glycosylated kaempferol may has anti-inflammatory effect by inhibition of the pro-inflammatory mediators by inactivation of NF-κB.

Supervisors

Dr. Ahmed Maher / TA. Radwa Saeed

RSPB2.5: Stem cells; a potential treatment for acute kidney injury

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Biochemistry

ABSTRACT

The Mesenchymal stem cells have regenerative activity due to the self-renewal property and its differentiation potential; the bone marrow is one of the main sources of mesenchymal stem cells used clinically, Using 30 albino rats, rats were randomly assigned to five equal groups, (group 1) which is the control group receiving 1 ml normal saline, (group2) is a diseased group receiving 5 mg/kg intraperitoneal injection of cisplatin to induce (AKI), (group3) receiving 2mg/kg diuretic, (group4) receiving the isolated MCS through the rat tail vein and (group5) receiving both the MSC and diuretic, rats were sacrificed at different time intervals, Serum creatinine, BUN, and renal tissue oxidative stress parameters were measured. Renal tissue was scored histopathological for evidence of injury, regeneration, and chronicity. Immunohistochemistry and ELISA were also done. . MSCs of bone marrow of healthy rats were able to recover cisplatin induced acute kidney injury and tissue damage, rats that treated by isolated MSCs shows high proliferative activity and they are able to decrease the level of oxidative stress and improving all renal functions.

Supervisors

Dr. Sherine Mahmoud/ AL. Zeinab Abdelnasser

RSPB2.6: Role of circulating miRNA in Cancer

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Biochemistry

ABSTRACT

Liver cancer, particularly hepatocellular carcinoma, is among the most frequent and devastating human cancers globally. MicroRNAs (miRNAs) are a type of short non-coding RNA that regulates gene expression after transcription. Recent data suggest that miRNAs are frequently upregulated in hepatocellular carcinoma and that some particular miRNAs are linked to clinical and pathological aspects of the disease. So, our study aims to investigate the potential effect of hesperidin and Gallic acid against cisplatin in treatment of liver cancer focusing on their effect on miR-122. By applying cytotoxicity assay that done by cell suspension were seeded in 96-well plates and incubated in complete media for 24h then Cells were treated with another media containing drugs at serial concentrations and let for 48 h after that the absorbance was measured using an Omega microplate reader. Also, using western blot assay by protein extraction, protein separation, protein blotting that mean (transfer of proteins from the gel to the membrane), blocking the membrane, incubation with the primary antibody-like (Bax) then do an imaging and data analysis quantitation. In addition to quantitative real-time PCR which is considered the main tool to detect the effect of miR-122 and its variable changes.

Supervisors

Dr. Sherine Mahmoud/ T.A. Youstena Youssef

RSPB2.7: Studying the Regulatory Role of Non-coding RNAs as Novel Diagnostic and Therapeutic Targets in Pulmonary Diseases.

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Biochemistry

ABSTRACT 2021

Objectives: Investigation of the pulmonary protective effect of miRNA inhibitor against LPS-induced Acute respiratory distress syndrome (ARDS), the predictable serious complication of COVID19 by targeting ACE2/ Angiotensin pathway.

Materials and methods: BALB/c Male mice were randomized into 3 groups (n= 6 mice/group); the first group is the normal control group who received normal saline, the second group is the induction group who got injected with lipopolysaccharide (LPS) intraperitoneally, while the third group is the treatment group who got injected with miR-200 inhibitor intraperitoneally two hours before the LPS injection. Lung samples were collected. The right lungs will be preserved at -80 ºC for the biochemical analysis for miR-200 and ACE2, while the left lungs will be fixed in 10% formalin solution for the histopathological investigations for of NF-κB, TNF-α and IL-6.

Results: The treated mice showed marked improvement in ACE2 levels with normal histological structure of lung tissue. There was also a downregulation of miR-200 and Ang 2 levels and marked elevation of Ang 1-7 levels

Conclusion: The upregulation of miRNA-200 is considered an early potential noninvasive biomarker, while miRNA-200 inhibitor is considered to be a therapeutic agent for ARDS.

Keywords: ALI, ARDS, NF-κB, miRNA, lncRNA, circRNA

Supervisors

Dr. Amr Abdelhamid/ T.A. Amira Shedeed

RSPB2.8: Study of SARS COV-2 Proteins

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Biochemistry

ABSTRACT

The severe acute respiratory syndrome of corona virus 2 or what is called COVID-19 is considered as the major health concern that faces the entire world and it started in Wuhan, China around December 2019 and it spread rapidly to almost 187 countries because its high contagious nature. Although a lot of precautions measures are obligated in order to reduce the transmissions of this pandemic till presence of an effective way such as vaccine or therapeutic agent is developed but it didn't accomplish what is required since global cases above 100 million and global death cases above 4 million.

Since the world in a middle of pandemic so research and development of new molecule is very expensive and time-consuming process so drug repurposing is the new concept for identifying a pre-existing therapeutic molecule that could have potent effect against COVID-19

Screening of several inhibitor drugs that are known to be very effective against HIV and HCV and gives high antiviral activity such as, Anti-HIV: (Paritaprevir, Saquinavir, Indinavir, Amprenavir, Nelfinavir, Draunavir, Ritonavir, Lopinavir, Atazanavir, fosamprenavir)

Anti-HCV: (Grazoprevir, Glecaprevir, Simeprevir, Voxaliprevir, Asunaprevir, Boceprevir) through a docking study that was performed by use of auto dock-vina.

From several molecules that study was performed on 18 molecules found to have an interaction between two nonstructural proteins of COVID-19 especially proteases protein as chymotrypsin and papain like proteases.

So, since the positive results that appeared we intend to test these medication in-vitro and in-vivo especially Paritaprevir showed the best results so it is best candidate to start with.

Supervisors

Dr. Amira Abdel Dayem/ T.A. Mariam Sabry

RSPB2.9: The Immunomodulatory Effect of Mesenchymal Stem Cells

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Biochemistry

ABSTRACT

Stem cells have the potential to differentiate into diverse cells in the body. It can theoretically differentiate without little repletion of other cells as long as the human or animal is still alive. Mesenchymal stem cells, also known as osteoblasts, adipocytes, and chondrocytes, are multipotent stem cells found in the stroma of bone marrow and stroma of numerous organs. Areas also include bone marrow, umbilical cord, adipose tissue, placenta, gut, liver, lung, heart, dental tissue, nasal mucosa, and salivary gland. In terms of therapeutic impacts, MSC functions are significant for a variety of disorders. MSCs are isolated from rat bone marrow and have a spindle-like shape following culture. MSCs are employed in a variety of medical applications, including GVHD treatment, cardiovascular, and bone and cartilage disease. Furthermore, it was proposed that MSCs may be utilised to treat ARDS and that there was evidence that they may be utilised to treat cancer. MSC has been found to exhibit immunomodulatory effects in vivo and in vitro in a number of investigations, which has led to a number of therapeutic applications. MSC can influence how adaptive dendritic cells (DC) and (NK), T lymphocytes and B lymphocytes, interact with cellular components of the innate immune system. Our aim is to evaluate the immunomodulatory effect of MSC, their abilities to suppress inflammation and treat inflammatory disease like ARDS.

Keywords: stem cell, mesnchymal stem cell, inflammation, immunomodulatory, ARDS

Supervisors

Dr. Amira Abdeldayem/ T.A. Esraa Ibrahim

RSPB2.10: Study of the Metabolism of anti-cancer Naringenin Derivatives with their Determination in the Presence of their Metabolites

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Biochemistry

ABSTRACT

Background: Citrus fruits like “Grapefruit” have a series of compounds named flavonoids. These flavonoids are responsible for the bitter taste of grapefruit. Naringin (parent drug) and its glycoside naringenin are flavonoids, were found to show off powerful anti-cancer and anti-oxidant effects in vitro and in vivo. Several lines of studies demonstrated that naringenin has very low bioavailability in the human body because of glucuronidation and sulfonation reactions which are occurring during phase II drug metabolism in intestine and liver. These conjugation reactions may reduce the bioavailability, absorption and the biological benefits of naringenin inside the body. For this reason, scientists developed and suggested three new derivatives from the naringenin molecule that have excellent anti-cancer activity. this project aims to study the metabolism of the three new derivatives in vitro and compare them to naringenin to predict their bioavailability through their metabolites and estimate the best derivative which will show the better bioavailability than others derivatives by using S9 fraction method. The second aim for this study is comparing the metabolism of the selected drug candidate in vitro between human and different animal interspecies specially rats to estimate if the bioavailability of new derivative and its metabolites are better than naringenin or not in rats and compare them to human metabolism to know if the new drug is good oral anti-cancer drug or not for pre-clinical studies. After testing naringenin derivative which contain fluorine atom through making LC-MS for analysis and S9 fraction method for metabolism, the results have shown off that the new drug may detartrate 2 folds in rat intestine and liver more than human. Naringenin drug with low bioavailability has broken down about 10-fold in rat more than human. So, the new derivative may be a good oral anti-cancer drug more than Naringenin and has higher bioavailability.

Keywords: Naringenin, derivatives, S9 fraction, anticancer

Supervisors

Dr. Ahmed Samir/ T.A. Amira Shedeed

Clinical Pharmacy

RSPL2.1: Investigate the Effect of Platelet-Rich Plasma in Hair Regrowth

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Marwa Abdelrahim
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ABSTRACT

Hair loss can result in decreasing in quality of life by causing some emotional and psychological distress and to overcome such problems, safe and effective hair loss treatments were developed in order to modify the patient's life quality. One of these treatments that emerged recently in regenerative plastic surgery is platelet- rich plasma (PRP) with strong evidence that suggested that it may provide an advantageous effect in hair growth. Aim of work: to investigate the safety and clinical efficacy of PRP treatment. Moreover, assess patients' satisfaction to confirm quality of the results and all steps of the study, guidelines, and possible side effects will be explained. Objective: evaluation of the follicles compared with baseline value and evaluation of the safety and feasibility. METHODS: The study will include about 30 subjects of both genders between the ages of 18 to 60 years with difference in pattern of hair loss will be selected by the responsibility of the physician presenting to cosmetic Egypt center and EL-Hood EL-Marsood hospital during our study which has already started January 2021 and will end in June 2021. The data will be extracted from physician and patient record into a designed standard clinical data sheet. The data includes the following details: general demographic data (age, gender, and day of admission), a detailed medical history (any drugs causing hair loss), laboratory test included the following: complete blood cell count; measurement of serum levels of, serum ferritin, folic acid, total iron-binding capacity, iron, T3, T4, fT3, fT4, antithyroid peroxidase

Supervisors

Dr. Soheir Abo Elazm / TA. Jilan Hamdy

RSPL2.2: Investigating the role of gut microbiome in colorectal cancer development and therapy response.

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ABSTRACT

Background: The attention surrounding the microbiome is rapidly increasing due to its extensive impact on various human diseases, particularly colorectal cancer. It is becoming increasingly apparent that the human microbiome plays a part in response to cancer therapy. **Aim of work: -** Investigating the effect of the gut microbiome on metastatic colorectal cancer. In addition, the association between gut microbiome with traditional colorectal cancer prognostic factors such as Age, BMI and comorbidities of the host were assessed. **Objective: -** Ensuring an improved quality of life for colorectal cancer patients. **Subjects and methods: -** 25 patients of both gender whose age range from 25 to 70 years that are presenting to oncology clinic at Al Kasr Al Aini hospital The Data was insterted in standardized designed clinical data sheet **Monitoring & Measurements:** after the last follow up period, fecal Microbiological analysis were measured, and data was coded and analyzed using SPSS software. **Results:** The average age among study population was 51- above 60 was 64%. BMI ranged 25-above 35 was 36%. as regarded comorbidity results showed 48% either diabetes mellitues or hypertension or both of them. *Klebsiella and Escherishia coli* were significantly dominant and overrepresented in all the cultured samples. Results of association revealed that fecal *Escherishia coli* and *klebsiella* were present in high amounts and abundant in patients whose BMI is high. However, *Klebsiella* was more abundant in diabetic samples. **Conclusion**: In conclusion, significant information regarding the effect of clinical parameters on the composition of the gut microbiota can be obtained from this study and it is a potential guide for future studies.

Keywords: - Colorectal Cancer, Gut microbiome, Relation, Assessment, clinical

Supervisors

Dr. Soheir Abo Elazm / TA. Jilan Hamdy

RSPL2.3: The Effect of Sport Supplements on Performance and Health Status in Athletes of Different Sports in Egypt.

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Clinical Pharmacy

ABSTRACT

Our aim is to investigate how those supplements, affect the performance of the athletes in beneficial or harmful ways and gain information related to the most supplements used which are whey protein, branched chain amino acids (BCAA), mass gainer, creatine and carnitine in different sports and match volunteers' information and the information gathered in the literature reviews or research papers in order to recommend how the athletes could overcome the side effects produced from the supplements and how to obtain the highest beneficial effects from the supplements. We created a Google form questionarries which consist of six sections closed ended questions like socioeconomic questions (age, social class, education and employment), sports that the athletes used to place, the supplements that are mostly used by the athletes and questions related to their knowledge, benefits and the side effects produced from those supplements. These questionarries are sent to famous sporting clubs and gyms through emails to be solved by Egyptian males' athletes in order to obtain the results and analyze them via Microsoft Office Excel program in order to find the reasons of the side effects or beneficial effects produced by the supplements and how could we decrease the adverse effects produced and increase the benefits of the sport supplements.

Supervisors

Dr. Abdel-Hamid Elhawary/ T.A Jilan

RSPL2.4: Pattern of Prescribing Proton Pump Inhibitors (PPIs) in ICU Patients in




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Clinical Pharmacy

ABSTRACT

Stress ulcer prophylaxis (is regarded as standard of care in the intensive care unit (because critically ill patients are at risk of stress related gastrointestinal (mucosal damage, which can progress to ulceration and GI bleeding Prevention of stress related mucosal damage is important because of its associated morbidity and mortality in critically ill patients SUP using pharmacologic agents like PPI has since become standard therapy to prevent stress ulcer formation and bleeding in ICU Objectives Identify patients at risk for stress ulcer, identify the influence of age and gender on the occurrence and treatment outcome in patient with stress ulcer, match the PPIs prescription pattern in the hospital with the present guidelines for prophylaxis and treatment of stress ulcer and perform economic analysis for PPIs usage Methods The study is a hospital based observational cross sectional retrospective study conducted in ICU Patients in Al Moalmeen Hospital that included approximately 150 eligible participants Any data needed was extracted from patient data collection form Results Out of 158 only 71 patients 44 9 were indicated for PPI Prescription 43 patient of them were COVID 19 patients The majority of the COVID 19 patients were indicated for SUP 30 out of 43 patient) When assessing economic burden, we found that the total cost for the non-indicated patients is 47 520 L E and the total cost of treatment failure in these patients cost about 5309 L E

Supervisors

Dr Abdel Hamid Elhawary/T.A Sara George

RSPL2.5: Clinical correlation between Leptin, hypoxia & blood glucose levels in Breast Cancer patients

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ABSTRACT

Breast cancer is the most common female cancer and the most likely cause of cancer death in women globally. Several prospective, epidemiological studies show that breast cancer seems to be linked to obesity. Notably, female obese breast cancer patients show a less sufficient response to chemotherapy. Several studies have shown up regulation the leptin expression in breast cancer and correlate their evaluation with metastasis and hormonal therapy resistance. Tumor hypoxia express hypoxia inducible factor and glut_1. There is an overexpression of angiogenic factor such as leptin at hypoxic condition. The aim of the present study, to assess the relationship between leptin, blood sugar level & arterial blood gases (oxygen tension &carbon dioxide tension) in breast cancer patients tamoxifen responder and tamoxifen resistance. We used Samples which obtained from blocks of 80 women, aged 30-82 years, who underwent partial or total mastectomy and lymph node dissection for primary breast cancer. All subjects signed informed consent before inclusion in the study. Leptin was measured by radioimmunoassay. Oxygen saturation was measured. Blood sugar level (random or glycated hemoglobin) measured. In conclusion, we estimate the correlation between leptin, glucose level and oxygen level and its relation to the resistance of tamoxifen

Supervisors

Dr. Nada Farag / T.A Sara Georgy

Microbiology

RSPM2.1: Genotypic study of the association between CRISPR/Cas system and antimicrobial resistance in Klebsiella pneumoniae

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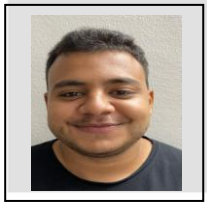

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ABSTRACT

CRISPR-Cas system is a recently discovered genomic engineering tool with the potential for knocking-out and knocking-in sequence-specific DNA targets. CRISPR is an abbreviation for Clustered regularly interspaced short palindromic repeat while Cas stands for CRISPR-associated enzymes. CRISPR/Cas has been originally known as a bacterial adaptive immune system utilized by host microbes for fighting foreign DNA invaders such as phages and plasmids. It has also been linked to higher susceptibility to antimicrobial agents in *Enterococcus* species as well as in *Escherichia coli*. Recent reports extending such findings to *Klebsiella pneumoniae* has been also published. This presents CRISPR/Cas as a potential solution for antimicrobial resistance. *K. pneumoniae* is a highly problematic species known for multidrug resistance and hypervirulence of some strains. The current study aimed at characterizing CRISPR/Cas systems in *K. pneumoniae* and their potential impact on acquisition of antimicrobial resistance. For this purpose, a collection of 46 *K. pneumoniae* isolates were tested for antimicrobial susceptibility as well as harboring CRISPR/Cas genes. Susceptibility profiles were analyzed using disk diffusion test and CRISPR/Cas genes were amplified using Polymerase Chain Reaction (PCR). The analysis revealed susceptibility to higher number of antimicrobials among the group of isolates carrying Cas genes compared to the Cas-negative isolates. As only five isolates were found to carry Cas genes, such findings were not considered as conclusive and a large scale bioinformatic analysis was done on a sample of *K. pneumoniae* genomes retrieved from the NCBI database. A total of 337 genomes were scanned for CRISPR/Cas genes which were identified in only 20% of the studied genomes. MLST analysis of the CRISPR/Cas positive isolates revealed that CRISPR/Cas systems were disseminated in different sequence types most commonly in ST23, a well-known multidrug resistant hypervirulent ST. Surprisingly, CRISPR/Cas-positive strains were found to carry larger number of resistance plasmids compared to others. In conclusion, CRISPR/Cas systems are disseminated with low prevalence in various sequence types and correlation to antimicrobial susceptibility is questionable. Further studies are required to investigate the role of CRISPR/Cas in acquisition of resistance by *K. pneumoniae*. A larger number of isolates should be phenotypically and genotypically analyzed.

Supervisors

Dr.Samira Hamed/ AL. Kareem Talaat

RSPM2.2: Virulence profile analysis of *Staphylococcus aureus* isolated from skin

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ABSTRACT

Acne is an uprising problem for most teens; it is classified as a skin infection which affects the face, the back, and even the hair scalps.

We conducted a study for the determination of virulence factors of S. aureus samples isolated from healthy and acne skin. Sample collection is done by sterile swabs. The samples collected, cultivated, isolated, and purified using suitable media, and then stocks are prepared for further work.

Since the ability of S. aureus to cause acne is linked to its ability for biofilm formation, we carried out antibiotic sensitivity tests on all samples, including S. aureus samples from healthy and acne volunteers. Gene extraction is then done by thermos-scientific-genomic gene jet DNA extraction kit followed by PCR reactions using primers specific for detection of genes mecA, LukE/D, icaD, icaA, hla, tsst-1, and geh.

Supervisors

Dr.Heba Magdy/AL.Hams Atef

RSPM2.3: Comparative study on commensal *Staphylococcus epidermidis* in normal and acne prone skin

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ABSTRACT

The aim of the current project is to determine the predominance of staphylococcus aureus and staphylococcus epidermidis in acne and non-acne prone skin. Objectives of the study are Identification of causative microorganisms in acne prone skin and to determine the most appropriate course of treatment. Acne is a common skin condition that happen mostly in adolescents that cause pimples on face, forehead and upper back. There are many causes like stress, hormonal changes and some medication. some types of bacteria cause acne like staphylococcus epidermidis. The normal flora is all over the human skin like staphylococcus species which is common on the skin that cause acne. Staphylococcus epidermidis is the most common bacteria causing acne. Staphylococcus epidermidis is a grampositive cocci which is Grape-like clusters. Virulence factors of staphylococcus epidermidis is identified by many ways like antibiotic sensitivity test which is done by measuring the sensitivity of S. Epidermidis towards some antibiotics like penicillin. Erythromycin and other antibiotics. Also, it can be identified by using biofilm assay technique to check formation of biofilm. detection of the virulence factors is very helpful in detecting staphylococcus epidermidis as it used in exploring the gene using multiplex PCR

Supervisors

Dr.Heba Magdy/TA. Hadeel Mohamed

RSPM2.4: Project Studying The Role of Efflux Pump On *Acinetobacter Baumannii* Antibiotic Resistance And Biofilm formatiom

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ABSTRACT

Acinetobacter baumannii is a Gram negative, coccobacillus, aerobic, non-motile opportunistic pathogen, that is difficult to control or treat because it is characterized by its multi drug resistance to antibiotics. A. baumannii survives for prolonged periods under a wide range of environmental conditions. A. baumannii causes severe infection and health care–associated infections, including bacteremia, pneumonia, meningitis, urinary tract infection, wound infection, and lung infection. These nosocomial strains play significant role in their persistence and antibiotic resistance, because of their ability to grow as a biofilm which is a serious problem for the public health. Accordingly, we evaluated the influence of efflux pump on biofilm formation and antibiotic resistance. The efflux pump are transport proteins that extrude the antibiotics from within the internal cells out into the external environment, and there are three components for each efflux pump: the outer membrane channel, the periplasmic lipoprotein, and the inner membrane transporter. There are Five major families of the efflux transporters RND (resistance nodulation division), ABC (ATP Binding Cassette), SMR (small multidrug resistance), MATE (multidrug and toxic efflux), MF (Major facilitator) in prokaryotes. Where resistance-nodulation-division (RND) systems are the most important ones in multiple resistant A. baumannii. Therefor we studied the effect of efflux pump inhibitors on biofilm formation by A.baumanni , and the possible role of the efflux pump inhibitors on the antibiotic resistance by A.baumannii. Seventeen isolates of A.baumannii were collected, and their sensitivity to quinolone antibiotic was determined and their biofilm formation ability was tested and the role of efflux pump on antibiotic resistance and biofilm formation was determined. The role of efflux pump on the quinolone antibiotic resistance and biofilm formation was determined using a synthetic efflux pump inhibitor Carbonyl Cyanide m-Chlorophenylhydrazine (CCCP). Our results showed that inhibition of efflux pump by CCCP does not affect levofloxacin resistance and biofilm formation.

Supervisors

Dr. Reham Wasfi/ TA. Zainab Kamel

RSPM2.5: Indole and Its Derivatives Modulating Effect on Proteus mirabilis

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ABSTRACT

Indole Indole is an aromatic, heterocyclic, organic compound that can be either produced by a variety of both gram positive and gram negative bacteria or occurs naturally in human epidermis and intestine tissue. Indole signaling is believed to play a role in regulating the production and excretion of toxins, antibiotic resistance, maintaining the genetic stability, motility and biofilm formation. Biofilm is irreversible attachment of bacterial cells to each other or to interfaces like indwelling medical devices. Bacteria produce biofilm to protect themselves against antibiotics, and immune system of the host. Indole affects the biofilm formation in some bacteria such as *Escherichia coli* which belongs to Gram negative enterobacteriaceaes that normally live in the intestine of the human and animals. Indole control production and secretion of exopolysaccharides in *Vibrio cholera* and also promotes the biofilm formation in non indole producing bacteria such as *Pseudomonas aeruginosa*. In our study we aim to determine the effect of indole on the biofilm formation by a non indole producing bacteria. *Proteus mirabilis* is a member of non indole producing Gram negative bacteria that belong to enterobacteriaceaes bacteria. It is often the cause of complex urinary tract infections due to its ability to form the crystalline biofilm that leads to obstruction of urinary catheters. Our work protocol will include the determination the effect of indole on biofilm formation of clinical isolates of *P.mirabilis* . Comparing the effect of synthetic and natural indole on biofilm formation ability.

Supervisors

Dr. Reham Wasfi/ AL.Mai Abdelwahed

RSPM2.6: Phenotypic and Genotypic studies of biofilm formation in clinical Isolates of *Acinetobacter baumannii*

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ABSTRACT

Acinetobacter baumannii is an important opportunistic pathogen responsible for nosocomial infections worldwide at recent decades. Biofilm formation by *A. baumannii* leads to antibiotic resistance and survives on abiotic and biotic surfaces. In the present study we aimed to assess the ability of biofilm formation in clinical isolates of *A. baumannii* by phenotypic methods and to detect the presence of genes involving in the biofilm development; bap, ompA, csuE, oxa by PCR method. Totally 40 *A. baumannii* isolates were evaluated for biofilm formation after bacteria isolation and identification using the modified Microtiter plate method and the existence of genes related to biofilm by standard PCR. The phenotypic results showed that the biofilm formation rates were 65% for high biofilm former, 27.5% moderate biofilm former and 7.5% low biofilm former. The csuE, and ompA genes were detected in all isolates with biofilm formation and the bap and genes were positive in 14.2% of A. baumannii isolates, respectively. The sequence of genes were submitted in NCBI. Our study indicates that csuE, and ompA genes were detected in all isolates unlike the bap.

Supervisors

Dr. Lamiaa Ismail/ TA. Basma Taher

RSPM2.7: Phenotype and genotypic detection of B-lactamase in *Acinetobacter baumannii* isolates obtained from clinical samples

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Hazem Mohamed
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ABSTRACT

The project is divided into two sections a phenotypic and genotypic working with acinetobacter baumannii, where we aim to find the resistant gene in the bacteria in general owing to the tests we do, in addition we started by islotating the bacteria and inserting several anti biotic discs in the bacteria's agar to visualize the zone of inhibition and measure it, proceeding and allocating the gene respobsible for the resistance in the bacteria. Phenotypic and genotypic detection of β-in Acinetobacter spp. The aim of this study is to determine the prevalence of β-lactamases in Acinetobacter spp. recovered from Egyptian hospitals using phenotypic and molecular methods.

objectives: Acinetobacter spp. isolates were collected from various clinical specimens. Antimicrobial susceptibility testing was performed by the disk diffusion method (Kirby-Bauer Disk Diffusion method). Screening of β-lactamases enzymes through the evaluation of carbapenemase production by using combined disk test(CDT) and Carbapenem Inactivation Method (CIM) Genotypic detection for carbapenemase production by using PCR technique.

benefits: And the reason of this experiment is the prevalence for the presence of beta lactamase enzyme as a method of resesisits for the clinical isolates of acinetobacter baumannii.

Supervisors

Dr. Lamiaa Ismail/ TA. Toqa Mostafa

RSPM2.8: Project Impact of environmental challenges on bacterial growth

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ABSTRACT

There is a lot of factors affect microbial growth.e.g environment that have challenges on bacterial growth. We focused on two of these noticeable effects. First, Dealing with spices that are always utilized for different purposes in preparing, enhancing, and giving flavor to the food . Spices may be exposed to a wide scope of microbial contamination. On exposure to the warm and moist environment, bad collection conditions, poor manufacture operation, and expanded drying times. Therfore, In our project we analyzed four different pathogens flourished in different spices; curry, cumin, black pepper, and paprika that can predict the hazards for consumers. These spices were purchased from various suppliers. Demonstration of the relation between handling, storage, and hygienic quality during the production stages of spices and microbial contamination. were recorded quantitatively and qualitatively Second, as microorganisms may respond to sound excitation with a constructive outcome on development. So, the impact of audible sound waves on microbial development was recorded. Through incubating different organisms; E-coli, Bacillus subtilis, Staph aureus, and Candida albicans independently in a separate petri dish with a suitable medium upon exposure to high and low-frequency sonic vibration contrasted with control. Apply various frequencies and record results.

Supervisors

Dr. Faten Bayioumy/ AL. Sara Medhat

RSPM2.9: Sustainable degradation of p-nitrophenol polluted pharmaceutical effluents by magnetically decorated microorganisms

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ABSTRACT

Pharmaceutical wastes have a high risk to human health and other living organisms. Pharmaceutical wastes can be corrosive, highly reactive, flammable, and irritant to the body tissues. In addition, some drugs may be mutagenic or genotoxic that may be harmful to humans, animals, and plants. Anywhere medicines are employed can be an area of pharmaceutical wastes. Phenolic wastes contamination of water and soil is due to the discharge of polluted wastewater of industries such as petroleum, paints, food, pesticides, plastic and pharmaceutical industries and homes into water areas. Phenolic wastes have a toxic effect on the environment and living organisms. *P*- nitrophenols as a xenobiotic compound in the environment. *P*-nitrophenol can be treated by chemical, physical, and biological methods. Bioremediations change the environmental condition by breaking down the target pollutants and activating the growth of microorganisms to treat any contaminated material such as subsurface, water and soil. Green synthesis of Fe_3O_4 nanoparticles that have environmentally acceptable solvent systems and eco-friendly reducing agents is of great importance. This work aimed to enhance biodegradation of *P*-nitrophenol by green synthesized Fe_3O_4 nanoparticles using water-soluble polysaccharides extracted from four marine macro-algae, namely, *Dictyota dichotoma* as reducing agents as well as stabilizing agents for the synthesized Fe_3O_4 NPs. The main goal of this work is to isolate local biodegrading microorganisms (BDMs) from different polluted environments in Egypt. Then enhancing biodegradation efficiencies by coating microorganism via green synthesized nanoparticles possessing magnetic properties such as iron oxide. In this study, an effective enrichment technique was applied to isolate different bacterial strains with the capabilities to utilize *P*- nitrophenols as a model compound of phenols. Fourteen different degrading bacterial strains were isolated from Lake Manzala Port Said, Egypt with high phenol content of 425.67 mg/L. Lake Manzala was selected for its crowds with fishing boats and presence of fueling and maintenance stations for boats which led to high petrogenic contamination. From all isolates; a Gram-positive bacterial isolate designated HN9 showed higher biodegradation efficiency, recording 83.58% removal of 100 mg/L *P*- nitrophenols. HN9 was identified by 16S rDNA gene sequence analysis to be *Lysinibacillus fusiformis* HN9 (NCBI Gene Bank Accession no. MW488952) with a similarity of 99.41%. Response surface methodology (RSM) was used to optimize and investigate the influence of different process variables on the batch biodegradation process. The higher biodegradation ability of coated HN9, suggests that coated cells of HN9 may form a novel system for the degradation of the xenobiotic compounds which is important for practical biodegradation field. With this excellent biodesulfurization efficiency, *Lysinibacillus fusiformis* HN9 coated cells is considered a good potential candidate for industrial applications for the biodegradation of pharmaceutical wastes.

Supervisors

Dr. Samira Hamed/ AL. Yosra Abdelsalam

Organic Chemistry

RSPOC2.1: Synthesis of Quinoxaline-Based Scaffolds as Anti-Microbial Agents

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Organic Chemistry

ABSTRACT

MRSA are dangerous nosocomial pathogens, finding an effective treatment may be challenging. MRSA become increasingly resistant to drugs other than beta-lactams. Quinoxaline and its derivatives are synthetic origin compounds having a wide spectrum of biological activities. In our project, a series of quinoxaline scaffolds have been synthesized and evaluated as anti-bacterial agents. Unfortunately, none of our compounds showed anti-bacterial activity against 3 types of bacteria. However, they showed good to moderate anti-cancer activity against breast cancer cell lines (MCF7), human liver cancer cell line (HepG2), and adenocarcinoma human alveolar basal epithelial cells (A549). Compounds 5a, 7a exhibited IC50 of (2.19 uM, 1.45 uM), (3.93 uM, 8.36 uM), (0.83 uM, 4.09 uM) against (MCF7, HepG2, A549) using Staurosporine as a reference drug (12 uM, 7.7 uM, 13.8 uM) respectively.

Supervisors

Prof. Dr: Aliaa Mohamed Kamal/ A.L. Aliya Shaker

RSPOC2.2: Design, synthesis and biological evaluation of Naringenin-based scaffolds

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Merna Mohamed
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Organic Chemistry

ABSTRACT

Naringin (4′, 5, 7-trihydroxy flavanone 7-rhamnoglucoside) (NAR) is a major and active flavanone glycoside of citrus fruits. Molecular weight of naringenin is 272.26. It is present as (2S) and (2R) diastereomers in many fruits; Naringenin (NAR) is the natural flavonoid aglycone of Naringenin, it is a flavanone with a stereogenic center at C2, it has two enantiomers, named, (R)- Naringenin and (S)- Naringenin, both Naringenin enantiomers are present in natural sources.. Naringenin biosynthesis has been investigated in Medicago, parsley and other plants. Naringin possesses various biological activities such as antidiabetic, antiatherogenic, antidepressant, immunomodulatory, memory improving, anti-inflammatory, DNA protective, hypolipidaemic, antioxidant, peroxisome proliferator-activated receptors (PPARs) activator and antitumor which is our main concern in this research. In this work we aim to design and synthesize naringenin derivatives with anti-cancer activity. The obtained derivatives should represent hopeful opportunity to produce compounds with anti-cancer activity with fewer side effects. Our objective is to design new Naringinin based scaffolds based on structure activity relationship study reported in literature, synthesize the designed derivatives, elucidate the structure of the synthesized derivatives using different spectroscopic techniques such as IR, ^{1}HNMR and ^{13}C NMR and finally, perform biological evaluation of the synthesized derivatives as anticancer agents against different types of cancer cell lines.

Supervisors

Dr. Heba Teba/ TA. Sara Elsayed

RSPOC2.3: Design, Synthesis and Anti-cancer Activity of some novel Pyrazolo[3,4-d]pyrimidine derivatives

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Omnia Elhadad
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Ahmed Yehia
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Organic Chemistry

ABSTRACT

Heterocyclic molecules with nitrogen atoms play a vital part in a cell's regular life cycle. Pyrazolo pyrimidines are fused heterocyclic ring structures that can be thought of as adenine base bioisosteres in DNA. Pyrazolo[3,4-d]pyrimidines are a kind of fused heterocyclic chemical that has a variety of biological and therapeutic characteristics. Anticancer, antifungal, antibacterial, antiviral, and anti-inflammatory properties have been discovered in them. For the first time in 1956, the anti-cancer activity of pyrazolopyrimidine was evaluated, and the findings were astounding. Since then, medicinal chemists have concentrated their efforts on various pyrazolopyrimidine isomer production techniques and biological profile assessment. Pyrazolo[3,4-d]pyrimidines derivatives have been studied for their anticancer potential and inhibitory action against different protein kinase enzymes. Design and synthesis of semisynthetic new molecules with strong anticancer action are the goals of this research. Starting with a product improves the safety of the resulting compounds and lowers their toxicity when compared to entirely synthesized compounds.

Supervisors

Dr. Inas Galal / TA. Radwa Gamal

RSPOC2.4: Synthesis and Biological Evaluation of 1, 3, 4-Thiadiazole Derivatives as Cytotoxints

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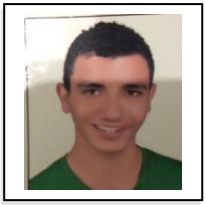
Mohamed Osama
141131

Omar Ahmed
154383



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Organic Chemistry

ABSTRACT

Cancer remains one of the most challenging causes of mortality throughout the recent decades. Cancer, as a disease, is described as the abnormal and uncontrolled cell proliferation, which later develops into a tumor that has the ability to metastasize and spread to other tissues and organs causing debilitation and progressive worsening of the quality of life. It is expected that by 2030 there will be 20 million cases diagnosed with cancer. Cancer metastasis and resistance to anti- cancer drugs are the main cause of mortality. Thus, this encouraged the search and development of novel and more effective anti-cancer therapies in medicinal chemistry. Thiadiazole structure is a widely studied scaffold. It is a 5-membered heterocyclic ring, which possesses relatively high aromaticity and can be synthesized to produce various derivatives, which displace numerous biological activities. The mesoionic characters of this heterocyclic ring allow for the ease in crossing cell membranes and strong interactions with biological targets. Some of the biological actions of this scaffold includes; anti-microbial, anti-hypertensive, anti-oxidant, anti-fungal, anti-inflammatory, and anti-cancer activity. Different synthesis pathways will be conducted to produce different derivatives with anti-cancer activities, some of these pathways include synthesis from Thiosemicarbazides through the crystallization of thiosemicarbazone. Biological evaluation of the designed derivatives will be used for evaluation of their actions on cancer cell lines.

Supervisors

Prof. Dr: Aliaa Mohamed Kamal/ A.L. Rana Elmasry

RSPOC2.5: Design, Synthesis and Biological Evaluation of Naringenin Derivatives




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Organic Chemistry

ABSTRACT

Naringenin is amongst the most essential natural sources of flavonoids, present mostly in a variety of edible fruits. Naringenin has anti-inflammatory, antiviral, anti-Alzheimer's, and anti-diabetic properties, as well as hepatoprotective and cardioprotective, eye-protective, anti-oxidant, and anti-cancer properties. A series of naringenin derivatives were synthesized that can suppress the growth of transformed cells such as human breast cancer cells, hepatocarcinoma, myeloid leukemia, colorectal cancer cells, fibrosarcoma, and melanoma.

Therefore, it's very important to design new derivatives of naringenin, synthesis of derivatives of naringenin, elucidation using various spectroscopic methods (IR, H NMR, and Mass Spectroscopy), and biological evaluation for the newly synthesized compounds and evaluating their activity in relation to the parent naringenin precursor. Finally, naringenin leads a group of the most extensively studied and documented phytopharmaceutical substances. Because it's effective and safe, naringenin could be considered the forerunner of phyto-pharmaceutical innovation, which covers a wide range of biological activities or the development of novel derivatives with specialized activity, such as anti-cancer action, through design and development. On our research we found out the activity of both derivatives of naringenin C1 and C2 poses a significant activity against the following cell lines (MCF7, HepG2, HCT, and PC3) and deficiency of both against A549.

Supervisors

Dr. Inas Galal / TA. Sara Elsayed

RSPOC2.6: Design a biological synthetic derivative of Naringenin

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Organic Chemistry

ABSTRACT

Cancer is the most common life-threatening disease due to the way we live. Cancer is caused by the uncontrolled growth of cells. If diagnosed early, it can be cured. Cancer treatment depends on different external and internal factors that cause cancer. Screening of cancer can be occurs by various screening tests and multiple treatments which are available nowadays as radiation therapy, surgery, chemotherapy, gene therapy etc. Naringenin is a flavonoid compound, which belongs to the subclass of flavones. It can be found in many citrus fruits, tomatoes and present in glycosides form. There are many biological activities of Naringenin includes anti-inflammatory, antioxidant, antibacterial, antiviral and anticancer. The aim of our research is to design different synthetic derivatives compound from Naringenin to provide anticancer agent with the most possible potency. In this study we will highlight the antioxidant activity of Naringenin derivative which owed to the A ring hydroxyl groups in position 5, 7 and ring B hydroxyl group in position 4. The activity of the Naringenin increase by the double bond in ring C between C2-C3 mainly and by the electron donating groups at the same ring in position 3. The carbonyl substituents and the 5 hydroxy group from complex with metals which can stop the free radical formation. In this study we will scope on the Naringenin bromide derivative in treating the hepatocellular carcinoma and its role in inhibiting cycline dependent kinases. This will starts from the Naringenin preparation as extraction from natural sources or synthetically achieved such as Prenyl Naringenin, Naringenin Oxime, and Naringenin O-alkyl and Oxime ethers derivatives which are more beneficial and more potent biologically. then modified to the chalcone derivative then to bromide derivative which is our main product. Infrared spectroscopy (IR), Nuclear magnetic resonance spectroscopy (NMR) has been applied on both derivatives to make the biological assessment which is expected to make an effective activity as anti-cancer especially the liver cancer
(Hepatocellular Carcinoma) more than the parent compound (Naringenin).

Supervisors

Dr: Heba Teba/ TA. Sara Elsayed

Pharmaceutical Chemistry

UNIVERSITY of GREENWICH

MSA University
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RSPHC2.1: Synthesis and Design of Selective Carbonic Anhydrase Inhibitors

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Pharmaceutical Chemistry

ABSTRACT

Cancer is a genetic disease. It is the second cause of death worldwide. Cancer treatments include different drugs with different mechanisms that cancer cells resist by different mechanisms. Cancer cells cause different changes in the tumor microenvironment (TME) as hypoxia that makes pH of TME acidic. Hypoxia and acidity induce cellular adaptations as expressing hypoxia inducible factor 1 (HIF-1) and inducing carbonic anhydrase IX (CA IX) for the enhancement of cancer cells survival. Also, CA IX initiates the first step of the cascade of the metastasis of cancer cells. CA IX is more expressed in cancer cells than normal cells. The aim of our work is to design and synthesize new biologically active selective carbonic anhydrase inhibitors (CAIs) of expected anticancer activity, while the objectives are design and chemical synthesis of new compounds, conformation of the chemical structures of the target compounds, and investigation of the synthetic compounds in silico by molecular docking. CAIs are formed of zinc binding group (ZBG) and linker and tail regions. Literature review studies showed that different chemical modifications in these components of CAIs revealed changes in the potency and selectivity. In our work we started with bromination of P-methoxyacetophenone producing bromo-methoxyacetophenone. This is followed by reaction of bromo-methoxyacetophenone with sulphanilamide forming 4-((2-(4-methoxyphenyl)-2-oxoethyl)amino) benzenesulfonamide. Then, cyclization of 4-((2-(4-methoxyphenyl)-2-oxoethyl)amino) benzenesulfonamide to yield 4-(2-amino-3-cyano-4-(4-methoxyphenyl)-1H-pyrrol-1-yl)benzenesulfonamide. This is followed by reaction of 4-(2-amino-3-cyano-4-(4-methoxyphenyl)-1H-pyrrol-1-yl)benzenesulfonamide with substituent acids in the presence of dimethylformamide producing N-(3-cyano-4-(4-methoxyphenyl)-1-(4-sulfamoylphenyl)-1H-pyrrol-2-yl)benzamide, N-(3-cyano-4-(4-methoxyphenyl)-1-(4-sulfamoylphenyl)-1H-pyrrol-2-yl)-4-methylbenzamide, or4-chloro-N-(3-cyano-4-(4-methoxyphenyl)-1-(4-sulfamoylphenyl)-1H-pyrrol-2-yl)benzamide. Identification of the synthesized compounds will be carried out using spectral analysis as 13CNMR,IR, and 1HNMR. The biological activity assessment will include in-vitro carbonic anhydrase enzym assay.

Supervisors

Prof. Dr. Yassin Nissan / Dr. Mai Saeed

RSPHC2.2: Design, Synthesis, and In Vitro Screening of Some Novel Carbonic Anhydrase Inhibitors

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Pharmaceutical Chemistry

ABSTRACT

Carbonic anhydrase is one of the metalloenzyme that catalyze the reaction between CO2 and water to form HCO3 and H+. Among 13 active CA isoforms, only CAIX and CAII are involved in cancer process. Most of the solid tumors have regions of hypoxia and acidosis which is not favorable for tumor cell, so expression of CA occurs as CAIX and CAII raise PH to slightly alkaline with the help of NBC and MCT. The activity of carbonic anhydrase is reduced by Carbonic anhydrase inhibitors that prevent the splitting of carbonic acid so the medium in blood is still acidic which is not favorable for tumor cell to survive. CAIs are also used for treating glaucoma, epilepsy, and oedema with causing hypokalemia, and metabolic acidosis. Carbonic anhydrase inhibitors include two types: classical and non-classical. The classical type is divided according to their coordination with metal (Zn) while non-classical CAIs divided according totheir anchor to zinc binding water and the functional group that bind to zinc. Sulphonamide is one of novel carbonic anhydrase inhibitors that act as anticancer by inhibition of proliferation of tumor cells. Its scaffold contains sulphonamide moiety, linker, and tail that enable the optimum binging to CA site, so our project aimed at Designing and synthesis of carbonic anhydrase inhibitors and in vitro screening as a new active molecule for cancer and our objectives are synthesis of this designed compounds by sequences of chemical reactions with taking SAR of compounds into our consideration, confirm and verify of the chemical structure and finally,assess the biological activity. This research provides the work plan as well of designing synthetic scheme for some novel sulphonamide derivatives and Study the SAR of sulphonamides derivatives as carbonic anhydrase inhibitors and its relationship to cancer.

Supervisors

Prof. Dr. Yassin Nissan / Dr. Mai Saeed

RSPHC2.3: Novel Sulphonamides as Carbonic Anhydrase Inhibitors: Design, Synthesis, and Screening

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Pharmaceutical Chemistry

ABSTRACT

We are not capable of directing the wind, but we can always adjust the sails. Being the second leading cause of death globally with an estimated 9.6 million deaths in 2018 and the cause of 1 in 6 deaths globally, cancer is the strongest and the fastest wind that was ever recorded in history. Herein, we are focusing on a certain type of cancers, which is hypoxic cancer. Hypoxia is a condition of insufficient oxygen, its occurrence in tumor tissues has been associated with cancer progression, metastasis, and resistance. One of hypoxic cancer tumor markers and the one we are focusing on is carbonic anhydrase enzymes (CA), especially the isoforms CAIX/CAXII. They are key pH regulators that allow survival of cancer cells under stressful conditions; therefore, their inhibition was a therapy target. Our aim is to design and synthesize novel biologically active molecules of an expected anti-cancer activity, then those two steps will be followed by identification of the chemical structure of the target compounds, and invitro assessed using “Molecular Docking” approach, underlining that those are our main objectives. Carbonic anhydrase inhibitors are subdivided into two classes, non-sulphonamides, and sulphonamides. Carbonic anhydrase inhibition by sulfonamides was the corner stone of the magnificent scientific era we are living, as it led to many drug discoveries rather than the anti-cancer we are discussing. The Benzene Sulfonamides like, Acetazolamide and Methazolamide are used as modulator in cancer therapy in combination with different chemotherapies. Additionally, Schiff base derivatives showed a promising potential for being potent CA inhibitors. To conclude, being recognized as a tumor marker its inhibition was of interest. Consequently, our working plan includes synthesizing novel sulphonamides derivatives through series of reactions, this will be followed by identification of the target compounds and accompanied by the carbonic anhydrase in
vitro assessment of those derivatives.

Supervisors

Prof. Dr. Yassin Nissan / Dr. Mai Saeed

RSPHC2.4: Computational Studies of Carbonic Anhydrase Inhibitors

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Pharmaceutical Chemistry

ABSTRACT

Cancer can be characterized as rapid abnormal cells proliferation which over run normal tissues leading to metastasis. Cancer cells are grouped according to origin of tissue or organ. The development of anticancer drugs became a challenging role between scientists. Carbonic anhydrase inhibitors may be anti-cancer by inhibiting carbonic anhydrase IX and XII which are recognized as a tumor marker in many types of cancer. Sulfonamide derivatives have shown anticancer activity in vivo and in vitro and that is related to the inhibition of carbonic anhydrase and some of the derivatives are selected preclinically based on using computer aided drug design. Proteins were selected from protein databank according to predefined criteria. Rigid body docking method was used using MOE software and docking of our molecules were carried out. Best poses for each compound were selected from docking database. The pharmacophore search was carried out for the best poses of our molecules that were obtained from docking and allowing the bond rotation. Then, we searched in the clean zinc database using MOE software of compounds that have similar features to our pharmacophore model with drug like properties according to “Lipinski's rule" several hits were obtained by docking of our compounds in both CA enzymes CAIX & CAX11 and best poses for each compound were selected from docking database according to predefined criteria. 1 I› pharmacophore model was obtained but they did not work, and we chose only the model that had the predefined features (two aromatic features & two hydrophobic features) that has similar pharmacophore features with reported sulophonarrides that have carbonic anhydrase inhibitors. several hits were obtained around 255 and 273 hits of CAIX & XII respectively, but the best 10 hits were docked, and the best poses of these hits were recorded

Supervisors

Dr. Rana Refaey / TA. Merihan Moneer

RSPHC2.5: Design of Novel cGRP-Anatgonists as Potential Anti-Migraine Agents.

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Pharmaceutical Chemistry

ABSTRACT

Migraine is one of the most disabling illnesses in the world that affects 12% of the population. It is now considered to be a complex neurological disorder in which multiple cortical, subcortical, and brainstem are affected. It is also accompanied mainly by nausea and vomiting. Calcitonin gene-related peptide (CGRP) is a neuropeptide which plays a crucial role in the pathology of migraine. From here we thought to work on novel computer based and ligand-based drug design by using the available molecules that act on the same target (CGRP) and promising CGRP antagonists for the treatment of migraine and structure based drug design by identifying the receptor by the aid of Insilco modeling (CADD), we intend to design a simplified small molecule, moving towards a new era where the treatment of migraine becomes more selective, with less side effects and cardiovascular complications in comparison to other groups such as triptans and ergot alkaloids and high efficacy. Proteins were selected based on certain criteria, then they got prepared by addition of hydrogen atoms, partial charges and energy minimization, and validation was carried out by re-docking of co-crystallized ligand, then docking of seven compounds took place followed by Pharmacophore generation and search. Four proteins 6ZIS, 6ZHO, 6PFO and 3N7S were selected and prepared, 6ZIS was the proper protein because of its promising RMSD 2.09, and three features were identified upon docking, Pharmacophore model were generated based on docking's results and many hits were produced to identify promising hits based on common interactions.

Supervisors

Dr. Rana Refaey / A.L Ramy Ramsis

RSPHC2.6: Elaboration of Hybrid Radio-Iodine Gold Nanoparticles as Theranostic Agent in Cancer Treatment.

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Omnia Fathy
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Pharmaceutical Chemistry

ABSTRACT

Cancer is one of the most prevalent causes of death all around the world and there is no doubt that scientists around the world are searching for new approaches every day in order to find a cure to this disease. Cancer is considered a solid tumor meaning that there is a limited blood supply as well as manifested intestinal barriers which make it hard for the drugs whether it's diagnostic or therapeutic to reach the cells, of course there are some special cases where the solid cells can have some leakage allowing high leakage of the drugs onto the peripheral tissues but still it doesn't reach most of the cancer parts that needed during chemotherapy or radiotherapy. The approaches that were used of targeting radiotherapy to the cancer cells called (brachytherapy) didn't give good results as there was leakage of the radioactive agents to other organs therefore decreasing the efficiency and tumoricidal effects. That's why scientists had to search for new approaches to ensure that the given dose is targeted to most of the cancer cells to ensure its efficacy but not just the outer cancer surface but the core of it as well to prevent cancer recurrence. The aim of this study is to hybridize gold nanoparticles with Quercetin and anticancer agent (Sunitinib) and radiolabel them with I-131 as a novel, smart drug delivery system with target-specific recognition, potentially useful in the treatment of cancer.

Supervisors

Prof. Dr. Tamer Sakr / A.L Yomna El-Mahrouky

RSPHC2.7: Enhanced Traditional Anticancer Efficacy Based on Nano-Nuclear Medicine Approch

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Salsabel Adel
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Pharmaceutical Chemistry

ABSTRACT

Tumor diseases garner the highest mortality rates on the globe after cardiovascular disease. Cancer diseases, such as non-small cell lung cancer are the most concerning as their incidence grows with the age growth of world population. There have been many approaches with different drug classes to treat cancer diseases however, most of these drugs aren't considered to be a definitive treatment of cancers due to acquired resistance to these drugs and poor targeting and selectivity with conventional drug delivery methods. In recent years, many discoveries in the fields of nanomedicine and nuclear medicine paved the way for developing new drug delivery methods and drug formulations. And thus, arise the importance of developing a delivery system based on nanoparticles, radioisotopes, and anticancer agents. Our aim is to engineer a new integrated drug delivery system that overcomes drawbacks of traditional anticancer therapeutic. First, wiping out resistant of gefitinib by adding the natural product resveratrol. Second, is integration of nanoparticles as carriers that eliminate burdens that face both gefitinib and resveratrol as low targeting in addition to low bioavailability. Finally, Tc99m that add privilege of imaging our engineered drug delivery system inside tissues and reveals the progression. objectives: 1) synthesis of gold nanoparticles using resveratrol for reduction and stabilization. 2) evaluation of nano-gold through TEM, DLS, ZETA potential and invitro stability test. 3) loading of gefitinib. 4) invitro stability and cytotoxicity test. 5) loading of radioisotope (Tc99m). benefits: development of this technique would provide us with more specific and selective drug delivery system through EPR phenomena (nanogold), and the penetration power of tc99m, the anticancer activity of gefitinib.

Supervisors

Prof. Dr. Tamer Sakr / T.A. Nouran Emam

RSPHC2.8: Functionalized Radio-Iodinated Gold Nanocarrier for Tumor Theranosis.

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Pharmaceutical Chemistry

ABSTRACT

Conventional approaches that have been used to manage cancer are surgery, radiotherapy, and chemotherapy, yet each have serious limitations. These limitations urge the development of a novel technique in targeting cancer stem cells. This can be achieved by merging three different technologies: chemotherapy, nanomedicine, and nuclear pharmacy thus maximizing their efficiency and overcoming the flaws in each technique when alone. Chemotherapeutic drugs such as 5-Fluorouracil is considered effective in treating localized and metastasized cancer. However, it cannot eradicate cancer stem cells alone which is responsible for the tumor relapse. Moreover, it lacks selectivity and can harm the normal cells. Nanomedicine offers specific targeting to tumor sites through using gold nano-system which utilizes angiogenesis phenomenon in a process called enhanced permeability and retention. The use of radioactive isotope – Iodine-131 - with both nano-gold and chemotherapy - 5-Fluorouracil – is crucial as it decays giving two types of radiations; β-radiation that can destroy cancer stem cells and gamma radiation which enables tumor imaging. Our objective is to synthesize gold nanoparticles having the ability to carry high payload of both; 5-Fluorouracil and Iodine-131 in order to increase tumor selectivity. Thereby taking forward steps towards achieving our aim in assessing the effective delivery to tumor lesions and treatment through conjugating radioactive Iodine-131 on
Nanogold-5-Fluorouracil system for tumor theranosis.

Supervisors

Prof. Dr. Tamer Sakr / T.A. Zeinab Elfakharany

RSPHC2.9: Evaluation of Enhanced Selectivity of Iodine-131-Gold Nano Particles for Tumor Theranosis.

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Farah Khaled
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Hadeer Khaled
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Hassan Aboulhamayed
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Pharmaceutical Chemistry

ABSTRACT

Cancer is the second leading cause of death globally. Unfortunately, conventional cancer therapies such as surgery, radio-, immuno-, and chemotherapy possess many drawbacks, precisely the lack of selectivity and failure to render recurrence. Hence, the aim of this work is to develop a nano-engineered system of cancer Theranosis based on hybrid science. This would lead to improving the selectivity of treatment through nanotechnology, via passive targeting of tumor cells therefore augmenting both the antineoplastic activity of a loaded chemotherapeutic agent, as well as of the radioactive isotope. Evaluation of the treatment progression and benefits will be made possible utilizing nuclear technology. The objective is to develop organometallic nanoparticles using green technology, labeled with a radioisotope, therefore, lowering the overall toxicity and enhancing the therapy via a much-revised mechanism known as enhanced permeability and retention. The plan of this work includes preparing gold nanoparticles with a phytochemical at room temperature through a one-step procedure. Profiling of the prepared gold nanoparticles using UV visible spectroscopy, dynamic light scattering, and transmission electron microscope. The preparation will then be loaded with a chemotherapeutic agent and observed for in vitro stability and in vitro cytotoxicity. Lastly, the preparation will be radiolabeled with Iodine-131, and theselectivity will be evaluated.

Supervisors

Prof. Dr. Tamer Sakr / A.L Yomna El-Mahrouky

RSPHC2.10: Selenium in Hybrid Technology as an Evolutionary Weapon for Cancer Prevention

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ABSTRACT

Since that “an ounce of prevention is worth a pound of cure”. So, the aim of this project relies mainly on developing a preventative agent that has the ability of not just curing but preventing tumor formation from scratch specifically in breast cancer as it’s considered to be the second leading cause of death in women worldwide. The aim is also to target mainly women who are predisposed to develop breast cancer either as a result of hereditary disease leading to mutations in BRCA1/2 genes or as a result of excessive use of hormonal therapy and contraceptives to control birth. And since that, the conventional prevention and treatment methods of breast cancer have a lot of drawbacks. So our objective is to use the hybrid technology of combining both Nano-medicine with Nuclear pharmacy, getting benefits from both and minimizing any drawbacks to be able at the end to develop the Nano-selenium particle which will be the fighting weapon, in which the selenium will be reduced first using sodium borohydride ,after that it will be coated with Vitamin A antioxidant, besides performing screening and diagnosis of the mutated genes in breast by TC99m gamma rays, repairing them so by this reaching the goal of preventing the initiation of the tumor cell.

Supervisors

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Pharmaceutics

RSPT2.1: Nanoparticles of Liquid Crystals for Topical Delivery of an Anti-inflammatory Drug

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ABSTRACT

The purpose of this study is to use the liquid crystal as a delivery system for enhancing the transdermal bioavailability of an anti-inflammatory drug. The preparation and evaluation of lyotropic liquid crystal for encapsulation of a hydrophobic drug for transdermal application, and also, the effect of surfactant will be studied on particle size and encapsulation efficient of nanoparticles. The main object to apply diclofenac (poorly soluble drug) which formulate via nanoparticles to target transdermal rout of administration. Physiochemical properties were evaluated to test the relation between the effect of the pharmacological activity and the chemical and physical properties of the chemical compound. Also, there are some of several characterization tests which performed on prepared product such as, size and number of nanometer on particle size, drug content test to ensure that the drug content uniformity of the active ingredient and ensure from the therapeutic effect of the drug, determine the formation of lamellar, cubic, hexagonal type by using transmission electron microscope, determination of the drug dissolution to determine the amount of drug released per unit time, using polarized light microscopy to evaluate the composition of the sample, evaluating of the prepared variables and finally select the optimum formula. After doing entrapment efficiency test, the result showed that absorbance of Diclofenac tween sample was about 0.5745 and absorbance of diclofenac poloxamer was about 0.5585, so the entrapment efficiency for Diclofenac tween was 99% and Diclofenac poloxamer was 97.5% and both formulas was existed in acceptable range. Also after doing in vitro release dissolution study for diclofenac tween sample in buffer the result showed that the range between 15 min till 3 hours. These ranges vary between 4.25-11.59% to determine the amount of diclofenac tween and the result in the in vitro release dissolution study for diclofenac poloxamer sample in buffer showed variations of drug release amount of diclofenac poloxamer at PH 7.4. in time 15 min, amount of drug release is about 1% and in time 3 hours, amount of drug release is 6.3%, so drug release amount varied between 1 - 6.3% at times of
15 min – 3 hrs.

Supervisors

Prof. Eman Saddar/ TA. Nancy Nabeel

RSPT2.2: Preparation and Evaluation of Liquid Crystals for Delivery of Hydrophilic Drug

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ABSTRACT

Theophylline -hydrophilic drug- is a phosphodiesterase inhibiting drug used for respiratory diseases such as asthma and chronic obstructive pulmonary disease. Aim: This study aims to design a modified drug delivery system for enhancing transdermal bioavailability of hydrophilic drug. Objective: Preparation and characterization of lyotropic liquid crystals dosage form for delivering a hydrophilic drug, the study will be carried out to determine the effect of surfactant type (act as stabilizer). Transdermal drug delivery system is a technique that provides drug absorption via the skin. The system has many advantages over conventional administration routes. Liquid crystal (mesophase) it is an intermediate phase between solid and liquid. It has physical character of liquid such as viscosity, surface tension and fluidly, but retain some character of crystalline solid like optical activity and orderly arrangement of particles. Liquid crystals can be divided into thermotropic and lyotropic phases. Recently, liquid crystal dosage forms have generated substantial interest because they are applicable to both oil- and water-soluble compounds. Liquid crystal for transdermal application is prepared by top-down approach The preparation of the theophylline loaded LCs by mixing aqueous phase (glycerol, water and PEG 200) with the lipid phase using different surfactants (GMO, surfactant and theophylline) under high energy input. The obtained formulations are evaluated via tests; particle size, PDI, zeta potential, *In vitro* drug release and entrapment efficiency showed that F1 showed 67.2 % release within 3 hours and EE with high value of 97% and 10 nm as particle size, while F2 showed 90.1 % release within 3 hours and has EE with high values of 78% and 339 nm as particle size. We concluded that the high release percentage of F2 over F1 is due environmental conditions applied only on F2.

Supervisors

Prof. Eman Saddar/ TA. Nancy Nabeel

RSPT2.3: Formulation and Evaluation of Topical Minoxidil-Lipid Vesicles for the Treatment of Hair Loss

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ABSTRACT

Alopecia is a major impact on the quality of life of both genders. The conventional treatment is topical minoxidil (MNX) formulations which stimulate hair growth and restore hair condition. However, the recent commercial Minoxidil products are associated with limited performance and a lack of tolerability and compliance due to the emergence of adverse effects. According to the most recent study, alternative formulation technologies might be used to prepare stiff or deformable nanoparticles to overcome the problems. The aim of this study is improving the delivery of Minoxidil in form of deformable lipid vesicles to overcome the conventional Minoxidil products drawbacks. The deformable lipid vesicles were prepared using the methanol injection method and use glycerol as a penetration enhancer with different concentrations 0, 10, 20 and 30% and they have been named as DLV-G0, DLV-G10, DLV-G20 and DLV-G30 respectively. Particle size, Polydispersity Index, the drug entrapment efficiency and the in-vitro drug release were investigated to the four formulations. Then the optimal formulation was compared with one of the commercial Minoxidil product using in-vivo study for 10 days in albino rats. The DLV-G30+Drug formula showed the best results as particle size was (103 ±0.5nm), the PDI was 0.23, ZP value was within the accepted range (-12.9 ±0.9) and the entrapment efficiency was 65.1% among other formulations. And when applying the in-vivo study, the DLV-G30 + drug showed rapid and significant growth of hair with no inflammation at the site of application compared to the commercial product.

Supervisors

Prof. Ghada Ehab/ AL. Fady George

RSPT2.4: Formulation and Evaluation of Antidiabetic Chewing Gum Loaded Two-Dimensional Pore Structure Nanoparticles for Enhancing

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ABSTRACT

Diabetes mellitus is a metabolic disorder due to absolute or relative insulin deficiency characterized by hyperglycemia. Repaglinide is an anti-diabetic drug in the class known as meglitinide. It lowers blood glucose by stimulating the release of insulin from pancreas. Repaglinide is (BCS class II); low solubility and high permeability. Aim of this study is formulating the repaglinide with mesoporous silica nanoparticles (R-MSNs) as medicated chewing gum (MCG) to improve its bioavailability through lowering the hepatic first pass metabolism and achieving faster anti diabetic action to get greater patient compliance. Repaglinide solid dispersion was prepared by solvent evaporation method utilizing 3 different drug-carrier ratios. Pharmaceutical investigations were performed to all solid dispersion nanoparticles formulation. Additionally in-vitro release study and cytotoxicity study were conducted. The optimized repaglinide- loaded silica nanoparticles (R-MSN) were formulated as (MCG) using melting method. Drug content, visual appearance, in-vitro release study and clinical trials were done to investigate and compare the anti-diabetic effect of repaglinide loaded silica nanoparticles and pure repaglinide in their medicated formulation. FTIR results revealed that there is no interaction between repaglinide and MSNs. DSC and XRD indicate that repaglinide present in the amorphous form. TEM revealed no structural changes in MSNs. SEM confirmed the good entrapment of repaglinide in MSNs. Drug content of all formulations above 80%. Solubility of repaglinide was enhanced. In-vitro release of solid dispersion was enhanced due to the amorphous nature. Also, a promising finding was reported that using of MSNs as a nano-carrier to prepare solid dispersion lower cytotoxic effect of repaglinide on the normal cell. Drug content in pure repaglinide MCG was (97.65%) and in R-MSNs- MCG was (98.90%). in-vitro release of both formulations showed a maximum value after 60 min. Finally, we concluded that the solubility and dissolution rate of repaglinide were improved by formulating R-MSNs as MCG and consequently the bioavailability of repaglinide was enhanced.

Supervisors

Prof. Reham Amer/ AL. Pakinam Zikry

RSPT2.5: Formulation and Evaluation of 3D Nanoscaffolds Design for Treatment of Burn Injury

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ABSTRACT

Wounds caused by burns differ from other wounds and need specific local consideration because of their complex nature this poses several challenges including scaring and infections, burn wounds are classified according to the skin damage depth to first-, second-, and third-degree burns. Traditional ways of treatment of burn wounds each have their limitations, Drug application locally at the site of wound is an effective and beneficial way of drug delivery. Recently nano-scaffolds became a trend in the medical field because of their promising properties such as high surface area as well as their ability to mimic the skin properties in addition to the ability to absorb the wound fluids. In this study we are dealing with developing sodium alginate nano-scaffolds loaded with silver nitrate as well as bee venom in order to treat burn wounds or shorten wound healing time. Sodium alginate scaffolds are perfect as they are identical to the extracellular matrix, silver nitrate that is synthesized by the green route have antimicrobial activities towards many microorganism also they possess antifungal activities in addition to that they have biodegradable biocompatible properties on the other hand bee venom which is also called apitoxin can accelerate the wound healing process as it anti-inflammatory, anti-microbial , anti-oxidant as well as analgesic properties in addition BV plays an important role in wound healing specially in diabetic patients. We developed nano-scaffolds composite bandages using silver nitrate nanoparticles, bee venom nanoparticles, and mixture of bee venom and silver nitrate scaffolds. The prepared silver nanoparticles and bee venom in nano-range with suitable zeta potential and PDI less than 1 which indicate homogenous distribution of nanoparticles. The prepared nano-scaffolds bandages were characterized using FT-IR and SEM; no compatibility between chitosan and sodium alginate, the scaffolds show porous structure. In addition nano-scaffolds bandages were evaluated for pH suitable with skin pH with no irritation, %swelling index between 20% to 60%, the drug content was 80%-88% and the in-vitro drug released showed sustained release over 24 hours. Cytocompatibility studies were carried out using human fibroblast (HDF) cells proved the non-toxic nature of the scaffolds. The pharmacological study prove that the wound area decreases over 12 days especially the silver nanoparticles scaffolds which show high wound healing effect.

Supervisors

Dr. Dalia Abdelaty/ A.L. Lamis Helmy

RSPT2.6: Application of Electrospinning Technique as a Novel Method to Formulate Nanofiber Mat for Wound Healing

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ABSTRACT

Aim: Preparation of nanofiber mats carried Deflazacort by using electrospinning technique to be applied topically on the skin for wound healing. Objective: Electrospun nanofibers show great potential in many biomedical applications including biosensing, regenerative medicine, tissue engineering, and drug delivery and wound healing. We selected these nanofibers to accelerate the healing and its ability to absorb the wound secretions in addition to large surface area. The skin is the organ that covers the whole body whereas it is composed of three main layers: epidermis, dermis then subcutaneous fat tissues. It is the organ that regulates the body temperature and protect all organs. When it is burned, it can be healed itself through cascade of healing, hemostasis, inflammation, proliferation and maturation. Nanofiber membranes that are prepared by electrospinning technique have a vital role for healing due to its unique size with high surface area. Deflazacort is a new glucocorticoid drug in the market, and it is prepared through electrospinning technique. Deflazacort has anti-inflammatory activity also immunosuppressive as the metabolic of deflazacort is21-desDFZ which bind to glucocorticoid receptor and bring out that activity in the body. The obtained mat is evaluated through characterization tests; Scanning Electron Microscope (SEM) analysis which produces a good membrane with a high quality which is Uniform smooth fiber with optimum fiber diameter without any beads and without pore formation. And average nanofiber diameter using SEM with 12000x magnification 533.9 nm ± 45.83. Calibration curve of the drug showed a λmax of 239nm and R=0.9993. Drug content determination and finally In vitro drug release of nanofibers in simulated body-fluids and In vitro degradation.

Supervisors

Dr. Dalia Abdelaty/ AL. Hala Salah

RSPT2.7: Formulation and Pharmaceutical Evaluation of Clozapine Wafers




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ABSTRACT

Schizophrenia is a mental illness while Psychosis is a hallmark symptom of schizophrenia. Antipsychotic medications include two groups which are: typical and atypical. Atypical psychiatric medication is Clozapine. Clozapine is one of the most unique drugs used in psychiatry. An antipsychotic drug that works by helping to restore the balance of certain natural substances (neurotransmitters) in the brain. The only forms of clozapine are tablets, wafers, and liquid agents. Clozapine is a tricyclic psychotropic medication that belongs to the Benz-isoxazole derivatives. Despite its efficacy, it has a low bioavailability. The aim of this study is to develop clozapine wafers to overcome the drug's low bioavailability. Sodium carboxymethyl cellulose, sodium alginate, and hydroxypropyl methylcellulose were used in varied quantities (HPMC)Six formulae were prepared. The F2 formula with 6% of sodium alginate is the formula of choice; shows 85 sec as the disintegration time, drug loaded with 102%, with pH 6.6, and high-dissolution release rate in 20 minutes. Wafers dissolve rapidly in the oral cavity, causing the active ingredients to be absorbed into the blood through the oral mucosa, avoiding the liver's first pass effect, thereby improving bioavailability.

Supervisors

Dr. Amira Hashad/ TA. Heidi Ayman

RSPT2.8: Lipid-Based Nanoparticles for Management of Hair Loss




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ABSTRACT

Androgenetic alopecia is a common condition correlated with hair that is characterized by gradual patterns of hair loss. It affects both genders because of the dihydrotestosterone disturbance which is the hormone responsible for decreasing follicular development. However, in the hair growth cycle, drugs work to promote the starting of the anagen stage, and some drugs reduce the telogen stage. Treatment of hair loss includes minoxidil, finasteride, low level laser light therapy and hair transplantation surgery with many side effects which include growth of hair at non treated area, impotence, and surgical risk. We chose rosuvastatin calcium to be the most efficient treatment option of hair loss since it causes hair growth, prevent cholesterol accumulation as it is HMG-CoA reductase inhibitor and shorten telogen phase Lipid nanoparticles are colloidal drug delivery systems, composed of different types of lipids Such as, liposomes, niosomes, solid lipid nanoparticles, and lipid nano capsules. Their size range is 50–1000 nm. They enter through the hair follicle as the sebum interact with them, then the drug accumulates in the follicles. Our aim is follicular targeting of hair promoting drug for treatment of hair loss to minimize unnecessary side effects associated with oral administration. Our objective was achieved by developing lipid-based nanoparticles of rosuvastatin drug. The method used for the preparation of rosuvastatin calcium lipid-based nanoparticles is ether injection method. In this method the surfactant used is span 60, and the lipid used is squalane, squalene, or cholesterol. The produced nanoparticles are characterized for its particle size, zeta potential, entrapment efficiency, and in vitro drug release. To sum up, by evaluating its characterization we found that F2 formula is the optimum formula which was prepared using squalene as lipid with span 60, its particle size was 183 nm, PDI was 0.328, zeta potential was -4.5, and entrapment efficiency was 97.83%. Based on the results of the previous tests the optimum formula which is F2 is chosen for further investigations such as TEM, FTIR, DSC, and XRD.

Supervisors

Dr. Shereen Hamdi/ AL. Maysoon Mostafa

RSPT2.9: Chitosan-Based Nanoparticles of an Anti-inflammatory Drug for Management of Arthritis

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ABSTRACT

This study aims to enhance the treatment of arthritis associated inflammation and the pain and also to minimize the side effects correlated with the administration of anti-inflammatory drugs. Etoricoxib is related to class 2 and selective COX-2 inhibitors which inhibit isoform 2 of cyclooxygenase enzyme (COX-2), preventing the production of prostaglandins (PGs) from the arachidonic acid. Transdermal route is the good idea to reduce many side effects from the other routes. Transdermal route has many advantages over liquid, tablet and parenteral dosage form. The preparation of the Etoricoxib Chitosan –based nanoparticles was prepared by using of ionic gelation method in form of transdermal gel then the transdermal gel characterizations are tested by zeta potential, particle size, drug release morphology, entrapment efficiency, ex-vivo permeation, FTIR, DSC and confocal laser scanning microscopy. The results showed that the maximum wavelength of etoricoxib in phosphate buffer at pH 5.5 and pH 7.4 is 284 nm also the correlation obtained from calibration curve between concentration and absorbance in phosphate buffer at pH R2 = 0.9995 and in phosphate buffer at pH 7.4 R2 = 0.9993 is linear. Comparing the formulation by zeta potential, particle size, entrapment efficiency, DSC, PDI, in-vitro drug release and also ex-vivo permeation showed the best formula accepted is F3 which it has small particle size equal 214 nm, PDI < 1, zeta potential > 30 and also entrapment efficiency percentage is about 70%. After the formula was evaluated by different parameters such as: confocal laser scanning study, transmission electron microscope (TEM) and UV-spectrophotometer show F3 is the best one. Aim: Enhancement of treatment of arthritis associated inflammation and the pain and also to minimize the side effects correlated with the administration of anti-inflammatory drugs. Objectives: The objective of this study is to develop Chitosan- based nanoparticles of anti-inflammatory drug and to evaluate its characterization.

Supervisors

Dr. Shereen Hamdi/ AL. Maysoon Mostafa

RSPT2.10: Enhancement of the Solubility of a Natural Phenolic Compound using Vesicular Nano Carrier

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ABSTRACT

The purpose of this study is to enhance the solubility of Syringic acid using emulsomes for the treatment of Alzheimer disease. Syringic acid is found to have a lot of pharmacological action as anti-inflammatory, antioxidant, and neuroprotective properties. Unfortunately, syringic acid has poor solubility in water which affects its absorption and bioavailability. The objective of this study is to formulate syringic acid loaded emulsomes, to enhance its solubility and bioavailability. Emulsomes are nano triglyceride carriers formed from solid lipid (SL) core and phosphatidylcholine sheath (PC), prepared by the use of thin film hydration method. In this study, a central composite design was used for the optimization of the prepared emulsomes. Two independent variables were studied which are SL: PC (X1) and drug amount (X2). The dependent variables were the entrapment efficiency percentage (EE %), the particle size (PS), and the zeta potential (ZP). The optimized formula showed nano spherical SA emulsome with EE% of 54.6%, PS of 285.1 nm and ZP of -55.1 mv. The results showed a satisfactory gradual release profile was observed for the prepared emulsomes over that of syringic acid standard where approximately 92% of the drug was released after 24 h versus 25 % for the optimized formula and syringic acid, respectively. The relative bioavailability of the prepared emulsomes was about 150 % compared to the syringic acid powder, which confirms the great enhancement in the neuroprotective effect of syringic acid upon being incorporated into emulsomes. The neuroprotective efficacy of the syringic acid loaded emulsomes was evaluated histopathologically and the biochemical markers on rats on different groups were measured. The results found that the nasal Syringic acid loaded emulsomes (SLE) significantly reduced the inflammation of the hippocampus and lower the expression of GFAP. It is also found that it suppresses the TNF-α and COX-2 expression in LPS+INF-γ stimulated macrophages in vitro and in vivo, decrease free radicals that lead to reduction in oxidative stress and neuronal degeneration.

Supervisors

Dr. Nabila Sweed/ TA. Nada Hashem

RSPT2.11: Optimization of a Vesicular Nanocarrier for the Enhancement of the Neuroprotective Effects of a Natural Phenolic Compound

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ABSTRACT

Syringic acid can be used as an anti-oxidant, antimicrobial, anti-inflammatory, antiendotoxic, hepatoprotective and neuroprotective agent. Syringic acid suffers from poor solubility and permeability which leading to its poor bioavailability. Emulsomes is one of the novel strategies that can be used for enhancing the solubility of poorly soluble drugs. The aim of this study to formulate of emulsomes loaded with syringic acid using different solid lipids, for the enhancement of the solubility syringic acid. In this study, central composite design approach was adopted in order to optimize the syringic acid loaded emulsomes with the aim of maximizing the entrapment efficiency % (EE %), minimizing the particle size, and maximizing the zeta potential. Two independent variables (factors) were involved in the study, which were SL:PC (X1) and the drug amount (mg) (X2).The measured responses were the entrapment efficiency EE % (Y1), the particle size (nm) (Y2) and zeta potential (mV) (Y3). The optimized formula showed an EE % of 61%, a particle size of 200 nm and a zeta potential of -36.3 mV. The results showed a satisfactory gradual release profile was observed for the prepared emulsomes over that of syringic acid standard where approximately 92% of the drug was released after 24 h versus 25 % for the optimized formula and syringic acid respectively. The relative bioavailability of the prepared emulsomes was about 150% compared to the syringic acid powder, which confirms the great enhancement in the neuroprotective effect of syringic acid upon being incorporated into emulsomes. The rats treated with the optimized formula showed an apparently normal hippocampus with no gliosis and almost normal cells and a mild GFAP expression in the hippocampus after being treated with LPS. Rats treated with the optimized formula also showed a significant decrease in TNF alpha and MDA, with a significant increase in SOD marker.

Supervisors

Dr. Nabila Sweed/ TA. Nada Hashem

RSPT2.12: Self-Assembled Drug Delivery System for the Enhancement of the Solubility and Bioavailability of a Poorly Soluble Drug

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Pharmaceutics

ABSTRACT

The objective of the current study was to enhance the solubility and bioavailability of a poorly soluble drug “vanillic acid” by using self-assembled drug delivery system “pharmacosomes” and optimize the process and formulations by using response surface methodology. Tetrahydrofuran was used as a medium for the reaction, the drug and phosphatidylcholine were dissolved in the medium, and then the complex formed after reflux for 3 hours under vacuum condition. The process and formulations were optimized by central composite design of response surface methodology. The phosphatidylcholine to the drug ratio (PC:Drug) (X1) and total lipid content (X2) were selected as independent variables. The drug content and zeta potential were used as dependent variables. The physico-chemical properties of the optimized formula were tested by Fourier transform infrared spectrophotometry (FT-IR), differential scanning calorimetry (DSC), transmission electron microscope (TEM), in-vitro drug release and saturated solubility. The optimized formula showed drug content of 98.2 mg/mL, and zeta potential of -39.90 mv. The in-vitro release showed a sustained release of optimized formula up to more than 48 hours with enhanced solubility. The transmission electron microscopy revealed spherical particles, which were uniform in shape and had smooth surfaces, and there was no visible aggregation of the particles. The pharmacokinetics study revealed enhancement of oral bioavailability of the formula compared to the pure vanillic acid with Cmax values being 173.7239853 µg/mL and 132.65 µg/mL respectively. In addition, the half-life of vanillic acid in pharmacosomes nanoparticles was increased by 3.6-fold in comparison with that of pure vanillic acid. The oral bioavailability of vanillic acid in pharmacosomes increased about 2.1 times when compared to pure vanillic acid. Thus, enhancement of solubility and bioavailability of vanillic acid were achieved by using nanoparticle form “pharmcosomes” which could be a promising drug delivery system..

Supervisors

Dr. Marwa Hamdy/ AL. Islam Mannaa

RSPT2.13: Response Surface Optimization of a Natural Cardioprotective Drug using Phytosomal Drug Delivery System

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ABSTRACT

The aim of this study was to enhance the solubility of a poorly soluble drug, vanillic acid using Nano-vesicles, namely phytosomal nanoparticles in a systemized way. Phytosomes are vesicular drug delivery system which has several advantages over conventional vesicular drug delivery systems. Phytosomes are phospholipid complexes with the drug that aim to improve the bioavailability and solubility of poorly water soluble, as well as poorly lipophilic drugs. Vanillic acid was complexed with soya phosphatidylcholine using solvent evaporation technique and solvent injection technique. Phytosomal vanillic acid formulations were subjected to saturated solubility, drug content, particle size (PS), and poly dispersity index (PDI) evaluation. In addtition, surface morphology (by scanning electron microscopy (SEM)), Fourier Transform Infrared Spectroscopy (FTIR), crystallinity (by x-ray powder diffraction), and in-vitro release rate and *in vivo* study were performed. The saturated solubility results showed that water solubility of the drug in the optimized formula, the partition coefficient, and oral drug absorption were improved. The content of vanillic acid in phytosomes prepared by solvent evaporation technique was found to be 98.98 ± 15.8%, which showed high percent of drug loading that make the delivery of drug feasible, while the content of vanillic acid in phytosomes prepared by solvent injection technique was found to be 58.9 ± 2.87. Optimization using design expert software was used to determine particle size and poly dispersity index response. PS of phytosomes was found to be in the range of 416.3 to 168.5 and the PDI was found to be in the range of 0.66 to 0.25. The phytosomal optimized formula was found to be spherical shape when examined using SEM with high drug loading and solubility. In FT-IR test it was observed stretching and shifting in peaks that indicated of occurrence of interactions. X-ray powder diffraction data confirmed the formulation of phytosomes with their interactions by produced broad peaks with less intensity. Within 48 hours the drug release was measured using dialysis bag method and showed a sustained release of the drug and increase in drug release rate of vanillic acid in optimized formula over time. In-vivo pharmacodynamics study confirmed that vanillic acid has an antioxidant, anti-inflammatory and cardio-protective effects. Thus, the solubility and hence the bioavailability of vanillic acid [illegible] successfully increased when

Supervisors

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RSPT2.14: Nano-Vesicles as Drug Delivery System for Topical Application

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ABSTRACT

The topical route of administration is a means of applying drugs on the skin and spreading to the skin layer by diffusion. It is considered to be the most suitable way for patients to self-administer, convenient and easy to use, but one of its disadvantages is that most drugs have high molecular weight and poorly fat-soluble, such as Miconazole Nitrate, which is a powerful antifungal drug for the treatment of fungal infections of the skin and eye cornea, in the BCS category 2 (biopharmaceutical classification system), which means it has low solubility and high permeability, so it will not be absorbed by the skin or mucous membranes. Therefore, to solve this problem, the drug is added to the nanovesicle as a carrier to enhance its permeability and solubility, such as Spanlastics, which is a new type of drug delivery system, a highly deformable and elastic carrier, in which the drug is retained in the inner phase as a phospholipid bilayer by ethanol injection method in which different formulas of the spanlastics were prepared by varying the type of surfactant (edge activator, EA) and ration of span 60 to EA and the best formula was TRN3 which have size of 120 dnm, PDI of 0.2,zetapotential of 18,6 mv and entrapment efficiency of 67,4%.It undergo physicochemical characterization and the size agreed with DLS and DSC and IR showed that there is no interaction in elevated temperature and room temperature respectively and finally we make it in gel dosage form and undergo ex-vivo and skin deposition test the amount of the drug gel that permeate the skin around 10% and 90% of drug gel was retained into the skin, while spanlastics gel permeate the skin around 1% and 99% of spanlastics gel was retained into the skin.

Key words: topical route, skin layers, nanovesicles, Transferosomes, Spanlastics, edge activator, Miconazole Nitrate, biopharmaceutical classification system, ethanol injection method, PDI, DSC, IR, gel, ex vivo release, skin deposition.

Supervisors

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RSPT2.15: Lipid Based Nanostructures for Promoting Hair Growth




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Pharmaceutics

ABSTRACT

Transdermal route administration is the direct application of a drug to the skin surface, reaching the systemic circulation at a controlled rate. Topical route is used to treat superfacial more over the topical route is the very effective method to promote the hair growth. There are many drugs used to promote hair growth and the golden standard is minoxidil, but the minoxidil has many side effects. Therefore, we searched for alternative drug and we found the Rosuvastatin in recently published paper is used for promoting hair growth, but also rosuvastatin has high molecular weight; thereby, being poorly lipid-soluble leading to very poor absorption through layers of skin or mucous membranes and low rate of permeation of drug through layers of skin and this is the common challenge because the layers of skin make it an extremely hydrophobic network of differentiated non-nucleated keratin-filled cells and coenocytes enclosed into the lipid domain. Many nanoparticles have been used to deliver the drugs to the hair at various parts of the hair such as (Niosomes, liposomes, ethosomes). So, we chose the squarticles as nanoparticles to deliver the drug because it composed of squalane and fatty esters that increase uptake of drug into the hair follicles. We prepared rang from squarticles, and we make various concentration of pluronic F 68 (3.5%) and ratio of fat that prepared from it squarticles and we found than the optimal formula was number 6 due to its size is 274.4 d.nm, zeta potential is -27.3 mv, PDI is 0.284 and entrapment efficiency 90.83 %. finally it is performed in vivo study and gave us the best result for hair growth of the animal after seven days.

Supervisors

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RSPT2.16: Utilization of Nanotechnology for Pulmonary Drug Delivery

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Pharmaceutics

ABSTRACT

Acute respiratory distress syndrome (ARDS) accounts for more than 50% of the disease pneumonia related fatalities such as Covid-19 and viral pneumonia and one of its implications is rise of anti-inflammatory markers. Dexamethasone & Ciclesonide are promising corticosteroid drugs that act by reducing such inflammatory markers and regaining the alveolar shapes. In this study our aim is efficient drug delivery of Dexamethasone & Ciclesonide to the lung via pulmonary drug delivery by using nano diamond as a carrier for efficient targeting to enhance the drug's efficacy in the deep lung. Either Ciclesonide or dexamethasone loaded nanodiamonds were prepared and characterized for different in-vitro aspects (particle size & zeta potential transmission electron microscope, lung disposition, infra-red spectroscopy and in vitro drug release). Ex-vivo cell uptake and cytotoxicity were also evaluated as well as in vivo studies. The drug has been loaded successfully on the NDs, the particle size of the formulation was within the nano range to be introduced through the oral cavity. The cascade impactor distribution show that the amount of deposition at stage 5 and 6 gathered together for Dexamethasone was 54.37 % and for Ciclesonide was 54.43% which is the majority of emitted dose and the highest proportion and this representing the peripheral region including alveoli. The prepared formula did not show any cell toxicities and retained the A549 lung cancer cell line viability. Thus, it can be concluded that Dexamethasone or Ciclesonide loaded NDs is a successful formulation in delivery and targeting of Dexamethasone or Ciclesonide to the alveoli.

Keywords: Dexamethasone, Ciclesonide, Nanodiamonds, Pulmonary drug delivery, Cocrticosteroids.

Supervisors

Prof. Dr. Hanan Ellaithy & Dr. Nihal/ TA. Heidi Ayman & TA. Nada Hossam

RSPT2.17: A Mixed Micellar Formulation for the Otic Delivery of an Antifungal Drug

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ABSTRACT

Voriconazole is a broad-spectrum antifungal medication that is effective against a wide range of molds and yeasts including Aspergillus species considered as the main cause of otomycosis. Owing to the numerous drawbacks associated with the systemic administration of voriconazole, a mixed micellar system has been chosen to deliver voriconazole topically that was proven to be more efficient than single surfactant micellar systems. In the current study, voriconazole in polymeric mixed micellar systems (PMMs) with different configurations and optimized critical factors affecting the formulations' quality and their corresponding levels. PMMS were prepared using the evaporation method. Since all formulations revealed narrow distribution of a nano size range (from 16.88 to 44.23 nm), low polydispersity index PDI, representing good dispersibility, and zeta potential values, M6 consisting of Pluronic P123 and Pluronic F127 of ratio 6:1 and ratio 40:1 of the total Pluronic to the drug was selected as the optimized formula due to its high micellar incorporation efficiency of 95.28% (± 1-3). Transmission electron microscopy (TEM) revealed that M6 was spherical in shape and had enhanced dispersibility. M6 was incorporated in an in-situ gelling system by group RSPT 2.18, releasing almost 100% of the drug after 24 hours confirming a sustained release behavior profile of the Micellar Gel novel system. The proposed formulation showed a great potential of high promising efficacy of voriconazole in the topical delivery of antifungals to the otic region.

Supervisors

Dr. Omar El-Kady/ TA. Lojaine Hesham

RSPT2.18: Preparation and Characterization of Micellar-Based In-Situ Gelling System for Otic Delivery of an Anti-Fungal Drug




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ABSTRACT

THE AIM of this study is to improve voriconazole's antifungal impact by using a micellar-based in-situ gelling method for otic drug delivery. THE OBJECTIVE of this study is to find a way to reduce the side effects of taking voriconazole orally to treat otomycosis. Otomycosis is a disease with a wide frequency and a number of dangerous consequences. Voriconazole is a triazole antifungal medication with a mechanism of action and selectivity that makes it a first-line treatment for fungal infections. However, systemic voriconazole (oral, IV, or IM) has serious side effects and poor pharmacokinetics. The therapeutic method chosen is topical administration. However, the method of treating it with voriconazole is full of challenges, namely earwax, which is solved by the development of a micellar based in situ gelling system that is thermosensitive to body temperature. Voriconazole was dissolved in isotonic phosphate buffer saline with diverse concentrations of Pluronic F-127 which are blended with Pluronic F-108 and kept within the fridge at 4 °C. Then, the formulated preparation is tested for assurance of the characterizations quality of the in-situ gelling system. In vitro evaluation of the prepared voriconazole in situ gel system through examining and evaluating the formulation physical characterization through visual inspection for their color and clarity, black and white backgrounds were utilized for clarity assessment, the content uniformity through using UV–Visible spectrophotometer and pH determination by putting the electrode of a pH meter against the formulation's surface and the effect of storage after the in vitro studies. The drug release is tested as in vitro release study by adding formulation into a dialysis bag then tested as ex vivo study by extirpating ear skin from albino rabbits. Results shows that Pluronic F127 hydrogel with 20 %w/v concentration was selected among other different formulations, Gelation time could also be affected by structure of Pluronic and different gelation temperature for Pluronic F-127 and Pluronic F-108.

Supervisors

Assoc. Prof Abdulaziz Mohsen / TA. Lojaine

Pharmacognosy

RSPG2.1: Exploring the imunostimulant activity of selected nuts in relation to their metabolite profile

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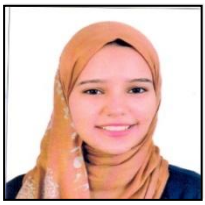

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Pharmacognosy

ABSTRACT

Immune system is the potent army that defends our body against various infections and diseases through innate and adaptive immunity. Herbal medicine is one of the essential sources for enhancing immunity because of their affordability, availability and people preference. Hazelnut, Walnut, almond and peanut are from the most widespread edible nuts that are rich in fats, fibers, vitamins, proteins and minerals. Our aim is to determine the shells and edible nut in vitro immunostimulant activity as well as metabolomics profiling of the four nut extracts. 500 grams of each of nuts and shells were powdered then defatted and extracted by using n-hexane and ethanol (95%). For nuts, total phenolic were found to be in Peanut Almond, Hazelnut and Walnut of 13.4538, 17.8237, 9.7978, and 17.6237 respectively and for shells, 240.0753, 21.4559, 159.6989, and 328.0860 respectively. The antioxidant activity of their shells and nuts was measured by: DPPH and ABTS assays through measuring inhibition percentage as well as FRAP by measuring absorbance which have been indicated the significant antioxidant capability especially walnut peanut shells. The toxicity of each of nuts' and shells' extracts has been assessed though MTT viability test which indicate their high cell viable effect on the differentiated THP-1. Addition of extracts to LPS-induced macrophages with each of these extracts especially peanut and walnut shells have decreased AP-1 and in turn decrease TNF-α, IL-8 as well as NF-κB contributed to reduction of iNOS and COX-2. UPLC-MS metabolic profiling of the four nuts shells and nuts have been done detecting around 128 metabolite.

Supervisors

Dr. Shahira Ezzat / Dr. Mohamed Abdallah

RSPG2.2: Wound healing activities and metabolic profiling of certain plants belonging to family Asteraceae

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ABSTRACT

Wound is an interruption in the skin integrity due to a disease or a physical trauma. If it is not treated in a proper way, it could lead to severe and serious complications. Herbal medicines used in treating wounds are preferred more than conventional medicines; as they are more affordable, have minor side effects and easy to obtain. According to several previous studies, *Calendula officinalis* L., *Carthamustinctorius*L. (Safflower) and *Ambrosia maritima*L. Plants which belong to family Asteraceae were proved to have anti-inflammatory, antioxidant and other biological effects. Our study aims to determine and evaluate the wound healing activity of the ethanolic extracts of the aerial parts of the three plants in vivo. In addition to conducting metabolomic analysis of the extracts of the three plants. Metabolomics analysis was performed on the three plants using ultra-performance liquid chromatography coupled with mass spectrometry. An in vivo experiment was conducted on rats to investigate the effects of *Carthamus*and Ambrosia on wounds using different doses and wounds' diameters were measured every day. The results obtained showed the following; the extraction of the three plants yield 14.5% g/w, the metabolomics analysis showed that the major constituents in three plants are (±)9-HODE and tuberosideA (Ullucustuberosus) in Calendula, chrysoeriol6-C-arabinopyranoside-8-C-glucoside and 2',6'-Dihydroxy-4'-methoxy-3'-(2-hydroxybenzyl) dihydrochalcone in *Carthamus*and quercetin 3-apiosyl-(1->2)-glucoside, fisetin4'-methyl ether and (9S,13S)-15,16-dihydro-12-oxo-10-phytoenoic acid in *Ambrosia*. On the other hand, the in vivo study showed significant healing effects of both of Carthamusand Ambrosia on wounds.

Supervisors

Dr.Shahira Ezzat/ Dr. Mohamed Abdallah

RSPG2.3: Waste products of Citrus aurantium; a source of beneficial nutraceuticals

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Pharmacognosy

ABSTRACT

Citrus genus has significant values. The major species of our interest are *Citrus aurantium*. Phytochemical investigation includes GC/MS of oil and showed that the highest linalool formateand D-limonene are present with the highest percentage. Flavonoids and phenols qualitative determination was done via HPLC /UV and highest amount was detected for quercitinand myricetin. Vitamin C was determined spectrophotometrically. For the biological analysis, firstly the antioxidant activity was estimated using different assays which are DPPH, ABTS, and FRAP and the three showed that ethanolicextract has antioxidant activity higher than volatile oil. Wound healing was done using cell culture (human skin fibroblast cell line). Enzyme activity also was investigated.

Supervisors

Dr. Soumaya Saad/ LA. Ibrahim Ezz

RSPG2.4: Anti- skin aging effect of *Carissa carandas*

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Pharmacognosy

ABSTRACT

The degradation of extracellular matrix in the skin has been connected to skin aging and has been linked to an increase in the activity of skin-aging enzymes such as hyaluronidase, elastase, and collagenase. This study involved phytochemical and biological study of *C. carandas* for its potential on skin ageing. Phenolic and flavonoid is estimated by using Folin-Ciocalteaureagent and aluminum chloride assay, respectively. Phenolic content showed concentration of 10 mg/g while flavonoid showed concentration of 1 mg/g. Vitamins were also investigated spectrophotometrically where *C. carandas* showed high concentration of Vitamin A (24.03 IU/kq) and vitamin C (16.52 mg/100g mg/kg). Mineral content was also assessed spectrophotometrically revealing the presence of magnesium, copper and zinc which are powerful antioxidant. The hexane extract was analyzed for its lipoidal matter content using Gas chromatography/mass spectrometry (GC/MS) the unsaponified matter, representing 94.43% where the major identified hydrocarbon was tritriacontane (54.21%) followed by untriacontane (19.64%), while the saponified matter represent 63.91% where the Percentage of saturated fatty acid was 8.21 % and the Percentage of unsaturated fatty acid was 27.66 %. The major identified unsaturated fatty acid was methyl lineolate (15.35%).Radical scavenging activity was estimated using (DPPH) which IC50 = 81.55 µg/mL, While FRAP assay of *C.carandus* showed a ferric reducing ability 290.8095 ± 25.0204 µM TE/mg, and ABTS assay showed the interactivity of antioxidant samples in the presence of peroxides as 388.1497+-24.42 µM. *C.carandas* had the highest tyrosinase inhibitory activity (IC50=180.4 ± 5.09), the highest inhibition activity (IC50 = 44.5± 2.17), and the strongest inhibition activity of the collagenase enzyme (IC50= 252.66± 2.51).This showed the promising effect of *C.carandas* on skin ageing process.

Supervisors

Dr. Riham Omar/ TA. Sohila Mahmoud

RSPG2.5: Dermocosmetic effect of *Ziziphus spina-christi*

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ABSTRACT

Aging is an unavoidable fate that afflicts all life, during this process in mammals reactive oxygen species (ROS) are generated which stimulate tyrosinase, elastase and collagenase activities that actively participate in skin aging.Natural products of skincare play an important role in the skin texture, appearance, and tone. *Ziziphus spina christi* was declared in the Ebers papyrus as a remedy for all ailments. It was traditionally used in the treatment of headache, bone pain, diarrhea, and eye infection. The aim of this study is to demonstrate the possible use of *Z.spina-christi* in skin care. Hexane extract was analyzed for its lipid content using gas chromatography/mass spectrometry (GC/MS) revealing the identification of palmitic acid as the major saturated fatty acid, oleic acid(30.61%) as the major unsaturated fatty acid and squalene (51%) as the major hydrocarbon. . Methanolic extract was analyzed for its phenolic content usingfolin-ciocalteu colorimetric assay while flavonoid content was analyzed using aluminium chloride colorimetric assay showing a concentration of 0.1 mg /g and 2mg/g respectively.Besides,minerals estimation show that calcium,selenium,iron and zinc content were 1.812,8.096,577.296 and 17.478 respectively byacid digestion method.For determination of the possible antiageing effect, antioxidant potential of *Z. spina-christi* methanolic extract was determined using three methods 1,1 – diphenyl-2-picrylhydrazyl radical (DPPH), Ferric Reducing/Antioxidant Power (FRAP), and 2,2'-azino-bis(3-ethylbenzothiazoline-6- sulfonic acid (ABTS). Where the IC50 was found to be 189.4 µg/ml while. FRAP assay showed a value of 303.49 ± 18.87 µM TE/mg, furthermore ATBS value was 279.39 +- 9.17 µM TE/mg. The inhibitory activity of *Z.spina-christi* methanolic extract against ageing enzymes tyrosinase, elastase, and collagenase showed a percentage inhibition of 81.73± 1.10, 88.20 ± 1.36, and 81.61± 1.37 respectively compared with 77.52 ± 0.83, 91.52 ± 4.63, and 78.82± 2.63 as positive control. . Therefore, our project demonstrated the potential role of *Zizyphus spina-christi* in skincare and justified its use in cosmetics.

Supervisors

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RSPG2.6: Melon by-products and their biopotential




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Pharmacognosy

ABSTRACT

Wastes of edible fruits represent a wealth with their phytoconstituents, They can be used in dietary supplements and skin care. In this project, Cucumis melo var.cantalopensis (Cucurbitaceae) was investigated for its phytoconstituents in correlation to the antioxidant and anti-aging effects The Wastes of c.melo var.cantalopensis (seeds and peels) were extracted with hexane to be analyzed for its fatty acids, sterols and hydrocarbons using Gas chromatography/mass spectroscopy (GC/MS). The main unsaturated fatty acid was methyl linoleate while the main saturated fatty acid was methyl palmitate, furthermore, the predominant hydrocarbon was octacosane. Vitamin content estimation revealed a high level of vitamins C and A in peels which were 16.52 and 24.03 mg/g respectively. Both peel and seed have a high level of minerals hence peel is rich in Ca, Mg and Fe and their amounts were 0.823, 0.432 and 192.873 mg/g, respectively on the other hand seed are rich in Se, Cu and Zn which their amounts were 4.410, 11.079 and 40.902 mg/g respectively. Phenolic content was estimated with Folin–Ciocalteu method and its value was 11.1mg/g while flavonoid content was 6. 5 mg/g. Anti-oxidant activity was tested using three assays which were DPPH, FRAP and ABTS. In DPPH free radical scavenging activity, extracts of C.melo showed that percentage inhibition of the methanolic extract of peel is 5.63 +/- 0.07 and seed is 11.68 +/- 1.20, in FRAP, results of peels and seeds ranges were 151.7 +/- 15.8 and 44.81+/- 6.44 microM TE/mg extract, respectively and in ABTS the range of values of peel was 160.94 +/- 12.85 and for seed was 19.63 +/- 2.71 micromolar TE/mg extract. C.melo represented a promising candidate in pharmaceutical skin care market.

Supervisors

Dr. Riham Omar/TA. Omneya M.Ayman

RSPG2.7: Evaluation of proteolytic activity of certain plants belonging to family Apiaceae

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ABSTRACT

Cellulite is a cosmetic problem which is more common in women as it affects about 85% of them, giving the skin orange-peel appearance. It is caused by a complex mechanism as it involves increase in the adipogenicity and problems in the microcirculatory system and lymphatics. The aim of the study is to evaluate the proteolytic activity of herbal extract for the treatment or management of cellulite. The extracts of the seeds of Ammi majus, Ammi visnaga, Anethum graveolens, Apium graveolens and Carum carvi were assessed for their phenolic and flavonoid contents, antioxidant activities by three different methods namely; DPPH, ABTS and FRAP. The lipolytic, pancreatic lipase, lipid (Oil red O), proteolytic and pro-collagen 1C peptide activities were also evaluated. The obtain results showed that A. visnaga has the highest total phenolic content (75.18 mg/g), while, Apium graveolens showed the highest flavonoid content (45.10 mg/g), A. majus has highest antioxidant activity using the ABTS assay with IC50 (48.33 ug/mL), Apium graveolens when evaluated DPPH showed the highest anti-oxidant activity IC50 (136.2 ug/mL), A. visnaga has the highest reducing power with (267.537 µM TE/mg extract) when evaluated with FRAP method, Anethum graveolens showed the highest inhibition percentage (37.11%) in proteolytic activity assay, C.carvi has the lowest inhibition percentage in pancreatic lipase assay with (30.92%) respectively. A. graveolens showed the least amount of oil red O staining with (0.492 OD). A.visnaga showed highest result in procollagen I C-peptide assay with (185.6 ng/ml). Apium graveolens showed the highest amount of glycerol (5.073 nmol/well) in the lipolysis assay. In conclusion, all the selected plants have potential anti-cellulite activity.

Supervisors

Dr. Mahitab Helmy / A.L. Nada Ali

RSPG2.8: Evaluation of the anti-adipogenic activity of certain plants belonging to family Apiaceae

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Pharmacognosy

ABSTRACT

Cellulite remains a question of cosmetic concern for most of post-pubertal females around the world. The aim of this study is to prepare herbal extracts from the seeds of certain plants; Coriandrum sativum, Petroselium sativum, Pimpinella anisum, and Foeniculum vulgare and evaluate their anti- adipogenic activity. Different chromatographic and spectroscopic techniques were applied to profile the metabolites present in those extracts and in vitro antioxidant assays like ABTS, FRAP and DPPH assays. While using many assays like procollagen, lipolysis, proteolytic activity, pancreatic lipase, and oil red stain assays we can identify which of the studied plants extracts that exhibit the best anti-adipogenic activity. Upon analysis P. sativum gave the higher number of flavonoids which is 18.6 µg/ml and C.sativum gave the higher amount of phenolics which is 42 µg/ml. The LC-MS-MS profiling of P.sativum extract showed best lipolytic activity, revealed the presence of three major compounds that are responsible for the activity which are Chrysoeriol 6-C-arabinopyranoside-8-C-glucoside, Kaempferol 3-(3"-acetyl-alpha-L-arabinofuranoside)-7-rhamnoside and 8-Hydroxygalangin, F.vulgare extract showed best antioxidant activity when analyzed by ABTS assay as it showed IC50 value of (64.64 ± 1.044 µg/ml), P.anisum gave best results in FRAP assay with mean (181.3056±11.4689 µM TE/mg), F.vulgare gave best results with DPPH assay with IC50 (133.5 ± 1.032 µg/ml), C.sativum gave best results with oil red staining assay, P.anisum gave the best results with lipolysis assay with activity 2.6 nmol/well , C.sativum is the best with pancreatic lipase assay with 2.8 nmol/well, C.sativum is the best with procollagen assay with 190.9 ng/ml and C. sativum is best in Proteolytic activity with 44.2%. Results suggest that C. sativum, P.sativum, P.anisum, and F.vulgare may exhibit anti-adepogenic activity.

Supervisors

Dr. Mahitab Helmy/ A.L. Nada Ali

RSPG2.9: The Metabolomic Profile of Origanum and Ocimum Species and Their Effect as Anti-diabetic Agents on Male Rats




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Pharmacognosy

ABSTRACT

Diabetes is a problem in glucose metabolism which results in increased blood glucose level. High glucose blood levels maybe because of low insulin production or decreased cell sensitivity toward insulin. Plants are used as a source to alternative medicine along with the traditional treatment of diabetes. The aim of this study is to reveal the effect of Origanum majorana and Ocimum citriodorum aerial parts as antidiabetic agents and how they act upon the genetic changes that occur to diabetic patient. Also, correlating the antidiabetic activity to the metabolomic profile of the two plants. Ethanolic extracts of both studied plants were separately profiled via HPLC-MS-MS analyses and screened for their antidiabetic activities through Invivo STZ-induced diabetic rats model combined with glibenclamide. The chromatographic analysis revealed the presence of carveol glucoside mainly in O. citriodorum and epigallocatechin, kaempferol 3-rungioside, and 5,7,3 trihroxy-2',4',5'trimethoxyflavone in O. majorana. The results of the biochemical investigations proved that both plants show antidiabetic potentials. On the genetic level, both of them increased the expression of Glycogen Synthase Kinase -3β (GSK-3 β), protein kinase-B (Akt) and Phophoinositol-3 kinase (Pl3K) at high doses. In conclusion, both studied species were found to possess a significant antidiabetic activity especially when combined to conventional antidiabetic drugs as glibenclamide, which promotes their employment as adjuvant antidiabetic therapy

Supervisors

Dr. Shahira & Dr. Mahitab / T.A. Sohila

RSPG2.10: Formulation and Evaluation of Nanocarriers Cream from Prunus persica Leaves Extract for Skin Care

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Pharmacognosy

ABSTRACT

Prunus persica (L.) leaves are by-products, rich in high polyphenol content that exhibit antioxidant activity. PPEE's chemical investigation revealed significantly high total flavonoids & phenolic content with antioxidant activities (DPPH, ABTS, and β-carotene assays) & also LC/MS/MS analysis was done leading to identification of 12 compounds. The in-vitro cytotoxicity studies were done against a human keratinocytes cell line showed the non-toxicity. In addition, PPEE and PPEE-SLNs revealed good anti-elastase activity when compared to that of N-(Methoxysuccinyl)-Ala-Ala-Pro-Val-chloromethyl ketone. Also, PPEESLNs revealed significantly higher anti-tyrosinase & anti-collagenase activities compared to EDTA and kojic acid, respectively. Different PPEE-SLNs cream formulae were assessed for promising anti-wrinkle activity against UV-induced photoaging in a mouse model & showed a significant UV-protection. Thus, the current study proves that Prunus persica leaf by-products give a valuable resource for natural cosmetic constituents.

Supervisors

Dr. Eman Sherien / A.L. Heba Ahmed

RSPG2.11: Effect of baking of *Nigella Sativa* seeds on its metabolite profile and immunostimulant activity.




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Pharmacognosy

ABSTRACT

The immune system is a complex system, and its role is to protect humans from pathogenic microbes. Actually, weakness of the immune system is a keyword for many diseases as common cold and flu, and coronavirus. Herbal medicines have been used as immunostimulant for centuries as they are more affordable and have fewer side effects. Nigella sativa L. is one of the most common herbs used worldwide. N. sativa seeds (NS) is an annual flowering plant rom the Ranunculaceae family. NS is considered a miracle herb as it has many uses in therapeutic medicine. the objective of our study is to evaluate the effect of baking on the immunostimulant activity of the different extracts of Nigella sativa. The dried and baked Nigella seeds were powdered and extracted with 3:1 methanol: water, then the filtered were extracted with 3:1 methylene chloride: water. The extract of each powder was evaporated to yield N1: 13.1 gm, N2: 64.6 gm, N3: 6.8 gm, and N4: 555 gm of the four extracts, respectively. Total phenolic content was found to be 30.1634, 6.5290, 25.7290, and 6.4242 mg / g extract gallic acid equivalent, respectively. Total flavonoids content was found to be 6.9348, 7.0475, and 20.600 mg / g extract. The toxicity of the four extracts, on the differentiated THP-1 macrophage was assessed using the MTT viability assay. Moreover, the inflammation-related immune responses in LPSinduced THP-1 macrophage activation were evaluated. The effects of the four Nigella extracts, on the production of TNF-α, IL-1β, IL-6 and IL-8 in THP-1 cells stimulated by LPS were determined by ELISA test to evaluate the anti-inflammatory activities. Treatment of THP-1 cells by N1, N2, N3, and N4 resulted in a significant reduction of the TNF-α (146.3, 180.5, 142.8, 94.75 Pg/ml), IL-1β (67.17, 84.9, 129.1, 179.8 Pg/ml), IL-6 (198.5, 260.5, 160.4, 347 Pg/ml) and IL-8 levels (326.6, 382.3, 202, 156.6 Pg/ml).

Supervisors

Dr. Shahira & Dr. Mohamed/ A.L. Salma

RSPG2.12: Metabolomics analysis of green and black tea extracts in relation to their wound healing potential

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Pharmacognosy

ABSTRACT

Wound healing is a highly significant process, where the body tries to restore the integrity of the skin that was damaged via an injury and it occurs via 4 essential stages which are hemostasis, inflammatory, proliferative and remodeling stages. Our aim is to compare the metabolite profile of black and green tea extracts in relation to their in vivo wound healing potential. Worldwide, the most used beverage next to water is tea, chiefly Camellia sinensis (L.) Kuntze due to its beneficial effects in health, aroma, reasonable sensory capability and taste. In addition, green and black tea are the most abundant types of tea. Black tea comprises flavonoid glycosides, thearubigins, catechins, theaflavins and flavonoids. Green tea encompasses more than hundreds of bioactive constituents. The utmost identified ones are polyphenolic compounds, catechins and flavonoids. It also comprises amino acids, theophylline and caffeine. To achieve our aim, Camellia sinesis leaves were collected, dried, powdered and prepared as an aqueous extract, where 500 grams of each tea was boiled with distilled water and then filtration was held. Lyophilization was carried out to the sample. The two extracts will be subjected to in vivo evaluation of their wound healing activities in rats. Additionally, we used UPLC-MS for analysis of both black tea and green tea constituents where caffeine was the major constituent found. As a result we use green, black tea and caffeine 50 and 100 mg/kg dose for in vivo wound healing study which illustrated significant improvement in the wound healing in the group treated with 100 mg/kg caffeine, compared to the control. In conclusion, it is most recommended to use the caffeine dose 100 in improving the healing of the wound.

Supervisors

Dr. Shahira & Dr. Mohamed/ A.L. Salma

Pharmacology

RSPHO2.1: Assessment of wound healing in diabetic rats treated with local Nano-tetracycline

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ABSTRACT

Diabetes is a highly serious illness that affects people all around the world. Type 1 and type 2 are the two major types. Diabetes Mellitus can lead to a variety of problems, including foot ulcers and delayed wound healing. The wound healing process is divided into four stages: hemostasis, inflammation, proliferation, and remodeling. Unfortunately, diabetes causes an imbalance in those stages, causing the wound healing process to be delayed. The goal of this study is to see how Nano-tetracycline affects wound healing in diabetic rats in order to speed up or improve wound healing. We employed Nano Tetracycline, a broad-spectrum antibiotic in the form of a high-capacity targeting method, to treat wounds and observe the wound healing process. In the experiment, 18 rats weighing 50-100 grammes were divided into three groups, each with six rats. (I) diabetic control group, (II) diabetic rats getting 0.1 ml of the standard solution which was applied that consist of 6.4 mg of tetracycline and diluted with 10 ml of sterile saline. (III) diabetic rats receiving a preparation of Nano-Tetracycline layer with a concentration equal to standard solution. Streptozotocin was administered intraperitoneally into rats at a dosage of 55 mg/kg. Rats were fasted overnight, and a blood glucose test was performed 72 hours later to establish hypoglycemia. After that, hair was shaved, and wounds were created with a biopsy punch. The rate of wound closure was assessed by Image J, as well as inflammatory parameters such as IL-1beta, TGF, MMP9, TNF-alpha, angiogenesis markers such as VEGF, IL-10 as anti-inflammatory markers, in addition to histopathological examination of wound tissue. In comparison to the control group, standard tetracycline had a favorable effect on wound closure, however Nano-Tetracycline showed more significant improvement in wound healing when compared to the diabetic control group and the group treated with standard tetracycline. The use of standard tetracycline decreased the elevated parameters and restored the changed histopathological features while use of Nano-Tetracycline showed more significant difference when compared to diabetic control group or the group treated with standard tetracycline. Nano tetracycline showed promising results that might be useful in treatment of diabetic complications such foot ulcers.

Supervisors

Prof. Dr. Amany Elbrairy, AL. Maha Shouman

RSPHO2.2: Testing Apigenin against LPS induced Alzheimer in rats

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PHARMACOLOGY

ABSTRACT

Alzheimer's disease (AD) is a chronic neurodegenerative disease characterized by intracellular neurofibrillary tangles and extracellular senile plaques that represent the pathological hallmarks of AD in the brain that led to neuronal dysfunction and loss. It was found that Lipopolysaccharides (LPS) which are components of Gram-negative bacteria main cell wall, also known as endotoxins, could induce memory impairment in rats, by inducing inflammation that causes Alzheimer's disease by an inflammatory stimulus that produces pro-inflammatory cytokines which activate both neuroimmune and neuroendocrine system. While Apigenin can work as an antioxidant, anti- inflammatory, anti-cancer, and anti-mutagenic. There is a hypothesis stating that apigenin improves memory retention of lipopolysaccharide-induced Alzheimer's disease in rats as it lowers the concentration of insoluble Aβ, improves learning and memory functions, promotes the protection of neurovascular by reducing oxidative damage, protects the blood-brain barrier integrity, and improves the cholinergic transmission. This research aims to test the effects of apigenin on rats with LPS-induced Alzheimer's disease and compare it with apigenin+omega3 as omega3 has antioxidant properties that can enhance the effect of Apigenin , and also compared with the results of donepezil a standard drug already being used for treating Alzheimer's disease by inhibiting the AChE enzyme. The study is done on 30 rats divided into six groups of 5 each All groups were injected I.P with LPS for 7 days, except the first group (control group) which received only saline. The treatment was introduced to the animals according to the following criteria: group 3 received 40mg/kg of apigenin orally, group 4 received 40mg/kg apigenin with 250mg/kg omega 3 orally, and group 5 received 10 mg/kg donepezil orally as a standard. The neuroprotective effects of apigenin were evaluated by measuring oxidative stress parameters (SOD and MDA), inflammatory mediators (TNF-α, and IL-10) and amyloid beta, as well as neuronal histopathological, immunohistochemistry manifestations and Novel object recognition test. Results showed that the pre-treatment with apigenin, apigenin+omega3 combination and donepezil exhibited significant prevention against LPS induced Alzheimer. They caused significant ($P \leq 0.05$) minimization in neuronal damage. They caused significant ($P \leq 0.05$) increase in SOD and IL-10 with significant reduction ($P \leq 0.05$) in TNF-α, MDA levels and amyloid beta, when compared to the LPS group. In conclusion, api… was found to have noticeable neuroprotective and anti- inflammatory … reverse the effect of LPS.

Supervisors

Dr. Ahmed Fayez, TA. Nyera Hamdy

RSPHO2.3: Effect of Long-Acting Tetracycline Sheets Preparation in Wound Healing in Rats

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PHARMACOLOGY

ABSTRACT

Wound healing is a critical process that can help save many lives, as it can lead to critical life-threatening problems if not done right. It costs billions of dollars every year to manage wounds worldwide, in fact, the USA alone spends an average of 50 billion dollars annually on wounds alone. Complications can occur if the wound is not treated right, and these complications include delayed healing, which can lead to a chronic wound. Poor healing, which might happen to patients with uncontrolled diabetes mellitus, and lastly, uncontrolled healing, which leads to the formation of excessive scars. The process of wound healing is a dynamic and complex one that involves 4 distinct and overlapping phases, as well as specialized cells such as fibroblasts, macrophages, and platelets, epithelial and endothelial cells. The first phase in the process of wound healing is the inflammatory phase, which happens right after an injury occurs. When the inflammation subsides, it's followed by the proliferative phase and wound healing angiogenesis. When a normal blood supply is reestablished, providing a favorable microenvironment for epidermal and dermal cell migration and proliferation, the matrix remodeling and scar formation phase start. Topical Tetracyclines help enhance wound healing, however new long-acting nano-particles sheets with tetracycline preparation are expected to promote wound healing. In this paper, the objective is to evaluate this new preparation. The wound was be induced by biopsy punch; each rat had 2 wounds on its back. 3 groups of rats were used. The whole process took 11 days. Parameters used for this experiment are VGEF, TNF- α, Il-10, IL-1B, MPP-9, TGF-β and histopathological examination.

Supervisors

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RSPHO2.4: The pharmacological study of tetracycline uses in an infected diabetic wound healing in rat model

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ABSTRACT

Since the skin is the part of the human body that encounters the world most directly, it is particularly vulnerable to injury. When injuries take place, the skin will lose its function and its integrity, which may result in a life-threatening situation. Wounds may occur due to various causes that affect the wound healing normal physiological process which consists of four main stages: homeostasis, inflammation, proliferation and tissue remodelling. However; patients with diabetes mellitus (DM) suffer from wound healing impairment. DM has many drawbacks which influence the four stages of the healing process causing a delay in the healing, or proceeding to chronic wounds. Moreover, wounds may get infected due to bacterial colonization; thus antibiotics are used to defend the body against the bacterial infections such as tetracycline. Diabetic rat models with excisional wounding inoculated with staphylococcus aureus bacteria are used in the experiment, divided into 3 groups: control, standard tetracycline (suspension) and Sobulous patch containing tetracycline groups. Rats are then sacrificed to be tested physiologically and histologically in order to determine the difference between pharmacological effects of the market available tetracycline and the novel dosage form in the healing process and its effect on the collagen regeneration. The biochemical markers TNF-α, IL-1B, IL-10 are measured using ELIZA, while the MMP-9 is measured through PCR. The results are promising as the tetracycline decreases the pro-inflammatory mediators and improve the anti-inflammatory mediators resulting in improved re-epithelization, granulation tissue formation, and accelerated wound closure. The aim of the study is to establish a wound healing model with a novel dosage form to increase the available market options for the targeted patients.

Supervisors

Dr. Sameh Shaaban, AL. Nada Ezz

RSPHO2.5: Pharmacological and Toxicological Study of Silver Nanoparticles on Liver Dysfunction using Rats

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PHARMACOLOGY

ABSTRACT

The liver is the largest internal organ in the body that is essential for many functions like protein synthesis and blood clotting factors and another critical function like detoxifying substances, production of cholesterol and storing hormones. When the liver is exposed to certain substance like alcohol, chemicals or drugs like N-acetyl cysteine it may cause hepatotoxicity. It is known as inflammation to the liver caused by narcotics. One of these drugs is acetaminophen (APAP) which will be used as an induced drug. Acetaminophen (APAP) is an analgesic drug by blocking COX-3. Acetaminophen is contraindicated with patients with liver problems as it has a hepatotoxic effect may lead to liver damage. To overcome this damage silver nanoparticle (AgNPs) may be used. Silver nanoparticles have unique cytotoxic, antimicrobial, and anti-inflammatory effects. The toxicity of silver nanoparticle (AgNPs) affected by concentration, size, and exposure time and environmental factors of silver nanoparticles (AgNPs). Aim of this study is demonstrating the protective effect of 2 different types of silver nanoparticles on liver and knows the pharmacological and toxicological action of it. Objectives of our study is discussing the mechanism of how can silver nanoparticle used as a protective in hepatotoxicity, reviewing assessments and documentation requirements of hepatotoxicity induced by APAP and silver nanoparticle, examination the cost and effective treatment strategies for management of hepatotoxicity and understanding mechanism of silver nanoparticle toxicity. The work plan is that 30 Wistar albino rats were used. Rats will be treated with two different sizes of silver nanoparticles (AgNPs) [(0-100nm) - (250-300nm)] at dose of 50 µg/kg p.o. and silymarin at dose of 50mg/kg once only p.o. after induction of acetaminophen at dose of 2 g/kg p.o. once only that by dividing rats into 5 groups each one contains 6 rats: group I normal, group II induction of APAP, group III &IV treatment with AgNPs. Parameters measured such as AST, ALT, LDH, MDA, and GSH. The group of APAP is highest level in ALT, AST, and LDH compare to other group and group of AgNPs Small is highest level in GSH compare to other and l group.

Supervisors

Dr. Sameh Shaaban, TA. Nyera Hamdy

RSPHO2.6: THE MANAGEMENT OF THE EXPERIMENTALLY-INDUCED PULMONARY TOXICITY IN MICE

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PHARMACOLOGY

ABSTRACT

Pulmonary diseases refer to several types of diseases that prevent the lungs from functioning well Pulmonary diseases are classified into obstructive lung diseases like bronchitis, asthma as well as chronic obstructive pulmonary disease and restrictive lung diseases like interstitial lung disease and fibrosis Lipopolysaccharide (was used to induce pulmonary toxicity in mice It induces a spectrum of biological effect which may be harmful to the host The toxicity of LPS are mediated by macrophages through tumor necrosis factor alpha (TNF α Vanillic acid can result in inhibition of oxidative stress, pro inflammatory cytokine production, and NF κB activation The purpose of the current study was evaluation of the protective effect of vanillic acid on LPS induced pulmonary toxicity in mice (Treatment with vanillic acid results in a significant protection of the lung tissue through its MAPK related inhibition of proinflammatory cytokine production In conclusion, vanillic acid can be a promising pulmonary protective agent against the variable inflammatory lung diseases

Supervisors

Dr. Mai Amin, TA. Mahmoud Ahmed

RSPHO2.7: Management of the experimentally-induced myocardial infarction in rats


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ABSTRACT

Myocardial Infarction is considered a pathologic diagnosis, which depends on the end result of either chronic or acute myocardial ischemia. The vast majority of myocardial infarction in people are from atherosclerosis & coronary artery disease. A myocardial infarction also is called a heart attack. Therefore, a myocardial infarction occurs when artery has extremely slow blood flow or while one of the heart's coronary arteries is blocked suddenly. Risk factors of myocardial infarction are two types, modifiable type, which includes smoking, obesity, hyperlipidemia, physical inactivity, hypertension, and diabetes mellitus. And non-modifiable type such as age, race, family history, and sex. Management of myocardial infarction depends on the severity and types that target to decrease the damage of myocardial infarction, also increase the coronary blood flow, non- pharmacological required lifestyle changes, healthy food and regular exercises in addition to pharmacological managements that depends on antiplatelet drugs, statins, beta-blockers, anticoagulation and analgesics. In case of severe cases of myocardial infarction surgical interventions, in addition to newer therapies. However, there is a method used for induction of MI by Isoprenaline in which its oxidation properties are thought to be a factor of causing myocardial damage. The aim of this study is reducing the extent of myocardial infarction. Moreover, it aims to investigate the possible cardioprotective effect of dihydromyricetin on the experimentally induced myocardial infarction in rats. Therefore, after the pretreatment with DHM, hearts of the rats showed fewer focal areas of degenerative changes and inflammatory infiltration in ECG analysis, and most of the myocardium showed intact histological structure. In brief, the DHM will show a significant decrease in the parameters as (CK-MB, MDA, IL-6 and TNF-α content) which upon their increase a degree of heart damage is indicated.

Supervisors

Dr. Mai Amin, AL. Reem Ali

RSPHO2.8: Pharmacological evaluation of new formulations for infected wound-healing processes in rats.

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ABSTRACT

Acute and chronic wounds are the two forms of wounds The acute wound passes through a complex series of events such as neovascularization cell division, synthesis of new extracellular matrix chemotaxis and formation of scar tissue The wound healing process involves four stages which are very complex hemostasis, inflammation, proliferation, and the last phase is remodeling wounds which do not heal in a timely and orderly manner are called chronic wounds Usually, pathological conditions can decrease the healing The goals of our research were to create a rat model of infected wounds, to assess the effect of the new dosage form on the infected wounds progression, to better understand the pathological mechanisms of wound healing, and to compare between the pharmacological effect of the new dosage form (new formula) and currently available drugs on the market (standard tetracycline) In this study, we used 12 male albino rats and the rats were divided into three groups with each rat receiving two infected excisional wounds the first group of rats was given saline, the second group was given standard marketed tetracycline, the third group was given the new tetracycline dosage form We made the two circular wounds 10 mm diameter) on each rat by a biopsy punch inoculated by suspension of bacteria The biochemical results revealed that new dosage form tetracycline showed a significance increase in mmp 9 TGF, and IL 10 concentrations and significance decrease in TNF and IL 1 B compared to untreated control group This means that the wound healing is increased markedly in dosage form than control group The new dosage form of tetracycline showed significance decrease in MMP 9 and increase in TGF and IL 10 than the standard groups This means that the new dosage form has better effect on TGF and IL 10 than standard and no difference between both in TNF and IL 1 B the histopathological results revealed that the treated groups with the new tetracycline dosage form showed marked increase in collagen at the wound area compared to the control group, the new tetracycline dosage form showed markedly increase in re epithelization, increased in granulation tissue formation, mild increase in the inflammation, and markedly increase in angiogenesis The immunohistochemistry VEGF results revealed that the new tetracycline dosage form exhibited marked increase in immune expression of VEGF at the wound area compared to control groups.

Supervisors

Dr. Doaa Aboulez, AL. Maha Alhadad

RSPHO2.9: Effect of Tetracycline on Tissue Proliferation in Infected Diabetic Rat Model

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ABSTRACT

Wound healing is a complex dynamic process supported by many cellular changes to coordinate the repairing of the damaged tissue to restore the skin integrity and uniformity maintaining its vital physiological functions. This process is classified into 4 stages which are regulated by multiple factors like growth factors, metalloproteinase enzymes, cytokines, and immune cells. Interfering the healing process by complications like diabetes mellitus and infections has shown impairments in the dynamic overlapping between these stages mainly sustaining the inflammation response and delaying the proliferation phase due to hypoxia, difference in the oxidative stress, increased extracellular matrix degradation and biofilm formation resulting into a chronic unhealed wound like diabetic foot ulcers and bedsores. However, throughout proper management, further complications can be prevented. Among new aspects of wound management is the usage of tetracycline due to its antimicrobial effect against multiple types of microbes causing wound infections, beside its non-antibacterial properties like metalloproteinase inhibition and anti-apoptotic effects that can promote the healing rate of the wound. Furthermore, these properties would be studied by evaluating the pharmacological variations between topical tetracycline and a new sustained-release drug delivery system upon diabetic rat model with an infected excisional wound while identifying the pathophysiology of cultured wounds with Staphylococcus aureus. The investigation of tetracycline in this study evaluates the effect on re-epithelization, collagen synthesis, angiogenesis and inflammation in wound bed showing highly promising properties of being a promoter for wound healing when used as a topical application in cases of diabetic and infected wounds restoring the ne… pathophysiology of the wound.

Supervisors

Dr. Mai Abdelhafez, TA. Mahmoud Ahmed

RSPHO2.10: Pharmacological study on wound healing acceleration using promising herbal medicine in rat model

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ABSTRACT

Wound healing is dynamic process of replacing the injured area in the skin. Healing is achieved according to four main phases. 1- haemostasis 2- inflammation 3- proliferation 4- restoration. This study discusses two herbal medicines which are green and black tea, in addition to their extract, caffeine to accelerate wound healing. Green and black tea have different botanical species that play a role in inflammation by increasing TGF-β1 expression which increases the production of collagen and the fibroblast proliferation; hence accelerating the wound healing process. In addition, caffeine has antioxidant effects that targets cell proliferation and migration. In the current study 15 Wister rats/ divided into 5 groups will be used. (The first group will be standard; the rest groups will apply the botanical medicine extract and caffeine). The wound size will be measured digitally, and the healing time will be quantified. Two wounds will be induced on the back of each rat via biopsy punch. Then will apply the botanical treatment according to rats group every other day. Images will be taken every other day and will be monitoring for 10 days. Blood and tissue samples will be collected in order to measure the biomarker. Finally, the result, in present study shows that herbal medicine accelerate the wound healing and decrease the time of healing according to the herbal pharmacological action in the stages of healing.

Supervisors

Dr. Mai Abdelhafez, TA. Mohamed Sofian

RSPHO2.11: Investigating the effect of Coriander oil on UV induced photo aging




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PHARMA COLOGY

ABSTRACT

Introduction: Photo ageing is a phrase used to describe the distinctive changes in skin caused by prolonged ultraviolet B (UVB) and ultraviolet A (UVA) exposure. These changes include wrinkles, roughness, and loss of skin tone UV rays induce change by encouraging the production of thymine dimers and pyrimidine dimers, which produce reactive oxygen species (ROS) that cause skin damage. The purpose of this study is to see if Coriander oil may protect against UV-induced photo aging. This plant was chosen for our study because natural products are generally inexpensive, safe, and have a variety of valuable characteristics. Experimental design: 49 female Swiss albino mice were split into seven groups, each with seven mice: 1- UV radiation group: which will be exposed to UV radiation only without applying the treatment, 2-normal control group, 3-UV + coriander Nano gel group,4- UV + coriander oil cream group, 5-UV + gel base group , 6-UV + cream base group, 7-UV + standard cream containing vitamin C group. We used hair removal cream to shave the mice. Mice were then exposed to UV light for 6 weeks to produce wrinkles. The mice were treated for 5 weeks after wrinkles formed. In the laboratory, skin samples are utilized for parameter measurements and tissue Histopathological investigations. Results: UV radiation causes considerable skin damage, which manifests as wrinkles and alterations in a variety of parameters. Coriander oil, on the other hand, dramatically reduced noticeable wrinkles. Cyclooxygenase 2 and prostaglandin E2 levels are reduced, whereas collagen levels are increased compared to the UV injured group. Coriander Nano-gels show better results than other formulations.

Supervisors

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RSPHO2.12: Evaluating the Anti-aging potential of natural compound against UV-induced Photoaging

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ABSTRACT

Skin is work as first barrier that protect our body from bacterial, fungal invasion, give us our appearance and our colour, regulating body temperature and sensation keeping both of water and electrolyte content inside our body. Unfortunately aging happened to us after years, thus aging affect our physical and mental health, our activity, our organs, our immunity system and our skin health. Several factors Several factors contribute to aging, intrinsic and extrinsic. intrinsic factor which is aging but also extrinsic factor which are bad habits like smoking, eating junk food not healthy food and effect on environment like direct sun light and ultraviolet radiation. Too much exposure to sunlight and UV radiations for long time will leading to Photoaging. Photoaging signs on exposed area to ultraviolet radiation as change in color of this so age spot will appear beside wrinkles appearance due to skin damage and inflammation occur beside 2 MED and ROS generation that change collagen and elastin regulation. There is many options for Photoaging treatment, the fastest treatment and most expensive like fillers and laser resurfacing and regular more safer treatment beside it very cheap are oral drugs like ISO and topical product like coriander oil extract that we focus on in this project and tested it on 49 female mice to observe the treatment happened or not beside we assisted MDA, SOD and elastin from mice skin sample cells . the result appeared that coriander treatment work and has great antioxidant activity toward MDA and SDA beside improvement of strength of elasticity

Supervisors

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