ANNUAL REPORT

2017
2018

Kuwait University
Faculty of Pharmacy
جامعة الكويت - كلية الصيدلة

Faculty of Pharmacy

Annual Report 2017/2018

Emerging roles for the modern pharmacist

The vision of pharmacy profession has changed since the publication in 2000 of the American College of Clinical Pharmacy (ACCP) vision of future role and responsibilities for pharmacy 00, to transform the profession from being product-oriented to patient-oriented.[1] Pharmacists are well equipped health care professionals with extensive knowledge and skills in pharmacology, therapeutics, drug interactions, pharmacokinetics and pharmacogenomics. Such knowledge and skills can enable them to prevent, detect, monitor and resolve drug-related problems.

The American Pharmacists' Association states that "a pharmacist should serve patients' needs at the individual, community and societal levels"[2], which is in alignment with the ACCP's 2017 vision, which sees pharmacists as *"health care providers responsible for high-quality patient care, accountable for medication optimisation in the prevention and treatment of disease".*[3] Therefore all pharmacists must become agents of change, and pharmacy education needs to be the key instrument of change to move the profession forward.[1,3] Pharmacy education should prepare graduates to meet the demands of profession transformation and the increasing complex patient and medication therapy management and supervision of prescription dispensing and processing by technicians. [1,3]

As pharmacy continues to mature as a clinical profession, it is well positioned to provide clinical services in the health care system. Its services have been expanding from hospital acute care to preventive care services or to what is known as "ambulatory care services". Both the American Society of Hospital Pharmacists (ASHP) 2018 and ACCP 2017 vision for expanding pharmacy profession scope of practice agree that ambulatory care services is one of the areas of practice of pharmacy that demonstrate the value of the pharmacist in optimising patient care and will show more growth in this area in the future.[3,4] The US health system is currently undergoing a major transformation from inpatient-focused care to an outpatient care model. This has resulted in decreased hospital admissions and a significant increase in demands for outpatient services. The focus of this new model is population-centric health care across the continuum of care with the goal of increasing preventive and primary care services to keep patients out of the acute care facility. Therefore, the expectation is that the number of pharmacists serving in clinical roles in primary care will increase with larger growth by the chronic care management programme through pharmacist-physician collaboration.[4]

The other area of development in the practice of pharmacists is through medication therapy management services (MTMS).[3] These include comprehensive medication reviews, medication reconciliation, drug use review, the ordering and review of lab tests, immunisations, drug dosage adjustments, and identification of gaps in care. MTMS can improve medication adherence and patient outcomes among patients suffering from chronic diseases, thus cutting costs and improving the quality of care and patient safety. MTMS are mainly provided for hospitalised patients which will continue to grow and strengthen with a greater specialist pharmacy community.

The ACCP vision is not restricted to only providing daily direct patient care, but extends to expansion of pharmacy services in other areas including contributing to developing guidelines, being recognised as investigators and generating research to optimise therapy.[3] Contributing to research is essential to maintain the growth of the profession through evaluating the quality and outcomes of patient care services.

While diversity exists in the level of pharmacist-provided patient care services in the countries in which this is well established, it is still at its infancy in others. Hence, health authorities should recognise the advancement in the profession and support the increased opportunity to broaden the phar-macist scope-of-practice with appropriate legislation. This could have a very positive impact on health-system pharmacy, and result in more cost-effective use of all pharmacy personnel.

References:

1. *American College of Clinical Pharmacy. Pharmacotherapy 2000;20: 991–1022.*
2. *APhA(2005) Pharmacist practice activity classification 1.0.*
3. *ACCP strategic plan 2017; The Strategic Plan of the American College of Clinical Pharmacy. Available at: https://www.accp.com/docs/about/ACCP_Strategic_Plan.pdf. Last access November 13, 2018.*
4. *Vermeulen LC, Kolesar JM, Crismon ML et al. Am J Health-Syst Pharm. 2018; 75:23-54.*

Article contributed by *Sarah Al Ghanem*

inside

Fifteenth Annual Report prepared by Yunus Luqmani with grateful acknowledgement of contributions from Mohammed AbdulHamid, Pierre Moreau and Faculty staff. Cover design and photograph assistance from Fatima Al Faraj

Faculty of Pharmacy, Kuwait University, PO Box 24923, Safat 13110, Kuwait
Website: http://www.hsc.edu.kw/fop/

VISION

To be recognized as an outstanding innovative leader in pharmacy education and research, contributing responsibly to the continuous improvement of pharmaceutical services and patient-centered care within our community, and promoting the philosophy of a healthy lifestyle.

MISSION

- ***Educate*** **our students and current pharmacists to the highest standards of pharmaceutical sciences and pharmacy practice to meet evolving needs of society**
- ***Engage*** **in relevant, interdisciplinary and high quality research to contribute to the development and better understanding of medicines and therapeutic applications**
- ***Share*** **the expertise and experience of its members with the community to promote health and responsible and safe use of medicines**
- ***Develop*** **intellectual capital to be an effective component of Kuwait University**

VALUES

Individual COMMITMENT: The journey towards our vision depends upon each and every individual contributing to our global efforts by focusing on their specific tasks and being open to change to improve their effectiveness in delivering the expected outcomes.

Intrinsic INTEGRITY: In order for our Faculty to succeed in its evolution, we must maintain the highest level of professional integrity in all aspects of our mission. This will foster mutual trust between ourselves and with both the higher university administration and our key external partners.

Intentional CREATIVITY: Our vision requires that we continually strive for focused and innovative outcomes that represent significant evolution from best practices. This needs collective time and effort to analyze all situations, to devise consensual solutions and implement strategic actions.

Internal SOLIDARITY: To face current and future challenges during its evolution, our Faculty needs to be a strong and unified organization, with complete cooperation between academic and administrative departments communicating and working together to fulfill our mission. Our collective goals should prevail above our individual interests.

Social ACCOUNTABILITY: As a public organisation, this Faculty is responsible for delivering the highest level of education, and for the creation of new knowledge to contribute to the advancement of our society. We are also responsible to actively contribute, by engaging with all relevant stakeholders, to the quality of healthcare offered to our population.

Dean's executive summary

During this academic year, our Faculty has continued to work towards our vision of becoming a leader in the region. We are developing ourselves in the four dimensions of our missions: education, research, outreach and management.

In the education domain, we have graduated another cohort of Bachelor of Pharmacy students and our first cohort of Doctors of Pharmacy (Pharm D) from our 2-year add-on programme. We also graduated MSc students from the first and second cohorts of the programme started in 2014. The PharmD graduates have spent their final year doing six rotations within Kuwait's healthcare system to refine their clinical skills in real-life situations. We have continued our preceptor training programme to expand our rotations for next year's PharmD students. The entry-to-practice PharmD implementation committee (EPIC) has finalised the plans for our comprehensive seven-year PharmD curriculum and the program went through the required administrative approval steps with flying colours. The entry-to-practice PharmD is expected to start in 2020, gradually replacing the BPharm and then the add-on PharmD.

Our research continues to do extremely well when compared to KU standards and our Faculty is amongst the leaders in terms of funding and publications per academic staff. Most of the academic staff is active in research and there are numerous collaborations within the Faculty and with external scientists as well. The impact of the reduction in research funding by Kuwait University has limited our research intensity and several projects were on hold. Moreover, a delegation of scientists from our Faculty met with representatives of the Research Sector of KU to alleviate some of the excessive bureaucratic requirements and help ease the use of research funding. Hopefully, things will be back to normal in the near future.

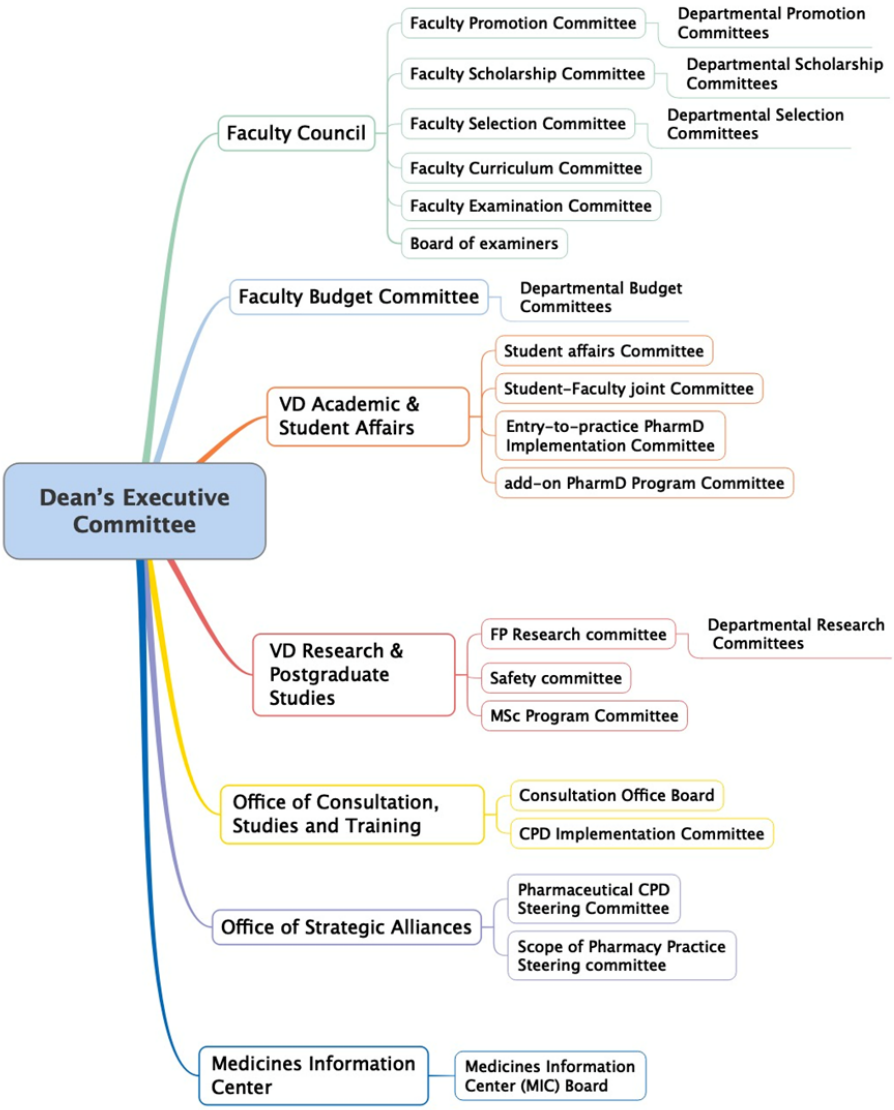
In terms of outreach and community services, our Faculty has continued to engage with external stakeholders. Under the supervision of our academic staff, our students have engaged in several activities to spread the knowledge of the competence of pharmacists to offer several professional services to the population. The Medicines Information Centre (MIC) has continued to train pharmacists from Kuwait's healthcare centres to offer appropriate recommendations to healthcare professionals.

Kuwait University launched its 2018-2022 strategic plan and the Faculty aligned its own plan with it to make sure that resources will be available. During the spring, our Faculty retreat focused on prioritising our strategic objectives, to select those that we will tackle during the 2018-19 academic year. The academic year was concluded by our Faculty Achievement Day that showcases the progress made during the year, in the four dimensions of our mission. The occasion was also marked by recognising particular individuals (selected by their peers) for exemplary contribution in our 5 core values: commitment, integrity, creativity, solidarity and accountability.

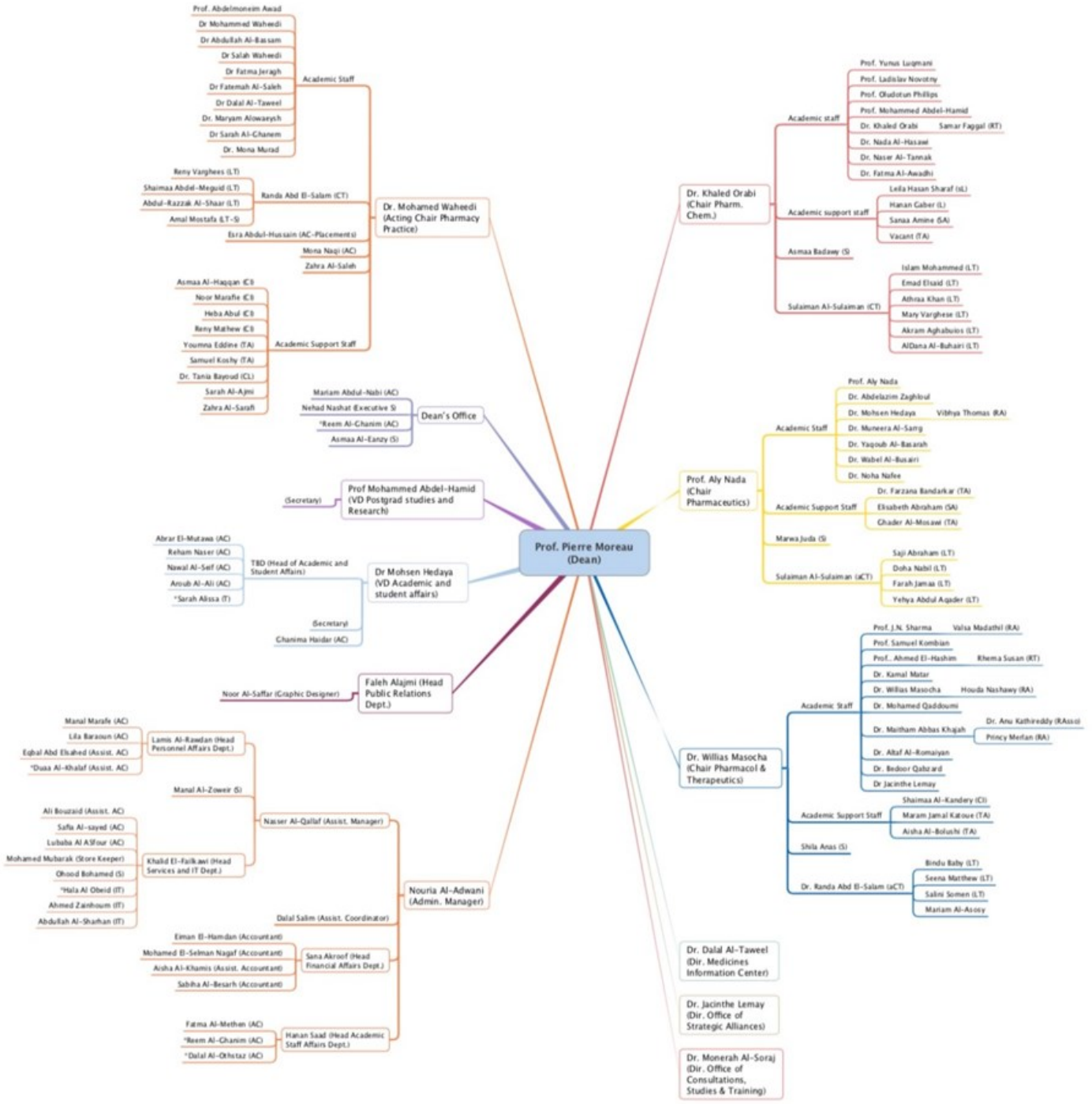
This annual report captures our achievements from September 2017 to August 2018. I am proud of all of our individual and collective accomplishments during the course of this academic year. Please take some time to browse through this report and appreciate the collective work of our amazing staff.

Prof Pierre Moreau

Faculty Governance



Faculty Personnel



Admin staff

Dean's Executive committee

Strategic Planning and Faculty Retreat

During the Faculty retreat of January 2018, the participants engaged in defining the 2018-2019 priorities from the 2018-2022 strategic plan. All the specific objectives were presented, and participants first had to define the urgency of addressing them (during which academic year of the strategic plan we should address the issue), using an online polling system. For the objectives considered urgent (to be done in 2018-2019), participants were then asked to grade their importance (low, medium, high), using the same system. The two dimensions (urgency and importance) generated a percentage score for each specific objective identified as urgent. Eight specific objectives were identified as the ones to be tackled in 2018-2019 (see yellow boxes in Table below).

TOWARDS 2020 FACULTY OF PHARMACY STRATEGIC PLAN PRIORITY		PRIORITY Composite Score (%)
EDUCATION	**GOAL: Preparing competent graduates who will influence the evolution of the profession**	
Specific Objective E1	Transform our undergraduate pharmacy curriculum to meet the scope of professional practice	
E1.1	Adopt a patient-centered and interprofessional approach to pharmacy education	In progress
E1.2	Focus on developing competencies (including life-long learning) by using active learning and experiential activities	In progress
E1.3	Adapt our current physical environment and IT capacities to new learning modalities	71.02
E1.4	Seek international accreditation to benchmark our curriculum	
Specific Objective E2	Create a stimulating learning environment for our students and become a preferred professional educator to attract and retain the best students	
E2.1	Position learning as a shared responsibility between students and instructors by engaging in active learning modalities	54.88
E2.2	Provide appropriate coaching to engage all in this new way of delivering education	88.54
E2.3	Involve students in decision-making related to their learning environment	
Specific Objective E3	Improve the percentage of students graduating without repeating courses	46.17
RESEARCH	**GOAL: Developing an efficient research infrastructure to improve the execution, visibility and impact of our research**	
Specific Objective R1	Develop efficient processes for the management of our research activities	
R1.1	Create an efficient administrative structure and support team at the Faculty level to improve research outcomes	76.49
R1.2	Engage with the institutional research sector to improve overall research management	69.73
Specific Objective R2	Consolidate the establishment of our research units	
R2.1	Initiate and monitor collaborative research projects	58.63
R2.2	Explore the potential of creating core facilities with advanced technology to enhance our research capabilities	
R2.3	Recruit experienced and inspired academic staff with complementary and innovative research programs	In progress
Specific Objective R3	Engage scientists in the promotion of the value of our research outcomes	
R3.1	Encourage participation of undergraduate students in Faculty research activity	
R3.2	Improve the relevance and translational potential of our preclinical research programs	
R3.3	Develop pharmaceutical services for the community	56.51
R3.4	Develop a communication strategy to promote our accomplishments	51.37
Specific Objective R4	Initiate a PhD program in pharmaceutical sciences	
COMMUNITY SERVICES	**GOAL: Implementing a relevant and integrated plan of community advocacy, involvement and services**	
Specific Objective C1	Consolidate our community service infrastructure and partnerships	
Specific Objective C2	Advocate and promote an enhanced role for pharmacists in the healthcare system	
C2.1	Lead the development of scientific or academic policy groups	
C2.2	Provide medication information and counselling as health educators	73.50
C2.3	Develop public awareness campaigns to consolidate the role of pharmacists	58.57
Specific Objective C3	Improve the knowledge and skill base of current pharmacists through continuing education programs	66.23
MANAGEMENT	**GOAL: Adopting contemporary management practices to improve communication and trust, promote teamwork and achieve job**	
Specific Objective M1	Promote and embrace shared core values to achieve a harmonized internal culture	59.50
Specific Objective M2	Improve our employee evaluation process to identify individual gaps between expectations and performance, and coach for improvement	53.13
Specific Objective M3	Develop and promote relevant training opportunities for professional development	65.34
Specific Objective M4	Prepare a plan for optimal job overlap and expertise sharing in the different departments	
Specific Objective M5	Establish KPI and a quality assurance unit to monitor all aspects of Faculty activities	49.48

Department of Pharmaceutical Chemistry

Academic Faculty

Dr. Khaled Orabi	Associate Professor & Chairman
Prof. Yunus Luqmani	Professor
Prof. Ladislav Novotny	Professor
Prof. Oludotun A. Phillips	Professor
Prof. Mohammed Abdel-Hamid	Professor
Dr. Nada Al-Hasawi	Assistant Professor
Dr. Naser Al Tannak	Assistant Professor (on Study Leave)
Dr. Fatma Al-Awadhi	Assistant Professor

Academic Support Staff

Ph. Leyla Hassan Sharaf	Lecturer
Ph. Hanan Gaber Sary	Lecturer
Mrs Zainab Taqi	Teaching Assistant (on Maternity Leave)
Mrs. Sanaa Amine	Scientific Assistant

Technical Staff

Mr. Sulaiman M. Al-Sulaiman	Chief Technician
Mr. Emad El-Sayed	Technician
Mr. Islam M. Essa	Technician
Mr. Akram Fayeq	Technician
Mrs. Athraa Khan	Senior Chemist
Mrs. Mary Verghese	Technician
Mrs. AlDana AlBuhairi	Assistant Technician
Mrs. Asmaa Badawy	Senior Secretary

Research Staff

Mrs. Princy Mathew	Research Assistant

Graduate Students

Ms. Amna Al Rabeea	Ph. Wael Al Shady
Ph. Abrar Al-Mutairi	Ms. Nemah Al-Abkal (Helwan University & Min of Interior) PhD
Ms. Noura Al Barrak	Ph. Naser El-Toum (Sudan Academy of Science) PhD
Ms. Noura Al-Zamel	
Ms. Ayah Ahmad	
Mrs. Dalal Al Adwani	

Future plans

- Support the implementation of the newly proposed Pharm D programme
- Continue to support and extend the MSc program in Pharmacy to include analytical pharmaceutical chemistry, in collaboration with the University of Strathclyde, and in Molecular Biology as well
- Promote the use of HSC e-learning website for course materials and communication
- Promote research activity in the Department and Faculty-wide
- Encourage mentorship of junior staff to establish research activity
- Encourage undergraduate student participation in research and advocate research culture
- Improve and expand the on-going community services on the detection and analysis of drugs of abuse, screening metabolic diseases in neonates and other pharmaceutical analysis through the Office of Consultations, Studies and Training

Dr Khaled Orabi

Department of Pharmacology & Therapeutics

Academic Faculty

Dr. Willias Masocha	Associate Professor *(Chairman)*
Dr. Maitham Abbas Khajah	Associate Professor *(Chairman)*
Prof. Pierre Moreau	Professor *(Dean)*
Prof. Samuel B. Kombian	Professor
Prof. Jagdish N. Sharma	Professor
Prof. Ahmed El-Hashim	Professor
Dr. Kamal Matar	Associate Professor
Dr. Mohamed G. Qaddoumi	Assistant Professor
Dr. Altaf Al-Romaiyan	Assistant Professor
Dr. Bedoor Qabazard	Assistant Professor
Dr. Jacinthe Lemay	Assistant Professor

Academic Support Staff

Ph. Al-Shaimaa Al-Kandery	Clinical Instructor
Ph. Maram Jamal Katoue	Teaching Assistant
Ms Aisha Al Baloushi	Teaching Assistant

Technical Staff

Ph. Bindu K. Baby	Technician
Ph. Seena Elizabeth Mathew	Technician
Mrs. Shila Anas	Senior Secretary

Research Staff

Mrs. Princy Mathew	Senior Research Assistant
Ms. Amal Thomas	Senior Research Assistant
Ms. Sana Hawai	Senior Research Assistant
Ms. Sowmya Balakrishnan	Senior Research Assistant
Ms. Krishna Santhosh	Research Assistant

Graduate Students

Mrs. Mandy Moein
Mrs. Batool Al Refai
Mrs. Fajer Al Shamlan
Mrs. Al-Shaimaa Al-Kandery
Mrs. Esraa Ali

Future plans

The department of Pharmacology & Therapeutics aims to continue striving to be a center of excellence in providing high quality of education and consultation for the pharmacy students in the different programmes offered by the Faculty (B. Pharm, PharmD, and MSc), for other healthcare professionals, and for the general public. Also, to conduct high quality of novel research in various areas of pharmacology, and to serve as a center of research consultancy for various research centers in the country and the region.

Past and current Chairman

Dr Willias Masocha
(Sept 2017 till June 2018)

Dr Maitham Khajah
(June 2018 till present)

Department of Pharmaceutics

Academic Faculty

Prof. Aly Nada	Professor & Chairman
Dr. Mohsen Hedaya	Associate Professor
Dr. Abdelazim Zaghloul	Associate Professor
Dr. Monerah Al-Soraj	Assistant Professor
Dr. Yaqoub Al-Basarah	Assistant Professor
Dr. Wabel Al-Busairi	Assistant Professor
Dr. Noha Nafee	Assistant Professor

Academic Support Staff

Mrs. Farzana Bandarkar	Teaching Assistant
Mrs. Elizabeth Abraham	Scientific Assistant
Mrs. Reham Al-Kazmi	Teaching Assistant
Ms. Ghadeer Al-Mousawi	Teaching Assistant

Technical Staff

Mrs. Doha Nabil	Technician
Mr. Saji Abraham	Technician
Mrs. Farah Jamaa	Assistant Technician
Mr. Yehya Mahmoud	Assistant Technician
Ms. Marwa Gouda	Secretary

Graduate Students

Ms. Bashaier Alkandari	M. Pharm. Sci
Mrs. Marian Sobhy	Ph.D (Cairo Univ)

Future plans

Continue to improve teaching and research quality through:

- expanding utilisation of the "E-learning" website as source and assessment tool.
- improving the students' experiential training in the field of Industrial Pharmacy through organising visits to Kuwaiti-Saudi Pharmaceutical Industries Company (KSPICO, Kuwait).
- recruitment of academic staff members with distinct experience in teaching and supervising graduate students for our current MSc and future PhD.
- Selection of excellent students to pursue their MSc/PhD studies in top Universities with specialisation in relevant and recent trends in Pharmaceutics field.
- increasing intra- and inter-departmental research collaboration.
- extending research collaboration and supervising postgraduate students with other universities, currently with Cairo University (PhD student).
- applying for general facilities grants to improve and upgrade laboratory facilities.

Prof. Aly Nada

Department of Pharmacy Practice

Academic Faculty

Dr. Mohammed Waheedi	Assistant Professor & Chairman
Prof. Abdelmoneim Awad	Professor
Dr. Abdullah El-Bassam	Assistant Professor
Dr. Fatma Jeragh	Assistant Professor
Dr. Fatma Al-Saleh	Assistant Professor
Dr. Salah Waheedi	Assistant Professor
Dr. Dalal Al-Taweel	Assistant Professor
Dr. Maryam Al-Owayesh	Assistant Professor
Dr. Sarah Al-Ghanem	Assistant Professor
Dr. Mona Murad	Assistant Professor
Dr. Mai Al-Huzami	Assistant Professor
Dr. Sarah Al-Manea	Assistant Professor

Academic Support Staff

Mrs. Tania Bayoud	Clinical Lecturer
Mrs. Reny Mathew	Clinical Instructor
Ms. Asmaa Al-Haqan	Clinical Instructor (on Study Leave)
Mrs. Heba Abul	Clinical Instructor
Mrs. Noor Marafie	Clinical Instructor
Mr. Samuel Koshy	Teaching Assistant
Ms. Youmna Alaa-Elddine	Teaching Assistant
Ms. Sara Al Ajmi	Clinical Instructor
Dr. Zahra Al-Sairafi	Clinical Instructor
Mr. Samir Taher	Clinical Instructor

Technical Staff

Mrs. Randa Abdul-Salam	Chief Technician
Ms. Shaimaa Abdel-Meguid	Technician
Mr. Abdul-Razzak Al-Shaar	Technician
Mrs. Reny Varghese	Technician

Administrative Coordinators

Mrs. Mona Naqi	Administrative Coordinator
Ms. Esraa Saleh	Administrative Coordinator
Mrs. Zahra Al Saleh	Administrative Specialist

Future plans

- Continue the improvement of the experiential training
- Continue the support to MOH pharmacists to improve the standard of practice in Kuwait
- Continue the supervision of MSc Students with University of Dundee and Dasman Diabetes Institute
- Expand the community services
- Expand the FOP medicine information center services, through delivering workshops for pharmacist in Kuwait
- Development and implementation of interventions to protect the environment through safe disposal practice of medication
- Development of Model Pharmacy.

Dr Mohammed Waheedi

STUDY

give me knowledge and I'll thank you,
impart me wisdom and I'll never forget you

Message from Vice Dean for Academic and Student affairs

The 2017/2018 academic year marked the graduation of the first cohort from the Doctor of Pharmacy (Add-on PharmD) programme, in addition to graduation of the 16th cohort from the BPharm programme. During this academic year we undertook several major projects and worked on them throughout the year. Also, the student affairs committee continued to enforce the standard procedures related to the student affairs. Furthermore, we developed a venue to formalise official communications between the faculty members and the students.

The Add-on PharmD Programme

Ten students with a BPharm degree from Kuwait University completed the add-on PharmD programme requirements and graduated with a PharmD degree from Kuwait University for the first time. These graduates completed eleven competency-based courses during the first year of the programme and six different clerkships during the second year. During the first year, instructors used active learning strategies and a novel competency assessment framework to teach these courses. During the second year, the students spent all their time at selected practice sites under supervision of trained preceptors. The Ministry of Health appointed graduates of the PharmD programme as junior pharmacists (level 5) skipping the two years of pharmacist in training (level 6).

The Entry-to-Practice PharmD Programme

During the first semester of 2017 the Entry-to-Practice PharmD programme structure, sequence of integrated modules and contents were discussed at different levels within the Faculty of Pharmacy to finalise the programme application. The final application for the transformation of the undergraduate programme from the BPharm to the Entry-to-Practice PharmD was approved by the Faculty of Pharmacy Council and then forwarded to Kuwait University Administration in the beginning of the second semester. The Entry -to-Practice PharmD programme was reviewed, discussed and provisionally approved by Kuwait University Scientific Committee and Kuwait University Dean's Council. Kuwait University Council did not have any issues regarding the programme and appointed a committee to work with the Ministry of Health and the Civil Service commission to develop the new cadre for clinical pharmacists before the final approval of the programme.

The student affairs Committee

The student affairs committee, which included four faculty members, a student and a non-academic staff member, continued to enforce the standard procedures related to student affairs. These procedures include student absenteeism policy for examinations, lectures and laboratories. Also, procedures for examination regulations, procedures for dealing with cheating incidents and invigilator responsibilities before, during and after the examinations. These procedures were made available to all faculty members, academic and non-academic staff, as well as students. The committee developed the code of ethics, which includes sections about professionalism and professional behaviour, proper academic conduct, academic dishonesty and consequences. The committee also planned an orientation for the new pharmacy students which was held in the beginning of the new academic year and updated the student handbook.

Faculty-Student Joint Committee

This committee includes four faculty members, and four student representatives, one from each class. This committee provided a mechanism for communications between the faculty members and the students. The new rules and regulations developed by the student affairs committee were communicated to the students through the student representatives in this committee. The students also made several suggestions which was discussed and found to be useful and important, and these suggestions were presented by the chairman of the committee in the Dean's executive committee.

Dr Mohsen Hedaya

Curriculum Development

Transformation of the BPharm into a PharmD

During the academic year 2017-2018, the committee for the implementation of the "Entry-to-practice PharmD (EPIC) finalised the second draft of the curriculum after receiving comments from international referees. Then, it received comments and suggestions from all members of the Faculty to finalise the required documents to submit the final version of the curriculum to the Scientific Committee of Kuwait University. Discussions focused mainly on the length and number of the integrated therapeutic modules, the possibility of keeping a BPharm within the PharmD structure and the move from a semester-based to a yearly-based progression structure.

The third version of the programme (Table below) was approved internally and then by the Scientific Committee of Kuwait University in March 2018 and by the Deans Committee in May and received a final approval by the University Council in June 2018. This approval is conditional to making sure that the PharmD graduates will have their place within Kuwait's healthcare system. An official KU committee was formed for that purpose.

In parallel to the curriculum development and approval process, a committee worked on the timeline for the implementation of the entry-to-practice PharmD (ep-PharmD). The committee members and Faculty members were divided on the subject, considering the needed clinical academic staff to support the programme's implementation. The Faculty Council passed a resolution to start the implementation of the PharmD during the academic year 2020-2021, after a re-evaluation of the human resources status in 2019.

The ep-PharmD curriculum is competency-based and requires a significant change in the teaching methods currently used. Indeed, active learning is expected to become more prominent to develop competent pharmacists. EPIC and the "Active Learning and Assessment Community of Practice" (ALA-CoP) are currently working on preparing tools and better defining the expectations for each course composing the ep-PharmD. This includes, in addition to the general content of the course, the disease conditions and drug classes, a template model for an integrated therapeutic module, active learning activity models, services to be practiced and the competency level to be expected. The ultimate goal is to ensure that each course coordinator and his team have the resources at hand to work on their course within the curriculum margins.

Staff with PharmD graduates

Prof Pierre Moreau

Entry-to-Practice PharmD course structure (yearly promotion)

Year 1 (30 CH)	Basics	1488-181 (5) English	1488-182 (5) English	Elective I (3)	Elective II (3)	
		1410-101 (1) Informatics	1400-141 (3) Biophysics	1440-140 (3) Chemistry	1410-144 (3) Biostatistics	1420-143 (4) Biology
Year 2 (32)	Basics	1110-101 (2) English in PP I	1110-102 (2) English in PP II	0410-103 (3) Biomath	0530-xxx (3) Physiology	1120-104 (4) Organic Chem.
	PHM Sciences	1120-105 (4) Pharm. Chem.	1130-106 (3) Formulation I	1130-107 (3) Formulation II		
		1140-108 (2) Immunology	1140-109 (1) Drug Dev.	1110-110 (2) Phm Calculation		
	Applied	1110-231 (3) Phm Practice				
Year 3 (32)	PHM Sciences	1120-111 (4) Biochemistry	1130-112 (4) Biopharma-PK	1140-113 (2) Pharmacology		
		1120-114 (3) Plant Chem.	1140-115 (2) Toxicology	1100-116 (3) Antimicrobials		
	Applied	1110-232 (2) Phm Care	1100-233 (1) Special Pop.	1110-234 (3) Dispensing	14xx-085 (0) IPE1	
	Therapeutics	1100-361 (2) ITM-Renal I	1100-362 (2) ITM-Hematol	1100-363 (2) ITM-CV I	1100-364 (2) ITM-Resp I	
Year 4 (29)	PHM Sciences	1120-117 (3) Quality Control				
	Applied	1110-235 (2) HP&E I	1110-236 (1) HP&E II	1130-237 (3) Extemp Prep I	14xx-090 (0) IPE2	
	Therapeutics	1100-365 (2) ITM-Derma I	1100-366 (2) ITM-Nutrition	1100-367 (3) ITM-CNS I		
		1100-368 (2) ITM-GI I	1100-369 (3) ITM-Endocrine I	1100-370 (2) ITM-B&J I	1100-371 (2) ITM-Reprod I	
	Experiential	1110-491 (4) EPPE Amb. I				
Year 5 (32)	PHM Sciences	1100-118 (3) Research				
	Applied	1110-238 (1) HP&E III	1110-239 (2) HP&E IV	1110-240 (3) Dispensing	1130-241 (3) Extemp Prep II	
	Therapeutics	1100-372 (3) ITM-CV II	1100-373 (2) ITM-GI II	1100-374 (2) ITM-Reprod II	1100-375 (2) ITM-Resp II	
		1100-376 (2) ITM-B&J II	1100-377 (2) ITM-Derma II	1100-378 (3) ITM-Endocrine II		
	Experiential	1110-496 (4) EPPE Hosp. I				
Year 6 (28)	PHM Sciences	1100-119 (2) Anticancer Rx				
	Applied	1110-242 (3) Management I	1110-243 (3) Management II	14xx-095 (0) IPE3		
	Therapeutics	1100-379 (2) ITM-CV III	1100-380 (3) ITM-CNS II	1100-381 (3) ITM-Renal II	1100-382 (2) ITM-Supp. care	
		1110-383 (3) Infection Trx	1110-384 (3) Cancer Trx	1110-385 (4) Advanced Trx		
Year 7 (39)	Experiential	1110-492 (6) APPE Amb II	1110-493 (7) APPE Amb III	1110-495 (6) Unrestricted PE		
		1110-497 (6) APPE Hosp II	1110-498 (7) APPE Hosp III	1110-499 (7) APPE Hosp IV		

Final Year Student Research Projects

In their final semester students take a 3 credit course in which they are expected to conduct a short piece of research on a specified topic and required to submit a written report of 5500-6500 words and give a 20 minute oral presentation of their work. Students are randomly pre-assigned to a faculty staff member who supervises their work throughout the project during regular weekly discussion meetings over approximately 13-15 weeks.

During this year there were a total of 33 students: 8 were assigned to Pharmaceutical Chemistry, 10 to Pharmacology & Therapeutics, 6 to Pharmaceutics and 9 to Pharmacy Practice. Projects reflected the diversity of the faculty's interests . Pharmaceutics offered projects concerned with different modes of drug delivery and formulations for targeted therapies to different organs and evaluation of metformin and folic acid tablets. Pharmacology & Therapeutics projects dealt with aspects concerning role of natriuretic peptide and glucokinase receptors in diabetes, of angiotensins in cardiovascular and inflammatory conditions, prostaglandin receptors in airway disease, hypertension, cystinosis,H_2S and epilepsy. Pharmacy Practice utilised questionnaire based surveys on safety culture in Kuwait healthcare centres, pharmacist and student perceptions/attitude/views on various drug related topics and pharmacy education, continuing professional needs among hospital pharmacists, medication assessment and adherence; all required students to perform statistical and qualitative data analyses. Projects in Pharmaceutical Chemistry included topics on alkylating agents, drugs for cancer therapy, use of deuterated drugs, evaluation of MDMA for stress disorders and Qtern for diabetes, applications of mass spectrometry and hallucinogenic actions of Psilocybe mushrooms. A practical project was also offered evaluating effect of ribonucleotide reductase inhibitor on breast cancer cells.

Students performed well with many excellent and highly graded projects. Three of the projects have been subsequently published in edited form in the Kuwait Pharmacy Bulletin. The oral presentations were of generally high quality. The main issues encountered were in incorrect usage of grammar and scientific language, selection of appropriate sources and being sufficiently critical in assessing/interpreting the information wherever appropriate. Response to questions in some cases exposed a failure to appreciate the wider implications of the research topic and general background knowledge and interpretation.

It is recommended that further effort should be made to ensure that projects require use of and critical assessment of information rather than too much emphasis on descriptive narrative of well described knowledge. There were no issues of plagiarism as students were aware that their compositions would be vetted through 'turnitin' software.

Prof Yunus Luqmani

List of projects by Department

Department of Pharmaceutical Chemistry	*Student*	*Supervisor*
Effect of a ribonucleotide reductase inhibitor on tamoxifen sensitivity of breast cancer cells	Asmaa Moussa Rezig	Y A Luqmani
DNA alkylating agents	Bibi Abbass Dashti	L Novotny
DNA intercalators and topoisomerase inhibitors in cancer therapy	Mariam Hussein Ali	L Novotny
Deuterated drugs: what difference do they make in pharmacotherapy?	Mariam Fadhel Jamal	OA Phillips
Synthetic cannabinoids	Noor Hussein Al-Dehani	M AbdelHamid
Psilocybe mushrooms: are they magic or hallucinogenic?	Sarah Nayef Al-Reshidi	K Orabi
MDMA, the FDA breakthrough drug for post-traumatic stress disorder	Khaled Nazar Hussein	N Al Hasawi
Qtern, a new therapy for type 2 diabetes	Shoug Sarhan Al-Mutairi	N Al Hasawi

Department of Pharmacology & Therapeutics	Student	Supervisor
Are prostaglandin E2 receptors viable therapeutic targets for airway diseases	Fatema Abdul-Latif Al-Hajri	A El Hashim
Evaluate the usefulness of natriuretic peptide system in diabetic retinopathy	Dalal Ghannam Al-Ghannam	M Qaddoumi
Targeting transient receptor potential vanilloid receptors for the management of neuropathic pain	Amal Abdulaah Al-Fadhli	W Masocha
Glucokinase activators: potential role in management of diabetes mellitus	Khadijah Redha Bahman	A AlRomaiyan
Role of H2S in hypertension and cardiovascular diseases: cellular mechanisms and therapeutic implications	Rawan Saleh Bahman	B Qabazard
Gaso-transmitters in cancer: from pathophysiology to experimental	Shaikhah Habib Al-Kanderi	B Qabazard
Role of stress in epilepsy	Mariam Mohammed Hassan	S Kombian
The role of the tissue kallikrein-kinin therapy in treatment of hypertension and kidney damage	Namareq Fadhel Al-Beloushi	JN Sharma
The role of angiotensin 1-7 (Ang 1-7) in inflammatory disorders	Abdullah Fareh weiss	M Kajah
Cystinosis: Insights into the disease and its management	Sarah Khaled Al-saad	K Matar

Department of Pharmacy Practice	Student	Supervisor
Design and validation of a medication assessment tool to evaluate the quality of medication use in the management of chronic CVD	Fatema Mohsen Ahmed	D Al Taweel
Assessing safety culture in government hospitals in Kuwait.	Hadeel Khalaf Al-Zubi	F Al Saleh
Assessing safety culture in private hospitals in Kuwait.	Sahikhah Waleed Al-Beraikan	F Al Saleh
Pharmacy students' attitudes and perceptions toward continuing professional development in Kuwait	Reem Abdul-Hadi Al-Ajmi	S Waheedi
Audit vancomycin dosage protocol in patients on hemodialysis: a pilot study	Hind Wabdan Rakan	S Al Ghanem
Pharmacists' attitudes, current practices, and barriers to supporting patients' medication adherence at Kuwaiti hospitals: a cross sectional study	Sharifah Mohammed al-Fajry	F Jeragh
Perceptions, attitudes,practices towards continuing professional development among governmental hospital pharmacists in Kuwait	Danah Ahmed Al-Awadhi	P Moreau
Continuing professional development needs assessment among pharmacists in governmental hospitals in Kuwait	Zamzam Saleem Hotari	J Lemay
Continuing professional development needs assessment among pharmacists in primary care centres in Kuwait	Fatema Abdul-Rahman Eddin	J Lemay

Department of Pharmaceutics	Student	Supervisor
Formulation and quality control aspects of metformin tablets in the Kuwaiti market	Mohammed Abdul-Karim Dashti	A Nada
Organ-on-a-chip: will it play a significant role in evaluating novel drug delivery systems?	Fatema Haitham Al-Farhan	M Hedaya
Bone drug delivery systems in the present and future: a comparative study	Haya Sulaiman al-Failakawi	A Zaghloul
Evaluation of developed versus branded folic acid tablets marketed in Kuwait	Nariman Mohammed Al-Helu	M Al Soraj
Low molecular weight serum proteins as drug carriers	Hessa Ahmed Dhiyab	M Al Soraj
Orally targeted drug delivery to the colon	Ghizlan Khaled Al-Ali	Y Al Basarah

Report of Vice Dean for Postgraduate Studies & Research

Progress in research is one of the strategic goals of Kuwait University due to the significant impact of research on the high reputation and good ranking of the University. The Faculty of Pharmacy, as a member of Kuwait University, gives a great attention to the development and improvement of research at the Faculty. In this respect, the Faculty is continuously encouraging senior and junior staff to apply for research projects funded by research sector (RS) and other funding organizations such as KFAS to support the conduction of research. The Faculty also encourages junior staff members to be involved as supervisors or co-supervisors of MSc graduate research projects run inside and outside the Faculty. In order to improve the research experience and to foster collaborative research, the Faculty approved scientific leaves for young researchers to communicate research institutions and faculties of pharmacy abroad in Europe and USA. During the academic year 2017-2018, two young staff members received scientific leaves, one to the Faculty of Pharmacy, University of Strathclyde, UK and the other one to Pharmaceutical Research Institute ACPHS, Albany, NY, USA.

In 2017-2018, 15 graduate MSc projects funded by the college of graduate studies (CGS) and Research Sector (RS) were conducted, out of them 5 projects were completed. For Faculty research projects, 14 research projects are ongoing, out of them 12 projects were funded by RS and 2 projects by KFAS. Collaborative research with faculty members outside the Faculty were conducted in 10 graduate projects and 5 Faculty research projects. As a general policy, all projects were thoroughly vetted for quality through department research committees and faculty of pharmacy research committee before being submitted to RS.

Furthermore, the research productivity of faculty members was recognised during 2017-2018. Thirty seven articles in the areas of oncology, pharmacology, biopharmaceutics, pharmaceutical chemistry, and pharmacy practice, were published. Publication in international peer-reviewed journals with good impact factors is usually recommended for submitted articles. Out of the 37 publications, 4 articles were published in Q1 journals with high impact factors. During this academic year, faculty members also shared in international and national conferences as oral presenters (13) or as poster presenters (15). During this year, some researchers raised issues regarding specific obstacles in their funded research projects which were related to delays or reductions of budget allocations for purchase of research materials and salaries of manpower. Representatives from the Faculty met with RS- key persons in a trial to find solutions of these problems. In this regard, the VDR-FOP attended an important meeting organized by KFAS in March 2018, in cooperation with RS and OECD (Organization for Economic Co-operation and Development) to gain better understanding of the academic research initiatives, strengths and weaknesses of conducting research at KU.

In order to provide the researchers with their needs of animals, the FOP collaborates with FOM, FOD and FOAH to submit a general facility proposal to RS for animal resources center (ARC). This service will be utilised by academic and graduate students in all faculties at HSC through their funded research projects.

Prof Mohammed AbdelHamid

Report from the Director of MSc programme in Pharmaceutical Sciences

The multi-disciplinary MSc programme in Pharmaceutical Sciences was developed with the vision of being a leading graduate programme in the Middle East and North Africa (MENA) region.

Our aim is to provide our students with up-to-date knowledge and know-how related to the pharmaceutical sciences, in addition to equipping them with cutting edge research skills and competencies through innovative teaching and use state of the art research technology. Our ultimate objective is to prepare graduates who will be future academicians and researchers who are highly knowledgeable, skilful and competent in their discipline to meet the current Kuwaiti society's academic, research and pharmaceutical needs and deal with the future challenges in pharmaceutical sciences and their applications in Kuwait and the MENA region.

The programme has two main components: taught courses and a research project. The taught courses are covered in the first year of the program which is divided into two semesters. Students enroll in 9 courses totalling 24 credit hours. After successfully completing the first year, the students then register for their thesis projects which can take from 12 -18 months.

The MSc programme was launched in September 2014 with a planned intake capacity of 6 qualified candidates per year. A flexibility in the programme is that students may be admitted on either full-time or part-time basis, but currently we have focused on full-time students only in the last year.

We are pleased that we have so far admitted **26** students to the programme; 5 have graduated and some of them have even joined our faculty as academic support staff and/or research staff. The reports that we received from the external examiners on the research projects' quality of our students have been very encouraging and have given us great confidence that we are on the right track. Despite the programme being in its early stages many of the students' research work has been presented in conferences and several manuscripts have been submitted to journals for publications.

As with any new programme, we have encountered some difficulties, but we have worked hard and diligently to fix them in order to make the program more student friendly and in congruence with internal Master Programme standards. We are very pleased with the progress of the programme and we are proud to say that we are beginning to deliver highly qualified and research-oriented graduates who are enriching the scientific work force and adding value to the society. None of what we have achieved would have been possible without the hard work and the continuous support of our Vice Dean for Research and Postgraduate Studies and the MSc programme committee, and I take this opportunity to thank them and also wish our students all the success in their careers.

Prof Ahmed El-Hashim

Programme Director

PharmD graduates

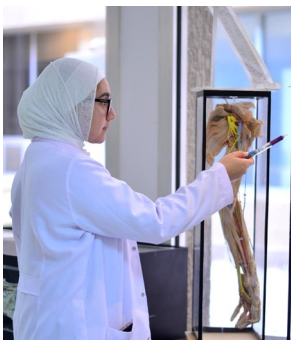
MSc graduates





Undergraduates





Scholarships

Name of Student	University of study	Tentative completion
Department of Pharmaceutical Chemistry		
Bashayer Al-Thufairi	University of California San Diego, USA	2019
Fatma Taha	University College London, UK	2021
Department of Pharmaceutics		
Maitham Bahman	University of Strathclyde, UK	2018
Amina Almurjan	Aston University, UK	2021
Abdul-Aziz Al Obaid	Aston University, UK	2022
Department of Pharmacology and Therapeutics		
Omama Al Farsi	Johns Hopkins University, USA	2018
Lulwah Al-Shammari	King's College London, UK	2023
Department of Pharmacy Practice		
Dana Al-Sanea *	Virginia Comm University USA	2020
Emad Al-Saraf	MCPHS,Boston, USA	2020
Ethar Makhseed	MCPHS,Boston, USA	2020
Fatma Rashed	MCPHS,Boston, USA	2020
Ali Saleh Al-Harbi	MCPHS,Boston, USA	2018
Huda Al-Enezi	MCPHS,Boston, USA	2020
Afrah Al Kazemi	MCPHS,Boston, USA	2022
Maha Al Harbi	MCPHS,Boston, USA	2022
Ahmed Ali Taqi	MCPHS,Boston, USA	2022
Mariam Al Obaidi	MCPHS,Boston, USA	2022
Asmaa Al Baloushi	MCPHS,Boston, USA	2022
Farah Al Humaidi	MCPHS,Boston, USA	2022

*Note : All students in PP list are studying for PharmD. except * who is studying for MSc/PhD*

Research

the best research
is that which generates the most interesting questions

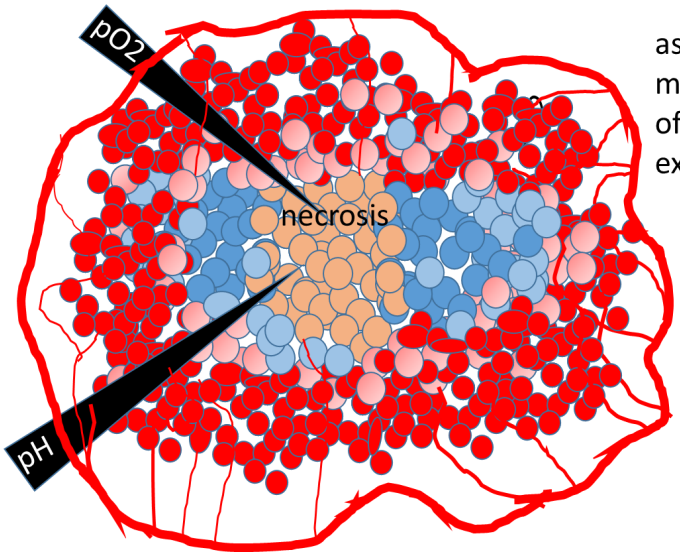
Faculty Research

In order to foster more collaborative research and to create a more conducive environment for staff, particularly junior staff, to join scientific research, an initiative was taken last year by staff members, to establish specific Research Units. These were named Molecular Oncology, Drug Discovery and Development, Immunity and Inflammation, Pharmaceutical Technology and Drug Delivery, Professional Practice and Education.

The major research focus areas and the extent of contribution were defined by each Research Unit. The collaborative research may be extending outside Kuwait with other Universities or research institutions and laboratories in Europe and USA. As a result of this collaboration, research articles were published and pharmaceutical/medical/educational research materials were presented in international and local conferences.

Research Units – Molecular Oncology

Mortality from cancer is predominantly due to systemic dissemination of tumour cells from the primary site. Numerous studies have addressed the question of *how* tumours metastasise but few have asked *why* do they metastasise? What makes a cell detach adhesions from its neighbours, force its way through a complex meshwork of extracellular structure in order to enter a vascular system full of hostile antibodies and immune killer cells? It is a widely held view that it is hypoxic conditions that facilitate metastasis, through glycolytic activation and extracellular acidification, and yet these cells are buried deep within the tumour far from the vascular network. We have proposed a model, based on *in vitro* observations, that suggests tumour metastasis as an active escape from a hostile environment. In our quest to study the mechanisms of therapeutic resistance to endocrine agents, we have established breast cancer cell lines that reflect precisely this behaviour and display the means to effect an escape from an imposed alkaline environment that will otherwise prove fatal to their survival. We observe a protective reaction to increased pH that minimises extracellular contact by cellular contraction and rounding (resembling a pre-apoptotic response), and the development of extensive locomotive membranous blebs to enable cellular migration. Restoration of pH 7.4 in the medium reverses this transformation. There is a re-arrangement of cortical actin and a flow of associated proteins such as integrin α2, FAK and JAM-1. Pre-treatment with cytochalasin-D or inhibitors of Rho or MLCK prevents both contractolation and bleb formation at high pH. Suppression of bleb formation can also be achieved with drugs that block Na+/K+ flux most likely through the associated intracellular signalling through such channels. Gain of endocrine independence and transition to a mesenchymal form facilitates this behaviour, the further study of which will provide indications of how such cancer cells escape into the circulation. Inhibition of blebbing, which is specific to these cells (not observed in normal breast cells), could be an effective means of retarding metastasis, and therefore cancer mortality.



as hypoxic conditions become more severe towards the necrotic core of the tumour, pH decreases due to excessive lactate/H^+ extrusion

which cells will be more likely to enter blood vessels and metastasise ?

the hypoxic ones or those at the periphery?

neoangiogenesis results in tumour vascularisation

Members

Faculty
Prof Yunus Luqmani
Dr Maitham Khajah
Dr Monerah Al Soraj

Research Assistants
Mrs Princy Mathew

Graduate students
Ms Amna Al Rabeea
Ms Noura Al Barrak
Ms Ayah Ahmad
Ms Noura Al Zamel

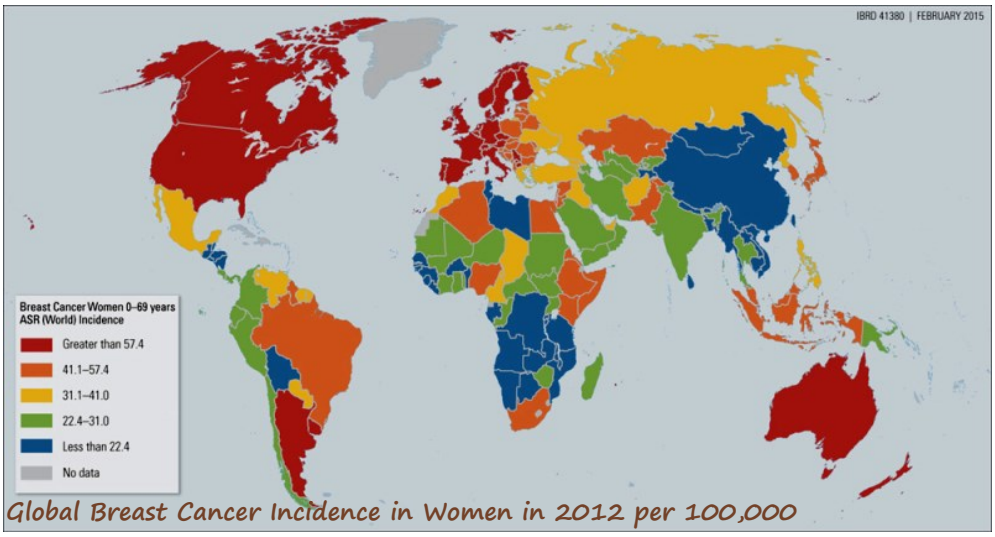
Under-graduate student
Ms Asmaa Rezig

Vision
To be recognised as an active and innovative investigative group in the field of molecular oncology with major emphasis on breast cancer research

Mission
To build a nucleus of talented and like-minded individuals who will continue to engage in inter-disciplinary and high quality research to contribute to increased understanding of the biology of breast cancer and the optimum therapeutic strategies to manage the disease

Operational Strategy
- formulate and obtain research grants to explore innovative ideas
- fully utilise current resources and extend our technical capabilities by acquiring latest technologies
- attract into the group and train talented and enthusiastic research staff and students

Collaborative research with local and international research institutions or centers
We are currently working with a group in Munich (Dr A Roidl) to do *in vivo* studies with the ER silenced cell lines and looking for further collaborations.



(www.ncbi.nlm.nih.gov)

Research Units – Drug Discovery & Development (DDD)

Our research at DDD RU focuses on discovery of medicinal compounds from natural and synthetic sources targeting various human diseases such as bacterial infections, progression of cancers, chronic CNS diseases. We are also interested in evaluating the pharmacokinetic–pharmacodynamic (PK-PD) properties of these new compounds *in vitro* and *in vivo*. In our Unit, the natural products group has made significant contributions. Research is being conducted to discover new leads with potential neurotherapeutic effects. One of these projects was devoted to identify the potential active ingredients from the Chinese tree *Ginkgo biloba*. Data from these studies showed that the leaves extract, ginkgolides-enriched extract and pure ginkgolide B exhibited neurotherapeutic activities where ginkgolide B showed the most neuroprotective effect. Additionally, the bioactivity-guided fractionation of *Allium cepa* (Onion) extract culminated in the isolation/detection of promising fractions with neuroprotective effects. These studies paved the way for further in-depth investigations into the mechanisms through which the constituents of these plants exert nerve regeneration and neuronal protection activities. Another natural product, quercetin, a flavonoid compound, was shown to decrease the viability of astrocytoma cells. On the other hand, in biological studies, cadmium which is a toxic metal to human cells when combined with quercetin resulted in a complex product with a potent anti-proliferative effect on malignant transformed cells.

The medicinal chemistry group also synthesized small heterocyclic compounds with potent pharmacological effects. Epilepsy is a highly prevalent neurologic disease characterized by brief excessive neuronal discharge. Although several clinically used antiepileptic drugs (AEDs) are available, many epileptic patients either do not respond well to these drugs or may present undesirable side effects. *In vitro* screening of selected oxazolidinone triazolyl derivatives from our labs, suggested their potential for anticonvulsant activity. PH192 a novel oxazolidinone triazolyl derivative was identified to exhibit *in vivo* anti-seizure activity in chemically- and electrically-induced seizure models in mice and rats with little or no CNS side-effects. The level of protection of PH192 and its safety were comparable to those of clinically used anticonvulsant agents e.g. phenytoin.

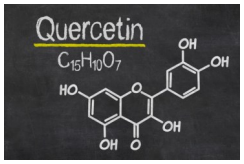
Finally, as a part of our efforts to collaborate with research institutions abroad, a research is ongoing using a series of newly-prepared organic tin compounds as potent anticancer agents. Preliminary studies indicated high stability of compounds in aqueous and plasma fluids.

Members

Faculty

Prof Oludotun A. Phillips
Prof Mohamed Abdel-Hamid
Prof Ladislav Novotny
Prof Samuel Kombian
Dr Khaled Orabi
Dr Mohsen A. Hedaya
Dr Mohammed Qaddoumi
Dr Nada Al-Hasawi
Dr Naser F. Al-Tannak
Dr. F Al-Awadhi

Allium cepa



Research Assistants

Mrs. Sanaa Amine
Mrs. Leyla Sharaf
Mrs. Hanan Gaber

Graduate students

Mrs. Dalal Al-Adwani
Mr. Wael Fadel
Ph. A Al-Mutairi

Vision

- To be recognised as an active research unit in the area of drug discovery and development of new drug entities that would add to the therapy of specific human diseases.

Mission

To establish a research group who will actively contribute to the field of drug discovery and development through design, preparation and biological evaluation of new medicinal compounds.

Strategy

- Encourage collaborative research in Kuwait and abroad.
- Enhance research capabilities.
- Utilize optimally research core facilities at KU.
- Publish research outcomes in national and international journals and conferences.
- Apply for patents, whenever possible.

Future research plans

- Expand current research efforts and seek new opportunities for collaborative research projects.
- Develop research projects with different funding sources.
- Use of molecular modeling and computer-aided drug design programmes in research to optimise drug's effect and to minimise side reactions.

Research Units – Immunity and Inflammation

Chronic inflammatory disorders are considered one of the main cause of morbidity, mortality, and drug utilisation worldwide. Inflammatory bowel disease (IBD), respiratory disorders (e.g. asthma and cough), arthritis, and neuroinflammation/peripheral neuropathies are examples of these conditions which are associated with high prevalence rates worldwide. The mechanisms underlying these diseases are still not completely understood and hence only few from the currently available drugs provide reasonable therapeutic outcomes, However, this is sometimes at a high cost as their chronic usage can lead to serious side effects and some result in drug dependence/resistance. Moreover, many of them are very expensive and beyond the reach of a large section of patients particularly for those living in the developing world. We currently have several research programmes running in this unit trying to understand and characterise the mechanisms underlying IBD, asthma/cough and neuro-inflammation/peripheral neuropathies. These include the role of angiotensin 1-7 peptide in IBD pathogenesis, the role of Src and epidermal growth factor receptor (EGFR) in driving the asthma phenotype, the role of bradykinin, PGE2 and adenosine in central sensitisation/inhibition of the cough reflex, and the role of hydrogen sulphide (H_2S) and endocannabinoid system in neuropathic pain. We also have programmes directed at drug discovery. For example, we are investigating the potential use of various agents such as the enaminone E121, the angiotensin peptide 1-7 (Ang 1-7), the chemically modified tetracycline COL-3, minocycline, endocannabinoids, phytocannabinoids, onion bulb extract (OBE), and the slow-release H_2S donor GYY4137 in various animal models and cell lines, and the molecular mechanisms/pathways by which these agents mediate their anti-inflammatory effects. We use various approaches to show their efficacy *in vivo* such as prophylactic (if it can prevent the development of the inflammation), treatment (if it can reverse established inflammation), and preventative (if it can prevent the disease manifestation if administrated prior to disease induction). We also aim to explore the involvement of additional pathways, namely the oxidative stress and endoplasmic reticulum (ER) stress, in mediating some drug effects. We have the expertise to perform various *in vitro* mechanistic experiments to identify the mode of actions of these agents such as immunofluorescence, western blotting, polymerase chain reaction, and isolation of various immune cells (such as neutrophils, mononuclear cells, and eosinophils) and a number of *ex-vivo* experiments.

Members

Faculty

Prof Ahmed El-Hashim - Professor
Dr Maitham Khajah - Associate Professor
Dr Willias Masocha - Associate Professor
Dr Bedoor Qabazard - Assistant Professor

Research Assistants

Mrs Seena Mathews (Technician)
Mrs Princy Mathew (Research assistant)
Ms Amal Thomas (Senior research assistant)

Graduate students

Ms Esraa Aly
Mrs Fajer AL-Shamlan
Ms Mona Yassin
Ms Shaimaa Al-Kanderi

Vision

To be an active research group in the field of inflammation and immunity.

Mission

To build an active group of talented scientists, technical staff, and graduate students who will perform high quality research in the field of inflammation and immunity in order to better understand these diseases and find better and safer treatment agents to control them.

Strategy

write and obtain high standard research grants to perform high quality research in the field of inflammation and immunity.

have a platform to get new talented graduate students who will contribute in this field of research.

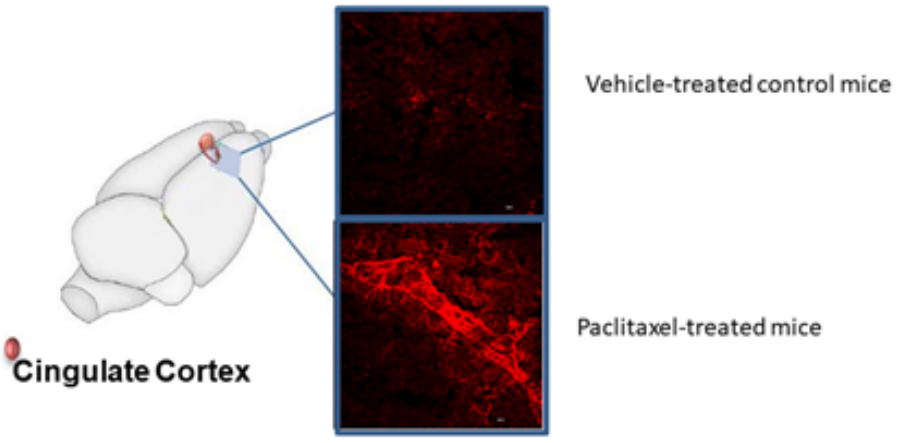
Future Research Plans

Securing grants for collaborative research between the members of the Unit and for future graduate students and contribute high quality science to our field.

Collaborative research with local and international research institutions or centers

Our local partners include Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Kuwait University; Department of Pharmacology and Toxicology, Faculty of Medicine, Kuwait University.
Our international partners include Department of Pharmacology, University of Bern, Switzerland; Sackler Institute of Pulmonary Pharmacology, King's College London, United Kingdom; Department of Neuroscience, Karolinska Institute, Sweden; Department of Pharmaceutical Sciences, University of Saint Joseph, USA; Centre for Pain Research, National University of Ireland, Ireland.

Effects of paclitaxel on glial fibrillary acidic protein (GFAP; an astrocyte marker) immunoreactivity in the anterior cingulate cortex (ACC)



GFAP immunoreactivity increased in the ACC astrocytes of paclitaxel-treated BALB/c mice compared to vehicle-treated control mice. Note that in a paclitaxel-treated mouse increased immunoreactivity of GFAP appears to be along a blood vessel: Scale bar: 50 µm.

Research Units – Pharmaceutical Technology and Drug Delivery

Research at PTDD RU focuses on pre-formulation and formulation studies to optimise the *in vitro* and *in vivo* characteristics of active pharmaceutical ingredients. The optimisation utilises different techniques such as solid dispersions, crystal modification, self-emulsified and liposomal formulations in addition to development of drug delivery systems (DDS) with modified and targeted release attributes; e.g. Nano-particulate DDS, transdermal DDS, and liposomes. The research also includes stability studies, quality control of pharmaceuticals, comparative bioavailability and pharmacokinetic studies for new drug formulations and marketed products, pharmacokinetic drug interaction studies and pharmacokinetic-pharmacodynamic modeling. Recently, technological and biological aspects of drug and gene delivery, endocytosis and cellular delivery of therapeutic macromolecules have become of interest for researchers in this research unit. Currently, the research projects running in the PTDD RU are investigating the strategies to enhance the dissolution of poorly water-soluble drugs such as ibuprofen, lamotrigine, and atorvastatin and paclitaxel to improve their oral bioavailability and to minimize their associated side effects. The pharmacokinetic -pharmacodynamic characteristics of the prepared formulations are compared with marketed products using in vitro dissolution studies and *in vivo* pharmacokinetic studies using rabbits and mice as animal models. Also, the pharmacokinetic behaviour and tissue distribution of novel chemically synthetic antibacterial oxazolidinone compounds are being investigated and compared with the approved and marketed member of this chemical compounds; linezolid in rabbits. The studies revealed comparable pharmacokinetic profiles, however with better tissue distribution for the new compound PH027. A new research project is directed to utilise a dual formulation and metabolic strategies to improve the oral bioavailability of the anticancer compound paclitaxel and *in vivo* testing of the effect of the strategies in rabbits. Another project is directed to prepare nano-suspensions of ibuprofen in a trial to improve the poor dissolution and oral bioavailability of ibuprofen and to avoid undesirable effects. The pharmacokinetic and pharmacodynamic anti-inflammatory activity of the new formulations of ibuprofen will be tested in animals.

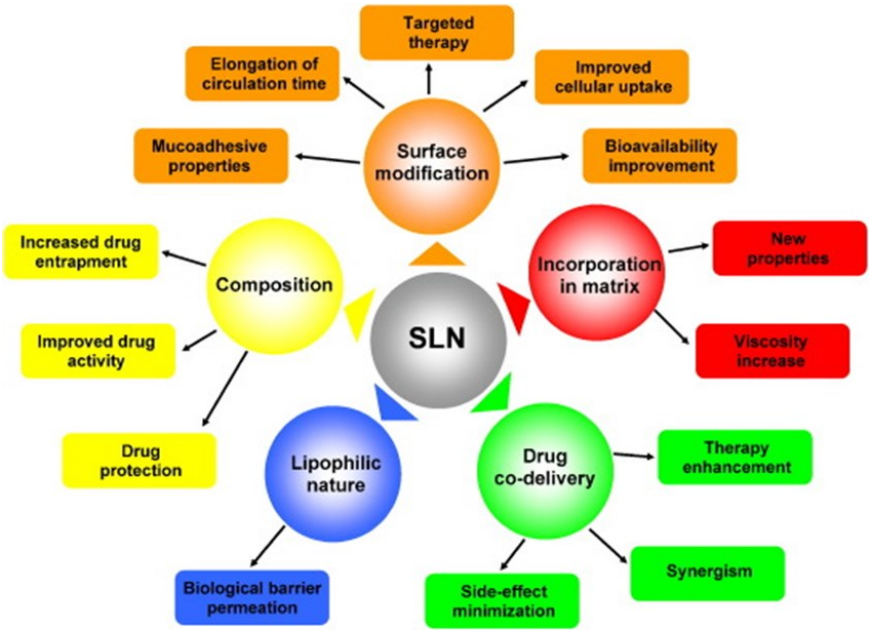
Members

Academic staff

Prof Aly Nada,
Dr Mohsen Hedaya
Dr Abdelazim Zaghloul
Dr Monerah Al-Soraj
Dr Yaqoub Al-Basarah
Dr Noha Nafee

Support staff

Mrs Farzana Bandarkar
Ms Ghadeer Al-Mousawi
Mrs reham Al Kazmi
Mrs Elisabeth Abraham
Mrs Doha Nabeel
Mr Saji Abraham



Graduate Students

Mr Ahmad Morad (MSc, in collaboration with Helwan University Egypt)
Mrs Marain Sobhy (PhD. in collaboration with Cairo University).

Vision

To be recognized as an active research unit in the fields of pharmaceutical formulation, biopharmaceutical evaluation, pharmaceutical technology and drug delivery systems.

Mission

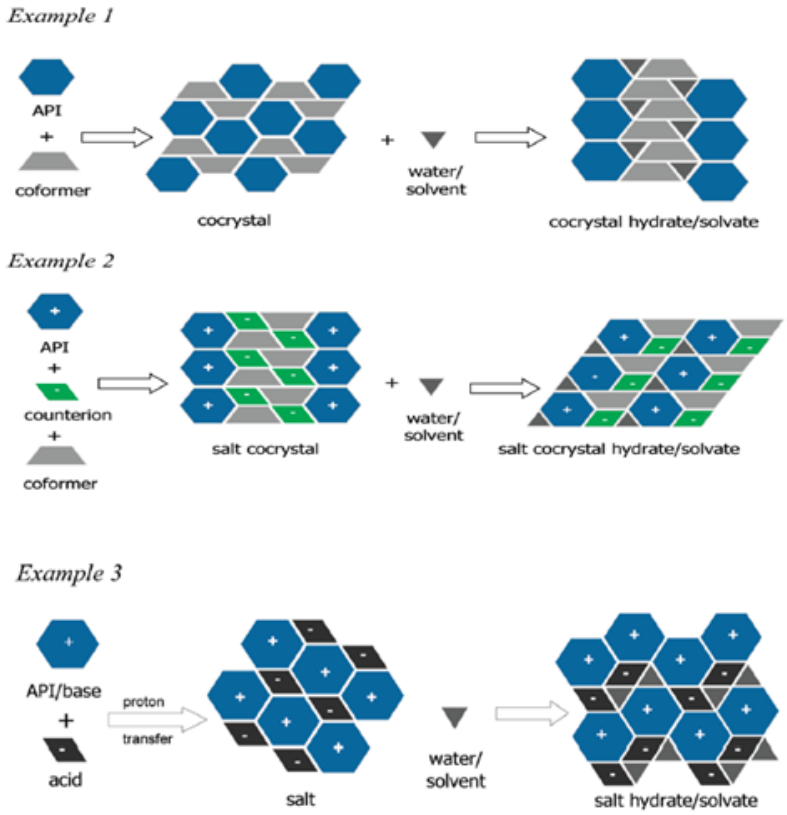
To establish a research group who will contribute to the design of new drug formulations to overcome problems associated with poor physicochemical properties including, dissolution and stability, and bioavailability.

Collaborative research with Faculties and research institutions

We have active collaborations with colleagues at FOP, Cairo University and FOP- Helwan University through joint supervision programmes of graduate students. We also have collaborations with researchers at Kuwait Institute for Scientific Research (KISR), and Pharmaceutical Research Institute ACPHS, Albany, USA.

Future plans for support our research

We are looking for more research collaborations with KISR. Also, we are planning to find other financial resources for funding our research in the Unit through research projects submitted to Kuwait Foundation for the Advancement of Sciences (KFAS).



Concept of co-crystallisation
Co-crystals, salt co-crystals, and salts along with their respective solvate/hydrate forms *(R Al Azemi, MSc thesis)*

Research Units – Professional Practice & Education Research Unit

This is the report of the sub-unit of Pharmacy education research that covers innovative teaching approaches, faculty and students development, inter-professional education, and curriculum design.

Members

Faculty	***Research Assistants***
Pierre Moreau	Asmaa Al-Haqan
Dalal Altaweel	Samuel Koshy
Sarah Alghanem	Maram Katoue
Maryam Alowayesh	Tania Bayoud

Vision

Aspire to be an international leader in healthcare education by becoming a local reference for innovation in education

Mission

- Engage colleagues in scholarly activities related to education, including young academic staff
- Identify educational needs and issues and develop innovative solutions for improvement
- Improving our educational environment according to best practice, current research and our own research agenda
- Measure the impact of our interventions to foster quality improvement of education and its outcomes

Strategy

- Conduct surveys to assess needs and issues related to education
- Apply for research grants when needed to support the research projects
- Collaborate with the Faculty of Education and the faculty of Medicine on specific aspects when needed
- Publish and present outcomes of our research at national and international conferences, according to a planned publication timeline
- Conduct workshops and training sessions for academic staff and students

A particular achievement this year was a book chapter presenting the situation of pharmacy education around the world and the whole process of the competency-based PharmD development in Kuwait that is to be included in a new Encyclopaedia in June 2019.

Future research plans

The following projects will be pursued over the coming 6-12 months

- Competency framework
- OSCE development and validation
- CBE – profiles –> active learning -assessment
- OSCE – standards setting
- OSCE – perception for students
- CDA development and validation (conceptual framework, data collection and improvement based on the data)
- Impact of the active learning environment on student performance (reached level of competency in portfolio)
- EPAs in pharmacy (based on comp. profiles)

Current Research Grants

MSc Graduate Research Projects

YA Luqmani (Supervisor), A Al Rabeea (MSc student). YP02/15 **Extracellular vesicles as modifiers of phenotypic behaviour of co-cultured recipient breast cell. Budget KD 5000. 2015-2017. Status: Completed.**

Extracellular vesicles (EVs) are shed by many cells and are being recognised as a form of communication between cells distinct from the better understood cell-free soluble mediators. In pathological conditions such particles originating from abnormal cells may have significant impact by modifying the behaviour of recipient cells with which they interact. The aim of this project is to optimize a method for their isolation from various breast cell lines, visualise their size and and structure by confocal and atomic force microscopy and co-culture them with target cells to determine their effect. We will assess changes in the target cells both in terms of morphology and behaviour and their phenotypic expression of genes that are characteristic of the donor cells. The principal objective is to determine whether the aggressive properties of mesenchymal type breast cells can be repressed by EVs originating from either other less aggressive cancer cells or from non-malignant cells.

YA Luqmani (Supervisor), M Khajah (Co-supervisor), A Ahmad (MSc student). YP02/17. **Role of aquaporins in endocrine resistant breast cancer cell motility and invasion. Budget KD 6000. 2017-2019. Ongoing.**

Aquaporins (AQPs) are trans-membrane channel proteins involved in water, solutes and gas transport. They are modulated in several cancers and associated with disease progression. Four AQPs (1, 3, 4, and 5) may be particularly important in breast cancer pathogenesis. Our aim is to determine their expression/localisation profile in endocrine sensitive and resistant breast cancer cells in comparison to normal cells from breast and non-breast origin. We will measure changes in expression in response to external pH as well as to growth factor stimulation and hypoxic conditions which all contribute to increased motility of endocrine resistant cells. Their role in bleb formation and invasion will be investigated by siRNA-mediated knockdown to determine whether loss of function may result in blockade of bleb formation. We hope that our findings will lead us to a better understanding of the role of AQPs in breast cancer motility and perhaps identify them as a novel therapeutic target to combat metastasis.

YA Luqmani (Supervisor), M Khajah (Co-supervisor), N Al Barrak (MSc student). YP03/17. **Influence of hypoxia on proliferative and migratory capacity of endocrine sensitive and resistant breast cancer cells. Budget KD 5000. 2017-2019. Ongoing.**

In this project, we aim to measure HIF-1α expression in estrogen receptor (ER) positive and ER silenced breast cancer cells and normal breast epithelial cells under hypoxic and normoxic conditions, and to test their proliferative and motile behavior and their ability to invade through basement membrane extracts as well as through cell monolayers to simulate the *in vivo* environment. In this way we hope to get an indication as to whether it is the hypoxic or normoxic cells (and whether ER+ or ER-) that are better able to invade under conditions in which they have to move through other cells before they get to the basement membrane. This may give valuable information as to which cells in a tumour mass should really be targeted for anti-metastatic therapy.

W Masocha (Supervisor), M Yassin (MSc Student). YP01/18. **Effects of the combination of indomethacin plus minocycline on bacterial endotoxin-induced microglia activation and inflammatory molecules expression in the mouse brain. Budget: KD 3999 from CGS & RS, Kuwait University. 2018-2019. Status: Ongoing.**

The objective of this project is to evaluate the effect of treatment with minocycline plus indomethacin on lipopolysaccharide (LPS)-induced neuroinflammation i.e. microglia activation and expression of inflammatory molecules in the brain. This study will enable us to evaluate in part the safety profile of the combination i.e. whether the combination of minocycline plus indomethacin has detrimental or beneficial effects during neuroinflammation.

W Masocha (Supervisor), M Khajah (Co-supervisor), Esraa Aly (MSc Student). YP03/18. **Effects of cannabinoid type 2 receptor agonists on the development of nucleoside reverse transcriptase inhibitor-induced neuropathic pain in mice. Budget: KD 2000 from CGS, Kuwait University. 2018-2019. Status: Ongoing.**

The objective of this project is to study whether CB2 receptor agonists can prevent the development of nucleoside reverse transcriptase inhibitors (NRTI)-induced painful peripheral neuropathy (PPN) and the neuroinflammation associated with it. We will use mice treated with a NRTI, zalcitabine (ddC), to induce PPN. Mice will be treated with CB2 receptor agonists to attempt to prevent the development of PPN and their effect will be compared with inhibitors of astrocyte and microglia activation. If successful, this study would provide potential targets and candidates for the prevention of NRTI-induced PPN.

M Hedaya (Supervisor), M Al-Soraj (Co-supervisor), B Alkandari (MSc Student). **Dual formulation and pharmacological strategies to enhance the oral bioavailability of paclitaxel. Budget: KD 2000 from CGS, Kuwait University. 2018-2019. Status: Ongoing.**

Paclitaxel is administered intravenously since its oral bioavailability is very low because of its limited aqueous solubility and extensive pre-systemic metabolism. The hypothesis is that the use of an oral formulation in addition to co-administration of metabolism/transport inhibitors, can significantly improve paclitaxel oral bioavailability. In this project, the microemulsion formulation will be examined as an oral formulation strategy to improve the bioavailability of paclitaxel. Additionally, a compound with metabolism and efflux transporter inhibition, will be selected to investigate its effect in increasing the bioavailability of paclitaxel. These studies will be conducted in rabbits as animal model. The results of this investigation will be used to formulate an oral paclitaxel formulation with an improved bioavailability.

AZ El-Hashim (Supervisor), W Masocha (Co-supervisor), F Al-Shamlan (MSc Student). YP05/16. **Investigations into the sensitizing effects of bradykinin on central cough pathways and its signaling mechanisms. Budget: KD 6000. 2016-2017. Status: Completed.**

Chronic cough is a poorly understood and managed clinical problem with a high prevalence rate. Despite the magnitude of the problem, current antitussive therapies are mainly ineffective. Bradykinin is well established as a mediator of both acute and chronic pain, also been reported to both induce cough and sensitize cough reflex in preclinical animal models and humans. In this project, we are investigating, if bradykinin can sensitize the cough reflex via central action and characterize the pathways by which bradykinin sensitize the cough reflex. The study may result in the development of novel and more effective antitussive medication.

A El-Hashim (Supervisor), S Al-Kandari (MSc Student). YP02/18. **Characterization of the effect**

and mechanisms of prostaglandin E2 (PGE2) in central sensitization of the cough reflex. Budget: KD 6000 from CGS & RS, Kuwait University. 2018-2019. Status: Ongoing.

Prostaglandins are potent mediators of inflammation and recently have been shown to have a role in cough. This project investigates the role of prostaglandin E2 and prostaglandin E2 receptors (EP receptors) in the central sensitization of the cough reflex and whether TRPV1 and TRPA1 are downstream effectors of the EP receptors sensitization in a stereotaxic guinea pig model of cough.

***K Orabi (Supervisor), M Al-Mutairi (Co-supervisor), W Fadel (MSc Student). YP04/16*. Bioactivity-Directed Fractionation to Isolate Possible Anticancer Leads from Costus speciosus: Potential Molecular Mechanisms of Action. Budget KD 6000. 2016-2018. Status: Ongoing.**

To date, only few reports have shown the effect of *Costus speciosus* rhizomes extract on human cancer cell lines. However, main mechanism by which the extract exerts its effect is not yet known. In this project the plant will be extracted and fractionated to get fractions with different polarities. Fractions with promising activities will be tested to investigate the possible involvement of mitogen activated protein kinases (MAPKs) in apoptosis in breast cancer cells. Fraction(s) show promising activities will be subjected to several chromatographic processes to isolate, purify and identify responsible compounds.

***K Orabi (Supervisor), W Renno (Co-supervisor), A Al-Mutairi (MSc Student).* Studies on Neuroprotective Effects of Different Polarity Fractions from Allium cepa on an Experimental Model of Nerve Crush Injury. Budget KD 6000. 2018-2020. Status: Ongoing.**

Allium cepa shows different pharmacological effects that were related to its volatile thiosulfinates. Additionally, non-volatile phenols and flavonoids were also atributed to its neuroprotective effects. In this study, *Allium cepa* will be extracted and fractionated to obtain three fractions with different properties, along with the common quercetin. The neuroprotective effect of these fractions will be evaluated on a crush sciatic nerve injury rat model, in comparison to the isolated quercetin. Their effect on the neurobehavioral outcomes will be assessed by subjecting the animals into the motor and sensory neurobehavioral tests. Other studies like histopathological and immunohistochemical will also be conducted.

***K Orabi (Supervisor), W Renno (Co-supervisor), D Al-Adwani (MSc Student). YP03/15.* Neurotherapeutic Effects of Ginkgo biloba Extract and Ginkgolides. Budget KD 4000. 2015-2017. Status: Completed.**

Ginkgo biloba leaves extract consists of 24% flavonoids and 6% terpene lactones where both are responsible for the biological effect of the extract (GBE). GBE is mainly indicated for Alzheimer's disease, age-related dementia and cerebral insufficiency. Molecular and neuropharmacology studies reported positive results of GBE on promoting peripheral nerve injury in a rat model. In this project, the crush sciatic model will be prepared and the effect of GBE along with the isolated pure ginkgolide B on nerve regeneration on sciatic nerve injury will be evaluated

***K Matar (Supervisor), N Al-Hasawi (Co-supervisor), B Al-Enezi (MSc Student).* Impact of valproic acid on busulfan pharmacokinetics: *in-vitro* assessment of potential drug-drug interaction. Budget KD 3,998. 2018-2020. Status: Ongoing.**

The objectives of this study are: i. To set up various in vitro models aiming to use them for investigating of metabolic effects of valproic acid (VPA) on busulfan (Bu), ii. To develop and validate an accurate method for Bu quantification in biological fluids such as plasma samples and different liver fractions (liver S9, microsomes and cytosolic fractions) using LC-MS/MS technique,

iii. To assess the in vitro metabolism of Bu alone and in combination with a prophylactic anti-epileptic drug (AED), VPA.

K Matar (Supervisor), B Al-Refai (MSc Student). YP01/17. **A quantitative tandem mass spectrometric method for determination of Colistin in plasma and its application to a pharmacokinetic study. Budget KD 6000. 2017-2018. Status: Ongoing.**

Although the antibiotic Colistin was clinically used long ago, however very few data were reported about its pharmacokinetic behaviour due to lack of sensitive and specific analytical process for its determination in biological samples. This project aims to develop and validate an LC-MS/MS method for quantitative analysis of Colistin and its prodrug CMS in plasma. The developed method will be used to establish the pharmacokinetic profile of drug in experimental animals before being used in humans.

K Matar (Supervisor), S Alghanem (Co-supervisor), M Moien (MSc Student). **Population pharmacokinetics of topiramate in patients with epilepsy in Kuwait. Budget: KD 950 from CGS. 2015 -2017. Status: Completed.**

Topiramate (TPM) is a relatively novel antiepileptic that is used as monotherapy or an add-on therapy. As most of antiepileptic drugs, adjustment of drug doses is important for optimum drug therapy and to minimize adverse drug reactions. In this project, the population PK modelling will be used to identify the factors that influence PK of TPM. The study is a retrospective for routine TDM data stored at TDM unit, FOM. The data will be collected from 50-200 infants and adults patients from public hospitals in Kuwait. Demographic data including age, gender, weight, concomitant medications, serum creatinine, and PK data such as sampling time, dose, dosage-interval, sample drug concentrations will be used to establish the model.

A Nada (Supervisor), Y Albasarah (Co-supervisor), R Al-Kazemi (MSc Student). YP01/16.
Dissolution enhancement of atrovastatin as a model poorly soluble drug. Budget: KD 6000 from CGS & RS, Kuwait University. 2015-2017. Status: Completed

The aim of this study is to investigate appropriate techniques to enhance atorvastatin (AT) dissolution, using the co-crystal formation or/and ultra-homogenization. The resulting modifications will be assessed concerning the relevant physicochemical properties, such as solubility, dissolution rate, particle size and shape, thermal profile, etc.; in comparison with the untreated AT. The stability of the developed formulations will be evaluated under different storage conditions to monitor any deviation from the initial characteristics. Furthermore, a comparative *in vitro* dissolution study of developed tablets formulation(s) against marketed AT tablet brand(s) is foreseen.

Co-supervision of students registered outside the Faculty

MH Yousif (Supervisor), BA Qabazard (Co-supervisor), H Al-Shahwan (MSc student). CGS, Kuwait University**. Signalling pathways that contribute to GYY4137-induced vasodilation in rat perfused mesenteric bed. Budget 2000 KD from CGS. 2018 – 2019. Status: Ongoing.**

Diabetes mellitus is attributed to the occurrence of macro- and microvascular complications including coronary artery disease, myocardial infarction, hypertension, impaired reactivity of the blood vessels, retinopathy, end-stage renal disease and neuropathy. Only few studies have examined the effects of *in vivo* administration of the gaseous mediator hydrogen sulfide on the development of complications associated with type-1 diabetes, and the molecular mechanisms

underlying the effects of this gaseous mediator are poorly understood. The aim of this project, is to investigate the therapeutic effectiveness of the slow-releasing H_2S donor GYY4137 on the impaired vascular function of the mesenteric vasculature in streptozocin (STZ)-induced diabetic rats. Additionally, the molecular mechanisms mediating these effects will be elucidated.

K Orabi (Supervisor), E Metwally (Co-supervisor), S Alezzbawy (Co-supervisor), S Alshammari (Co-supervisor), N Al-Abkal (PhD Student), Faculty of Science, Helwan University, and the General Administration of Criminal Evidences, Ministry of Interior, Kuwait. **Quantitative determination and comparison of the Heroin adulterants in recent years, and determination of the chemical properties of the opioid Tramadol in the state of Kuwait. 2018-2021. Status: Ongoing.**

Heroin is the most prevalent type of drugs of abuse in Kuwait as the statistics of the General Administration of Criminal Evidences, Ministry of Interior, show a considerable increase in the amount of heroin samples seized and the number of deaths of addicts in the recent years. This study aims at determining and measuring heroin adulterants traded in the State of Kuwait in recent years. Additionally, a quantitative analysis of the seized samples to determine the percentage of heroin and tramadol in each sample will be done. Finally, a comparative study between the heroin samples circulated in Kuwait during the year 2012 and those recently (2016 – 2018) seized will also be conducted.

S Al Sabah (Supervisor), YA Luqmani (Co-supervisor), N Al Zamel (MSc student). YP03/17. **Analysis of the signaling properties of a dual incretin receptor agonist. Budget KD 5000. 2017-2019. Ongoing.**

Glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like pepide-1 (GLP-1) potentiate insulin secretion in a glucose-dependent manner through their respective receptors (GIPR & GLP-1R). Although GLP-1R agonists are used to treat diabetes and obesity, use of GIPR agonists remains controversial. Recent studies suggest that simultaneous activation of GIPR and GLP-1R with a single peptide may provide superior glycaemic and weight control. This novel 'dual incretin' is known to activate the $G\alpha_s$ pathway. Furthermore, GLP-1 may promote hetero-dimerisation of GIPR and GLP-1R and treatment with GIP may reverse this process. The aim of this project is to investigate how the dual agonist affects pathways other that $G\alpha_s$ and if and how it influences receptor dimerisation.

M Elamin (Supervisor), K Orabi (Co-supervisor), N Barakat (PhD Student), Sudan Academy of Science. **Anti-tumor potential of selected Sudanese medicinal plants. 2018-2021.**
Status: Ongoing.

In recent years, there has been growing interest in the therapeutic use of natural products, especially those derived from plants. The plant kingdom offers a unique and renewable resource for the discovery of potential new drugs and important leads against various pharmacological targets including pain, cancer, HIV, Alzheimer's and malaria. The aim of this project is to investigate the phytochemical and antitumor potential (against human breast carcinoma MCF-7) of several selected Sudanese medicinal plants, including *Coccinia grandis* and *Annona squamosa*. Potential active leads will be isolated and spectrally identified.

A Nada (Supervisor), M El-Nabarawy (Co-supervisor), M Sobhy (Ph.D. Student), Faculty of Pharmacy, Cairo University. **A Pharmaceutical study on fast release dosage forms of a certain drug for 0ptimization of its bioavailability. 2016-2017. Status: Ongoing.**

The aim of this thesis is to improve the solubility and bioavailability of poorly water-soluble drugs (non-steroidal anti-inflammatory, antidiabetic, antihypertensive drugs, etc.) by physical

modifications, and thus enhancing drug dissolution and bioavailability. The experimental work in this thesis includes: a) Enhance drug solubility using different methods as solid dispersion, and nanotechnology, etc.; b) Evaluate the physical, chemical, and pharmaceutical properties of the drug; c) Stability study of the optimum formulations; and d Bioavailability study for the best-chosen formula compared with the commercially available product(s) in human volunteers.

N Khalafallah (Supervisor), N Nafee (Co-supervisor), A Ramadan (Co-supervisor), H Abdelazim (Ph.D. Student), Faculty of Pharmacy, Alexandria University, in collaboration with R Donnely (Queen's University Belfast, UK). **A pharmaceutical study of nanocarrier-mediated photodynamic therapy. 2015-current. Status: Ongoing.**

The aim of this thesis is to develop hydrogel-forming microneedle arrays loaded with either free or nanoencapsulated photosensitizer (PS) for the treatment of psoriasis. This comprises two steps; first, the preparation of PS-loaded microneedles and second, the entrapment of PS into lipid-based nanocarrier system, prior to incorporation in microneedles. The impact of the formulation on the photodynamic activity will be investigated.

N Boraie (Supervisor), N Nafee (Co-supervisor), M Zewail (Ph.D. student), Faculty of Pharmacy, Alexandria University. **Novel therapeutic approaches for the treatment of joint disorders. 2015-current. Status: Ongoing.**

The thesis focuses on the preparation and characterization of targeted delivery systems for the management of rheumatoid arthritis. With this regards, drug-loaded nanostructured lipid carriers were incorporated in thermogelling systems to offer both passive-targeting and controlled release to the drug. Moreover, active targeting was ensured by coating nanoparticle surface with polymers selective for synovial and/or inflammed tissues. As a proof of concept, the anti-arthritic effect of the loaded formulations was examined *in vivo* on artheritic rat models.

N Boraie (Supervisor), N Nafee (Co-supervisor), S Makled (Ph.D. student), Faculty of Pharmacy, Alexandria University. **Implementation of Cell-mediated Drug Delivery Systems: Macrophage Targeting. 2015-current. Status: Ongoing.**

The objective of the thesis is to develop micro- and nano-based carrier systems targeting macrophages for the potential treatment of pulmonary diseases namely tuberculosis. In this context, multiparticulate carriers with variable sizes and/or surface charges were prepared. Formulations ensuing high colloidal stability and drug loading were selected and surface decorated with targeting ligands showing preferential uptake in macrophages. Further investigations comprising *ex vivo* experiments on clinical isolates as well as *in vivo* bio-distribution in rat model have been accomplished.

O Abdallah (Supervisor), N Nafee (Co-supervisor), H Feteha (MSc. student), Faculty of Pharmacy, Alexandria University. **Development and formulation of some dosage forms for drugs with sub-optimal pharmaceutical properties. 2016-current. Status: Ongoing.**

The main target of the thesis is to prepare, characterize and evaluate formulations which overcome some challenges presented by the sub-optimal bio-pharmaceutical properties of some drugs with the goal of enhancing the product performance. Accordingly, various excipients were added to selected drugs to form nanocrystals. The effect of these additives on enhancing the overall product performance in terms of physicochemical properties, drug loading and release behaviour was studied.

O Abdallah (Supervisor), N Nafee (Co-supervisor), A Abdel Mageed (M.Sc. student), Faculty of Pharmacy, Alexandria University. **Development of in situ gelling systems for nasal application.**

2016-current. Status: Ongoing.

The thesis aims at the application of nasal route for systemic and/or brain drug delivery. In this context, *in situ* gelling systems based on temperature and/or pH triggered hydrogels were formulated. The *in situ* gelation provides ease of administration (in the liquid state) and sustained drug release (from the hydrogel) post instillation. Various formulations were prepared, candidates with optimized physicochemical properties were selected. Efficacy of the loaded formulations was confirmed *in vivo*.

F. Hashem (Supervisor), A. Zaghloul (Co-supervisor), A. Morad (MSc Student), Department of Pharmaceutics, Faculty of Pharmacy, Helwan University. Formulation and Evaluation of Paediatric Suppositories Containing Certain Medications. 2018-2020. Status: Ongoing.

The aims of this study are to develop paediatric rectal suppositories containing certain medicaments (e.g. antibiotics, antiepileptics, hypoglycemics) to be alternatives for oral and parenteral drug administration as in cases of severe nausea, vomiting, coma, fever, bitter taste, and needle phobia. The prepared formulations will be *in vitro* characterized for manufacturing defects, content and weight uniformity, mechanical strength, penetration time, melting and disintegration range and dissolution profiles. Appropriate excipients may be added and different techniques may be applied to improve the *in vitro* bioavailability of target drugs. The bioavailability assessment of the optimized formulation(s) will be studied on animal and/or human volunteers to correlate the in- vitro *in vivo* results (IVIVC).

Faculty Research Projects

MA Khajah (PI), YA Luqmani (CoI). PT01/14 from RS. **Studies on the role of the Na^+/K^+-ATPase channel in endocrine resistant breast cells. Budget: KD 66,100 from RS, Kuwait University. 2015-2018. Status: Ongoing.**

Na+/K+-ATPase (NKP) is an important ion transporter pump as well as an integral signal transduction molecule, whose expression profile is altered in various tumours including breast. In this proposal, we aim to study the effect of inhibiting the NKP (using two chemical inhibitors; ouabain and 3,4,5,6-tetrahydroxyxanthone, as well as siRNA-mediated knockdown), on various cellular functions (such as proliferation, motility, *in vitro* and *in vivo* invasion) and its contribution in modulating various signaling critical in breast cancer pathogenesis. This pump may offer a novel future therapeutic target to be used in breast cancer patients who have developed metastasis, aiming to improve therapeutic outcomes and enhance survival rate.

W Masocha (PI) and NF Al-Tannak (CoI). PT02/15. **Determination of the role of the endocannabinoid system in the enhanced antinociceptive activity of the combination of indomethacin with minocycline in rodent models of pain. Budget: KD 89,900 from RS, Kuwait University. 2016-2019. Status: Ongoing**

Previously, we observed that co-administering indomethacin plus minocycline (IPM) to mice results in enhanced antinociceptive effects. The objective of this proposal is to examine how the endocannabinoid system play a role in the antinociceptive effects of the IPM combination. This will be evaluated by measuring the expression of endocannabinoid molecules in rodents with paclitaxel-induced neuropathic pain (PINP) treated with IPM; and also by administering antagonists of the cannabinoid receptors together with IPM to rodents with PINP using the hot

plate test and dynamic plantar aesthesiometer. This study will provide us with knowledge of the mechanism of the IPM's synergistic effects and could also provide us a platform for further use of evidence based drug combination in the management of neuropathic pain.

A Nada (PI), M Hedaya (CoI), F Bandarkar (Contributor). PP02/17 **Formulation and Pharmacokinetic Study of Ibuprofen Nanoformulations. Budget: KD 4000 from RS, Kuwait University. 2017-2018. Status: Ongoing.**

Ibuprofen (IB) is a widely used non-steroidal anti-inflammatory drug (NSAID). According to the Biopharmaceutics Classification Scheme (BCS), IB is a class II drug characterized by high permeability and low solubility. Because of its high membrane permeability, its dissolution from the dosage forms is the rate limiting step for its absorption. Thus, the improvement of IB dissolution for its immediate release at absorption site in the gastrointestinal tract following oral administration is desirable for optimal therapy. The current proposed project will focus on the assessment of the bioavailability of the drug from optimized nanoformulations, based on pharmacokinetic studies in animals. The in vitro and in vivo pharmacokinetic parameters obtained from the test formulations will be compared to a reference marketed product, as well as untreated raw IB powder.

BA Qabazard (PI), MH Yousif, A Mousa (Co-Is), OA Phillips (Contributor). PT03/16**. A study of the effect of chronic hydrogen sulfide treatment in the corpus cavernosum of type-1 diabetic rat model. Budget KD 20,000 KD from RS, Kuwait University. 2018-2020. Status: Ongoing.**

Erectile dysfunction (ED) is a common diabetic complication for which current treatment is limited to phosphodiesterase inhibition (PDEi). With the problem of PDEi resistance/poor response in diabetic patients, it is important to investigate new targets/treatment for this problem. Recent evidence has illuminated the role of hydrogen sulfide (H_2S) as a dynamic mediator of the erection process, representing a promising target for treating ED. Several pathological changes take place in the diabetic penile tissue, including inflammation, oxidative stress, neuropathy and fibrosis of the corpus cavernosum (CC), the major erectile structure of the penis. The aim of the study is to Investigate the role H_2S as a potential protective mediator against diabetes-induced structural and functional alterations in the CC by examining if it: (1) enhances corporal relaxation following pharmacological stimulation, and (2) attenuates fibromuscular changes in diabetic CC. These studies may identify potential new strategies for the treatment of diabetes-induced ED.

BA Qabazard (PI), W Masocha (CoI). PT04/16 **Evaluation of the activity of hydrogen sulfide in a rodent model of chemotherapy-induced neuropathic pain. Budget 4,000 KD from RS, Kuwait University. 2017-2019. Status: Ongoing.**

Paclitaxel is an important chemotherapeutic agent for treating metastatic breast cancer and other solid tumors. However, painful peripheral neuropathy is a common side effect of paclitaxel therapy for which no clinically proven drugs are available, except duloxetine which has moderate recommendation for treatment of chemotherapy-induced neuropathic pain (CINP). Recently, a role for hydrogen sulfide (H_2S) in nociception modulation has been suggested. The role of H_2S in relieving CINP is unknown, and whether H_2S can play a role in modulating CINP remains to be identified. Our preliminary results suggest that the novel H_2S donor GYY4137 has an anti-hyperalgesic effect in mice with paclitaxel-induced thermal hyperalgesia. Thus, we will utilize GYY4137 to investigate the potential of H_2S donors to prevent or alleviate pain in a mouse model of CINP.

N Al-Hasawi (PI), OA Phillips, F Al-Awadhi, L Novotny (CoIs), LH Sharaf, S Amine (Contributors). PC01/17**. "Anti-proliferative and anti-progressive effects of a series of glycinyl and alaninyl triazolyl-oxazolidinones on Kelly neuroblastoma cell line." Budget KD 4,000 from RS, Kuwait University. 2018-2019. Status: Ongoing**

Neuroblastoma is the most extracranial malignant childhood tumor. It accounts for 15 % of children related-death at type age between 0 and 14 years old. Despite the intensive treatment regimen of patients with high risk of scarification of neuroblastoma, the clinical outcome is poor with greater than 50 % of tumor recurrence. Oxazolidinones are 5-membered heterocyclic compounds with anti -bacterial activity against resistant Gram-positive pathogens including Mycobacterium tuberculosis. Recently, the anti-cancer properties of triazolyl-oxazolidinone derivatives was demonstrated against breast cancer cell lines by inhibiting up to 70 % of the proliferation of MCF7 cells and reducing motility and invasion by 50 % of MDA-MB-231 cell. The aim of the project is to synthesize a series of triazolyl-oxazolidinones derivatives, in order to study their effects on the proliferation and progressive behaviour of Kelly neuroblastoma cells including their adhesion and migration.

N Al-Hasawi (PI), K Orabi, N Al-Tannak (Co-Is) RP01/16. **Bioactivity guided fractionation of Withania somnifera (L) Dual roots extract: Evaluation of NCAM polysialyation inhibition in human cancer cells. Budget : KD 27,200 from RS, Kuwait University. 2017-2019. Status: Ongoing.**

It has been known for several decades that alterations in glycosylation patterns play an important role in the metastasis of cancer cells but thus far few drugs have been developed which specifically target these molecules. Polysialic acid (PSA) is a developmentally regulated cell-surface glycan which, in mammals is mainly expressed on neural cell adhesion molecule (NCAM). Polysialylated NCAM is abundant in embryonic tissues and limited to areas of persistence of neuronal plasticity in adults. It has been reported that PSA is re-expressed in a number of malignant and highly metastatic cancers where it appears to be associated with tumour progression. We propose a therapeutic approach in which expression of PSA could be inhibited by treatment with relatively non-toxic agents that do not target cell survival processes. The aim of this proposal is to perform an extensive fractionation of a well-known Ayurvedic medicine Withania somnifera or ashwagandha, in order to potentially identify constituents that can reduce tumour cell motility through inhibition of PSA expression without exerting cytotoxicity.

D Al-Taweel (PI), A Awad (Co-I). PR18-13PR-01 From KFAS**. Evaluation of adherence to clinical guidelines for treating patients with chronic cardiovascular diseases in Kuwait. Budget KD 8,000 from RS, Kuwait University. 2018-2020. Status: Ongoing.**

Information regarding the prescribing practice of physicians in the management of patients with chronic cardiovascular diseases in different healthcare sectors in Kuwait is lacking, particularly in secondary care. This highlights the need to acquire data in this field to assist top stakeholders including policy makers to plan for the best quality of medical management for patients with chronic CVDs in secondary healthcare settings in Kuwait. To our knowledge, our study demonstrates a novel approach to evaluate and identify gaps in the adherence of medication use to clinical guidelines for chronic CVDs in the secondary care setting in Kuwait and likely, in the Middle Eastern countries.

A Al-Bassam (PI), K Matar, J Al-Barrak (Co-Is), A Kaseb, H Tran (Contributors). PR01/16**. Pharmacokinetic Investigation of black seed oil in healthy volunteers. Budget KD 4,000 from RS, Kuwait University. 2017-2018. Ongoing.**

Our objective is to determine the pharmacokinetic parameters in black seed oil active ingredient, thymoquinone (TQ). The black seed herb has been used for many years as part of herbal medicine. However, the mechanism of its action is still unknown and its basic pharmacokinetic profile is still lacking. TQ was first extracted in 1960's and was defined as the main active constituent of the black seed herb after a series of experiments. Examining TQ effects on several disease states including cancer, epilepsy, liver disease, GI ulcer, has been the focus in the past few years. The aim of this study is to conduct the first human trial evaluating the pharmacokinetics of black seed and the TQ content of the black seeds in healthy human subjects.

A El-Hashim (PI), M Khajah, K Orabi (Co-Is). P11613PT01 **Investigation into the inflammatory mechanisms of onion bulb extract and its active constituents in animal models of inflammation. Budget KD 121,000 from KFAS. 2016-2019. Ongoing.**

Onion has been shown to have anti-inflammatory properties. In this proposal the onion will be extracted and fractionated to give several fractions with different polarities. The extract, along with the fractions, will be tested in both asthma and inflammatory bowel disease models. This study is expected to shed light on novel mechanistic pathways for the anti-inflammatory action of the extract. This study may also serve as the basis for using onion or its active constituent(s) as therapeutic agents for treating inflammatory diseases or preventing their development.

J Lemay (PI), M Waheedi (CoI), S Alsharqawi (Contributor), T Bayoud (Contributor). PT02/16**. Beliefs about Medications: A Kuwait's Perspective. Budget KD 3,900 from RS, Kuwait University. 2016-2018. Status: Completed.**

Medications are essential part of chronic disease management. However, adherence to long-term therapy remain poor. Cultural and religious beliefs are quite different between ethnic groups and they influence the beliefs about medications and ultimately, adherence to treatment. However, there is a paucity of data regarding important beliefs about medications in the Middle East region and it remains to be determined how these beliefs would impact treatment adherence. The aim of this project is to investigate the relationship between patients' beliefs about medications with self-reported adherence to treatment among patients with chronic illnesses who are followed up in primary care clinics in Kuwait.

A Al-Romaiyan (PI), S J Persaud (Co-I), P Jones, S Oyedemi (Contributors). PT01/17. **The *in vitro* effect of commiphora myrrha extract on islet function. Budget KD 4,000 from RS, Kuwait University.2017-2019. Status: Ongoing.**

The prevalence of diabetes mellitus is growing worldwide. In Kuwait the incidence of diabetes is significantly increasing. Glycemic control of diabetes is still underachieved and the need of new medicines for diabetes control is demanding. Herbal medicines have attracted the attention as a safe antidiabetic medicines long ago. Preliminary studies in animals showed that administration of the extract of herbal medicine Commiphora myrrha (CM) reduces the glucose blood levels and increases insulin secretion. The molecular mechanism of the hypoglycemic effect is, however not yet identified. In this project, the insulinotropic effect and the cellular mechanism of CM extracts will be examined in beta-cells and primary islets *in vitro*.

S Al-Ghanem (PI), W Alfouzan, J Covvey, W AlAdsani (Co-Is). PT01/17**. Audit prescribing pattern for colistin in Kuwait hospitals. Budget: KD 3,500 from RS, Kuwait University. 2018- 2019. Status: Ongoing.**

Colistin is widely used to treat infections caused by multidrug-resistant (MDR) Gram-negative bacteria. The optimum dosage of Colistin is unclear due to a lack of accurate pharmacokinetic and pharmacodynamic information, also the current dosing guidelines are not based on scientific background This lead to treatment failure as well as emergence of resistance. In Kuwait, MDR infections have emerged with an increase need to use Colistin. Efficacy and safety for Colistin administration have not yet been established and there is still confusion around the "optimal" dosing regimen. In the era of increased awareness of antibiotic stewardship to prevent MDR pathogens across the globe and nationally, it is imperative that we investigate the current prescribing practices in Kuwait to establish a common consensus across all health institutions regarding the appropriate dosing to maximize efficacy and safety.

M Al-Soraj (PI), YA Luqmani, A Roidl (Contributors). PP01/14. **Restoration of estrogen receptor functionality into mesenchymal-like invasive breast cancer cells. Budget KD 91,000 from RS, Kuwait University. 2016-2019. Status: Ongoing.**

We aim to restore expression of estrogen receptor (ER) and E-cadherin these genes permanently by transfection of appropriate constructs into the ER- tumour cells as well as transiently by exposure to de-methylating agents and histone deacetylase inhibitors. We will also re-express E-cadherin and down-regulate the principal mediators of EMT in our ER silenced cell lines to determine whether EMT that has been induced in these cells can be reversed at points further along the pathway. Another strategy will be to introduce ER protein directly into the ER silenced cells to bypass the siRNA mediated blockade. We will then assess their properties with respect to morphological behaviour and gene expression profile.

Co-investigator in projects outside the Faculty

A Al-Bader (PI), K Matar, C Mathew, A Al-Taiar, M Hammoud. RM 02/15**. Role of carnitine and amino acids in the etiopathogenesis of type 1 diabetes in the experimental NOD mouse model. Budget KD 52,150 from RS, Kuwait University. 2018-2021. Status: Ongoing.**

The objectives of this project are: i. to investigate the effect of carnitine supplements during pregnancy and early life in reducing the risk of type 1 diabetes (T1D) in non-obese diabetic (NOD) mouse, ii. to investigate the association between the levels of amino-acids and carnitine during pregnancy and early life and the risk of T1D in NOD mouse

M Abaza (PI), K Orabi (Co-I), K ElSayed (Co-I), A Bahman (Co-I), A Elnagar (Contributor) and R Al-Attiyah (Contributor). SL02/10. **Computer Modeling-Assisted Design and Semisynthesis of Natural Flavonols Analogues as Potent Proteasome Inhibitors in Vitro, in male and female cancer cells: Apoptosis Inducing and Chemo-Sensitization Potencies. Budget: KD 77,050 from RS, Kuwait University. 2014-2018.Status: Ongoing.**

This project is designed to study the potential of natural flavonols and their semisynthetic analogues, which were pre-designed and examined by *in-silico* docking, to inhibit proteasomal activity *in vitro* in a cell-free system. In addition, their ability to target the ubiquitin-proteasome pathway (UPP) in human male and female tumors, including prostate, breast, and ovary, cancer cell lines is evaluated. Moreover, this project evaluates the antiproteasomal activity and the underlying molecular mechanisms of action through analysis of genes controlling cell cycle, apoptosis and tumor signal transduction. Studying natural phenolics and their *in-silico* pre-designed semisynthetic analogues may lead to the identification of a new generation of proteasome inhibitors.

MH Yousif (PI), BA Qabazard (CoI). MR01/17. **A study on the protective effect of chronic treatment with an H_2S donor on type-1 diabetes-induced impaired reactivity of the perfused mesenteric vascular bed in SD rat. Budget 4,000 KD from RS, Kuwait University. 2017-2019. Status :Ongoing.**

Several studies have reported the presence of biological mechanisms associated with diabetes mellitus that can potentiate the risk of cardiovascular disease in diabetic patients. The direct economic problem associated with diabetes mellitus is attributed to the occurrence of macro- and microvascular complications including coronary artery disease, myocardial infarction, hypertension, impaired reactivity of the blood vessels, retinopathy, end-stage renal disease and neuropathy. Only few studies have examined the effects of *in vivo* administration of the gaseous mediator hydrogen sulfide (H_2S) on the development of complications associated with type-1 diabetes. In this project, we will investigate the therapeutic effectiveness of the slow-releasing H_2S donor GYY4137

(Morpholin-4-ium (4-methoxyphenyl)(morpholino) phosphinodithioate) on the impaired vascular function of the mesenteric vasculature in streptozocin (STZ)-induced diabetic rats.

C Ezeamuzie (PI), OA Phillips (CoI). Research Project MR01/14. **A study of oxazolidinone hydroxamic acid derivatives as novel inhibitors of leukotriene biosynthesis. Budget KD 94,873 from RS, Kuwait University, 2015-2018. Status: Ongoing.**

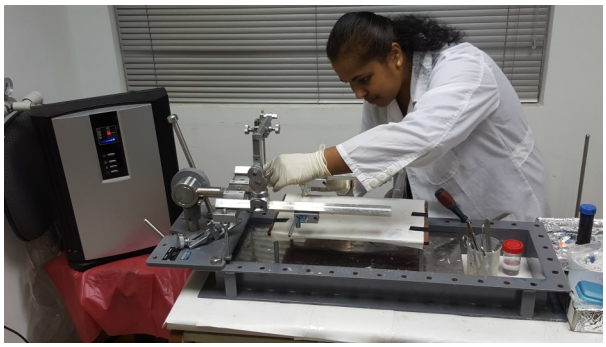
We recently demonstrated that a series of oxazolidinone hydroxamate derivatives have potent inhibitory effect on the release of LTC4 following antigen/IgE-mediated activation of mast cells. In this research proposal, we plan to synthesize a series of hydroxamate oxazolidinone analogues and characterize their biological activity, structure-activity relationships and mechanism of action, focusing on their effects on LT release during IgE/antigen-dependent and -independent activation of mast cells *in vitro* and *in vivo*. Cultured and IgE-sensitized rodent mast cells, as well as human blood leukocytes will be stimulated *in vitro* and the effect of the compounds on the release of LTs and degranulation determined. The mechanism of action of the lead compound will be investigated by studying its effect on the activity of the 5-LO enzyme relative to cyclo-oxygenase (COX) enzymes and other enzymes or signalling molecules in the AA metabolic pathway.

N Nafee (PI), A Abouelfettouh (Co-I), D Gaber (Co-I) from Faculty of Pharmacy, Alexandria University, Egypt in collaboration with M Schneider from Saarland University and R Hartmann from Helmholtz Institute for Pharmaceutical Sciences Saarland (HIPS), Germany. **Inhalable nano-embedded microparticles for the pulmonary delivery of novel anti-infectives. Budget: 55,000 Euro funded by the Alexander von Humboldt Foundation. 2017-2019. Status: Ongoing.**

Bacterial infection is a hallmark of lung disease provoking extreme impairment. The *biofilm* matrix renders antibiotics ineffective and secures survival of the embedded pathogen. Novel strategies address either biofilms disintegration and/or interference with bacterial processes to prohibit their protective mechanisms. Mucus-penetrating solid lipid nanoparticles (SLNs) proved potential in improving delivery, release and biological activity of the payload, which endorses further investigations. First, the influence of nanoparticle characteristics governing *P.aeruginosa* attachment, virulence and biofilm formation is of ultimate significance. Second, coating/decorating particles with biofilm-modifying entities has been undertaken for targeted drug delivery. Third, nanoembedded inhalable microparticles were formulated. Finally, *in vivo* application to infected lung model merits assessment.

Facets of Phamaceutical Research & Practice

Tissue culture

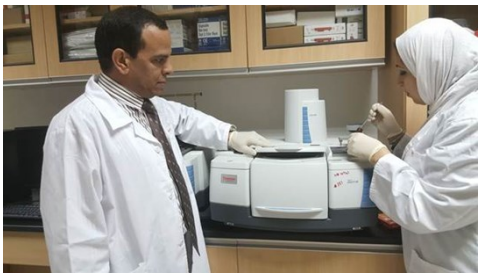


Neuropharmacology

Synthetic chemistry

Microscopic analysis

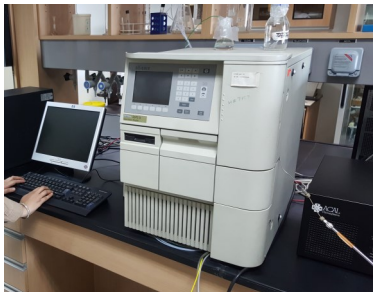
Pharmaceutical formulations



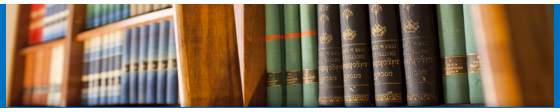
Oncology preparations

Pharmaceutical analysis

Dispensing decisions



List of Publications



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List of Conference Presentations

Oral Presentations

Al-Hasawi NA, Amine SA, Novotny L (2017). The *in vitro* anti-proliferative interaction of flavonoid quercetin and toxic metal cadmium in 1321N1 human astrocytoma cell line. The 3rd World Congress on Pharmaceutics and Drug Discovery, Dubai, UAE.

Al-Taweel D (2017). Evaluation of medication use in elderly patients, 45th European Society for Clinical Pharmacy (ESCP) Conference, Germany

Al-Taweel D (2017). Screening and treatment of microalbuminuria in patients with Type 2 diabetes in a primary care setting: a clinical audit, 45th European Society for Clinical Pharmacy (ESCP) Conference, Germany

Etman M, Shekedef M, Nada AH, Ismail A (2017). In vitro & in vivo meloxicam co-ground mixture with PEG 6000, International Conference and Exhibition on Pharmaceutical & Novel Drug Delivery Systems, Philadelphia, USA.

Kombian S (2018). *Reward and Addiction: Are there endogenous psychogenic substances? A case for substance P and cholecystokinin, Keynote Speaker.* Convention of Biomedical Research Ghana (CoBReG), 11th Annual Ghana Biomedical Convention, University of Health and Allied Science, Ho, V/R, Ghana.

Lemay J, Alsaleh FM, Al-Buresli L, Al-Mutairi M, Abahussain EA, Bayoud T(2017) Adverse Drug Reaction Reporting in Primary Care: A Comparative Study between Physicians and Pharmacists in Kuwait; 12th World Pharma Congress, Budapest, Hungary.

Mikus P, Pecher D, Dokupilova S, Zelinkova Z, Peppelenbosch M, Mikusova V, Piestansky J, Marakova K, Havranek E, Novotny L, Mucaji P (2017). Analysis of low-molecular drugs by means of HPLC-MS methods: Development of HILIC-Q-TOF MS method for determination of TPMT enzyme activity. Analytical Chemistry Workshop, Faculty of Pharmacy, Comenius University, Bratislava, *Presented by Mikus P.*

Moreau P (2017). Leading Curriculum Change: Change management case study from Kuwait. FIP-AIM forum, FIP World Congress, Seoul, South Korea.

Moreau P (2018). Principles of Assessment: Why planning assessment matters? Third forum on advancing pharmacy education in the Middle East and the Gulf region. Beirut, Lebanon.

*Novotny L, Al-Hasawi NA (2018). Anti-proliferative interaction of quercetin and cadmium: A possible new quercetin-related benefit in the human. The 15th Annual European Pharma Congress. Frankfurt, Germany.

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Pecher D, Dokupilova S, Mikus P, Zelinkova Z, Peppelenbosch M, Mikusova V, Piestansky J, Marakova K, Novotny L, Mucaji P (2017). Analysis of low-molecular drugs by means of HPLC-MS methods: Development of IEC-QQQ MS method for metabolomic profiling of thiopurines. Analytical Chemistry Workshop, Faculty of Pharmacy, Comenius University, Bratislava – *Presented by Pecher D.*

Qabazard B, Masocha W, Khajah M and Phillips OA. (2018). H_2S donor GYY4137 prevents and ameliorates thermal hyperalgesia, and cold and mechanical allodynia in a murine model of paclitaxel-induced neuropathic pain. Global Pharma and Nursing Meet. Dubai, UAE.

Poster Presentations

Abd-El-Azim H, Tekko I, Ramadan A, Nafee N, Khalafallah N, Voraa L, Cordeiro S, Permana AD, Donnelly RF (2018). Hollow microneedles incorporating hypericin-loaded nanocapsules for improved localized photodynamic therapy. 78th World Congress of Pharmacy and Pharmaceutical Sciences, Glasgow, UK.

Al-Adwani DG, Orabi KY, Renno WM (2018). Neurotherapeutic Effects of *Ginkgo Biloba* Extract and Its Isolated Ginkgolide B. 23rd HSC poster conference, Kuwait.

Al-Kazemi R, Nada AH, Albasarah Y (2018). Dissolution Enhancement of Atorvastatin Calcium by Co-crystallization, 23rd HSC Poster Conference, Kuwait

Al-Rabeea A, Luqmani Y, Khajah M (2018). Extracellular Vesicles as Modifiers of phenotypic behaviour of co-cultured recipient breast cells. 23rd HSC poster conference, Kuwait.

Al-Tabba' R, Khajah M, Masocha M (2017). Enhancement of the Anticancer Activities of Paclitaxel by COL-3 in Human Breast Cancer Cell Lines. 22nd HSC poster conference, Kuwait.

Azer MS, Zaghloul AA, El-Nabarawi MA, Makky AM, Abd El-Moniem RA, Nada, AH (2018). Self-nanoemulsifying Drug Delivery System of Lamotrigine: Design, Preparation and *In-vitro* Characterization, 23rd HSC Poster Conference, Kuwait.

El-Hashim AZ, Khajah M, Benter I, Babyson R, Akhtar S, Uddin M (2017). Epidermal Growth Factor (EGF) Receptor and Src Kinase Activation Are Essential for the Development of Allergic Airway Responses. 22nd HSC poster conference, Kuwait.

Hedaya MA, Thomas V, Abdel-Hamid ME, Kehinde EO, and Phillips OA (2017). Study of the matrix effect on the determination of Linezolid and a novel Oxazolidinone compound (PH027) in tissue samples using UPLC-MS/MS, Application to tissues distribution study. AAPS Annual Meeting, San Diego CA , USA.

Khajah M, Mathew PM, Luqmani YA (2018). Invasive capacity of endocrine resistant breast cancer cells is enhanced by Na+/K+ ATPase activity by increased phosphorylation of its downstream signaling molecules. 23rd HSC poster conference, Kuwait.

**Lemay J, Waheedi M, Al-Taweel D, Bayoud T, Moreau P (2018) Status of Clinical Pharmacy in Kuwait. 8th Pharmaceutical Care Conference, Muscat, Oman.

Masocha W, Thomas A (2018). Cannabinoid receptor dependent effects of the combination of indomethacin plus minocycline in murine models of drug-induced neuropathic pain. PainSA Congress, Johannesburg, South Africa.

Nada AH, Bandarkar F (2018). Molecular entrapment of Ketoprofen in Beta-Cyclodextrin to enhance drug solubility and dissolution rate, 23rd HSC Poster Conference, Kuwait

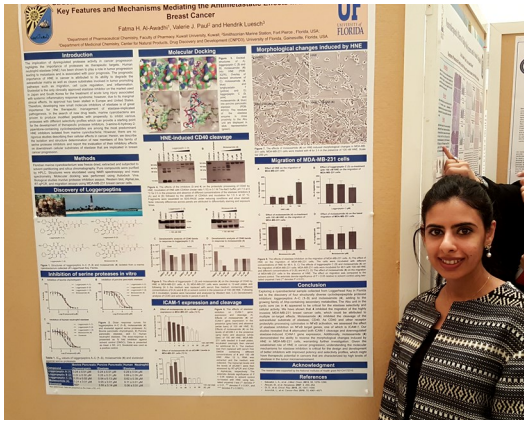
Orabi K, Al-Adwani D, and Renno W (2018). Neuroprotective Effects of *Ginkgo biloba* Extract and Ginkgolide B". The 58th Annual Meeting of the American Society of Pharmacognosy, Lexington, KY, USA.

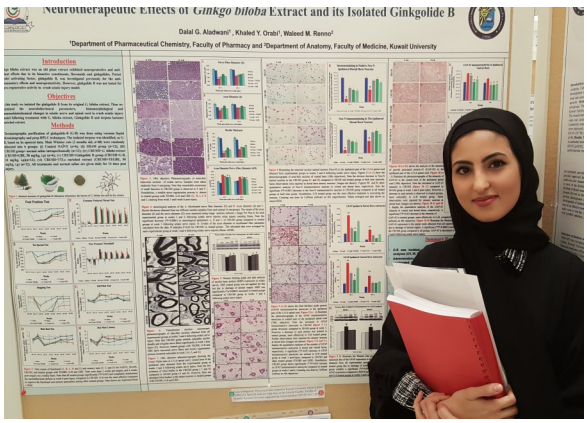
Qabazard B, Masocha W, Khajah M and Phillips OA. (2018). H_2S donor GYY4137 prevents and ameliorates thermal hyperalgesia, and cold and mechanical allodynia in a murine model of paclitaxel-induced neuropathic pain. Global Pharma and Nursing Meet. Dubai, UAE.

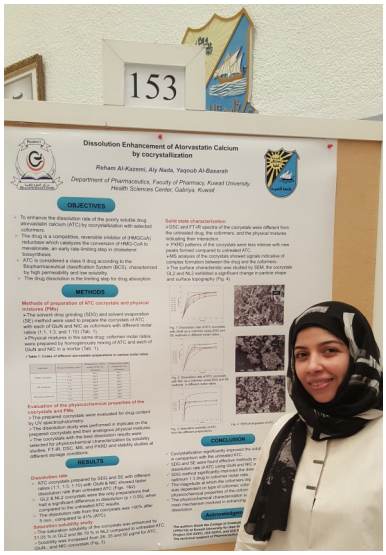
Waheedi S, Batra P, Farris KB (2018) Lipid-based versus body-mass-index based method for assessing cardiovascular risk. 78th FIP World Congress of Pharmacy and Pharmaceutical Sciences, Glasgow, UK.

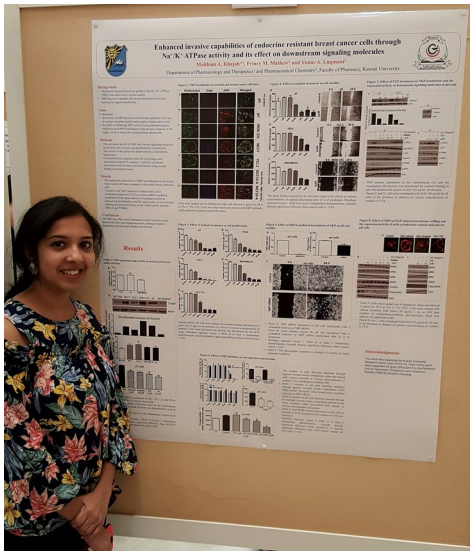
* Certificate of recognition
** Best Poster Award

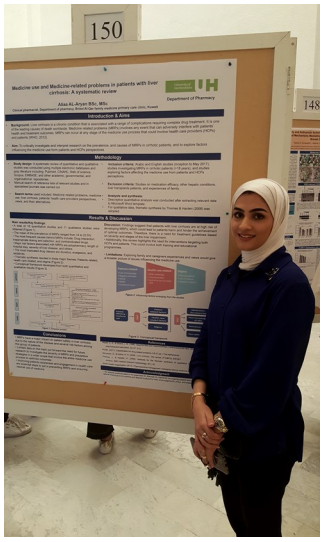
HSC PosterDay

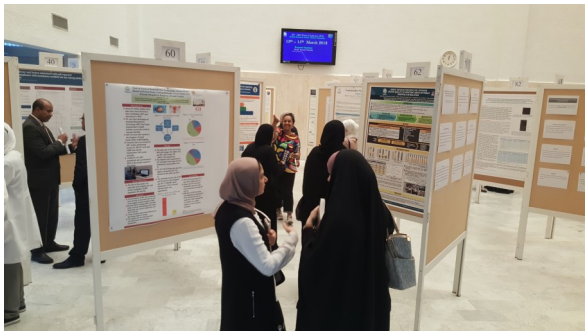




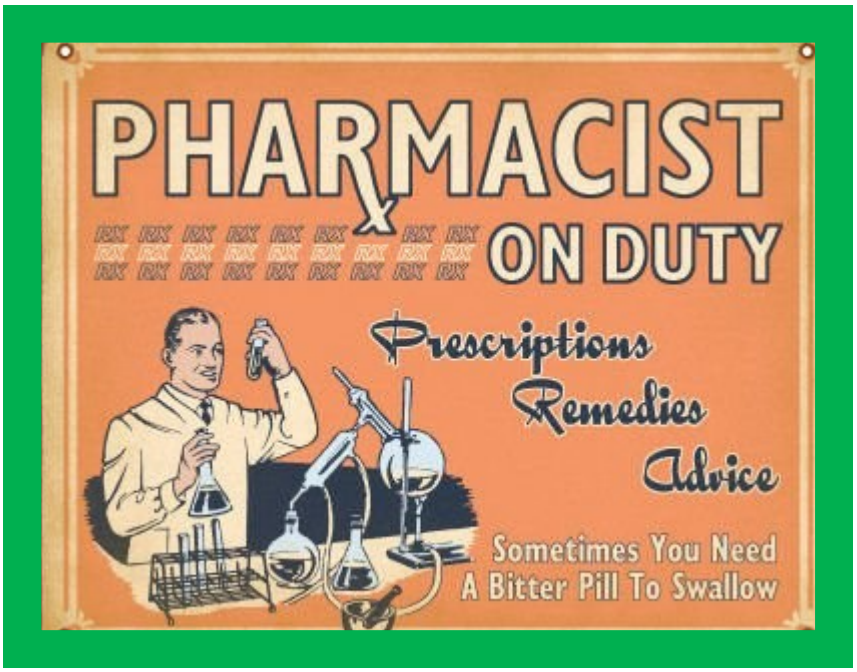








Community Service



interaction with a pharmacist can be beneficial for your health!

Individual contributions

Pierre Moreau

- Member of the Advisory Board of the FIP-Academic Institutional Members, representing the Middle-East region.
- Co-chair of the "Task Force on the Advancement of Pharmacy Practice in Kuwait" (TAPP).
- Co-chair of the "Annual Forum on Advancing Pharmacy Education in the GCC and Middle-East".
- Organiser of the workshop on Interprofessional Education by Prof. Alan Dow. Health Sciences Centre, Kuwait University, Kuwait, January 2018.
- Editor of FOP-Update Newsletters.

Pierre Moreau & Tania Bayoud

- Preceptor training for the add-on PharmD placements. Two-day workshop on general preceptor skills and assessment of PharmD students. January, May, June, August 2018.

Ladislav Novotny

- Editor-in-Chief, Journal of Pharmaceutical Analysis (from 2015), International Journal of Clinical Pharmacology and Pharmacotherapeutics.
- Member of the Editorial Board, 15th Annual European Pharma Congress: "Discover and Explore the Future of Pharma", May 2018, Frankfurt, Germany.
- Certificate of Special Recognition for serving as a member of the conference Organizing Committee of the 15th Annual European Pharma Congress. Frankfurt, Germany, May 2018.
- Member of the Editorial Board, The 18th International Nutrition & Diagnostics Conference, September, 2018, Prague, the Czech Republic-International Scientific Committee.

Maitham Khajah

- Member in the joint MSc Molecular Biology Program, College of Graduate Studies, Kuwait University (July 2017 – present).
- Presented a 3-day (12 hours in total) workshop. Title: Inflammatory bowel disease: An update for healthcare providers. Office of consultations, Services, and Training, Faculty of Pharmacy, Kuwait University (March 2018).

Bedoor Qabazard

- Co-ordinated a workshop, "Team Teaching in Integrated Courses", Theme "advancing pharmacy education in the GCC and middle-east", 6th Kuwait International Pharmacy Conference 2017 , Faculty of Pharmacy, Kuwait University, Kuwait.

Willias Masocha

- Member of the 23rd, HSC Poster Conference Judging Committee (March 2018).
- Co-organizer of the International Brain Research Organization (IBRO) UM5 Advanced School on Neuroimmunology and Brain Infections, Rabat, Morocco (November 21 – December 4, 2017).
- Board member of the Global Schools of Neuroimmunology representing African School of Neuroimmunology under the International Society of Neuroimmunology Schools Program (2017).

Khaled Orabi

- Consultant, the General Administration of Criminal Evidences, Ministry of Interior, Kuwait. Provides different consultations in the field of drugs of abuse detection. Put a plan to

develop the Departments of Narcotics and Toxicology. Started a comprehensive database for cannabimimetics, 2016 – Present.

- Leader, Joint Research Team; Faculty of Pharmacy, Faculty of Science, Kuwait University and the General Administration of Criminal Evidences, Ministry of Interior, Kuwait. The team is established to collaboratively do research on detection and identification of drugs of abuse newly introduced and confiscated in Kuwait. 2014 – Present.

Yunus Luqmani

- Chairman of 23rd HSC Poster Conference 2017/18
- Member of 24th ,HSC Poster Conference 2018/19

Yunus Luqmani, Leyla Sharaf, Samuel Koshy

- Editorship of Kuwait Pharmacy Bulletin, Faculty of Pharmacy

Aly Nada

- Consultant for training on GMP, Kuwaiti-Saudi Pharmaceutical Industries Co. (KSPICO), Kuwait.

Naser Al-Tannak

- During Scientific leave (2017-2018), Faculty of Pharmacy, Strathclyde University, Glasgow, UK shared supervision of an MSc student (Sept-Dec 2017) and partially supervised a Ph.D. student (Oct 2017 - Oct 2018)
- Appointed as an "Ambassador of Science" for the University of Strathclyde, UK (2017- date).

Dalal Al-Taweel

- Organised a workshop on "Medicines information skills for pharmacists", conducted with Al Haqan A and Abdel-Meguid S, Kuwait Medicines Information Centre, Faculty of Pharmacy, Kuwait, December 11-13th, 2017
- Organised a workshop on "Scale up your medicines Information skills", conducted with Al Haqan A and Abdel-Meguid S, *8th Pharmaceutical Care Conference*, Muscat, Oman. February 21-22nd, 2018.
- Director, Kuwait Medicines Information Centre, Faculty of Pharmacy, Kuwait University.
- MSc/PhD external/internal assessor or examiner.
- Supervision of MSc student (Heidi Rezq) in collaboration with University of Dundee, UK and Dasman Diabetes Centre, Kuwait.

Continuing Education Programme

- Impact of Nanomedicine on the Future of Medicine: The Road Toward Precision Medicine/Case Studies*, Shaker A. Mousa, PhD, MBA, FACC, FACB*, The Pharmaceutical research Institute, ACPHS, Albany, NY USA, Dec 22, 2017.

- Characterisation of the Effects and Mechanisms of prostaglandin E2 (PGE2) in Central Sensitisation of the Cough Reflex, *Al-Shaimaa Al-Kandery,* Pharmaceutical Sciences MSc Programme, Faculty of Pharmacy, Feb 21, 2018.

- Dual Formulation and Pharmacological Strategies to Enhance the Oral Bioavailability of Paclitaxel", *Bashayer Al-Kandari,* Pharmaceutical Sciences MSc Program, Faculty of Pharmacy, Feb 28, 2018.

- Impact of valproic acid on busulfan pharmacokinetics: in-vitro assessment of potential drug-drug interaction, *Bashayer Al-Enezi,* Pharmaceutical Sciences MSc Programme, Faculty of Pharmacy, April 11, 2018.

- Investigations into the Sensitizing Effects of Bradykinin on Central Cough Pathways and its Signaling Mechanisms, *Fajer Al-Shamlan,* Pharmaceutical Sciences MSc Programme, Faculty of Pharmacy, April 30, 2018.

- Population Pharmacokinetics of Topiramate in Patients with Epilepsy in Kuwait, *Mandy Moien Mohamed,* Pharmaceutical Sciences MSc Programme, Faculty of Pharmacy, July 3, 2018.

Office of Strategic Alliances

Since its creation in 2015, the Office of Strategic Alliances (OSA) has worked towards developing long standing partnerships with key external stakeholders interested in contributing and working towards an expanded scope of pharmacy practice in Kuwait. In order to achieve this goal and in light of the allowed activities of the Office of Consultations Studies and Training (OCST), the OSA has undergone significant changes. To that end, the two steering committees (e.g.: steering committee for the expansion of the scope of pharmacy practices and steering committee for the implementation of continuing professional development for pharmacists) were dissolved and the "Taskforce for Advancing Pharmacy Practice" (TAPP) was further strengthened with the following objectives:

- Enable pharmacists to develop their competencies to embrace a more clinically-oriented practice.
- Identify and initiate national projects (or services) that will advance the scope of practice, and improve the public perception and trust by other healthcare professionals of the pharmacists.
- Identify and document current pharmaceutical policies and services in different institutions to develop unified practices.
- Develop, adapt or adopt frameworks and make recommendations to decision makers to support practice evolution.
- Develop key performance indicators to capture relevant metrics.
- Develop a formal communication plan for the task force, including publications, white papers, social media, conferences, etc.

To meet those objectives, TAPP created Special Interest Groups (SIG) to allow members to work in smaller focused group:

- SIG-Regulatory framework to develop a regulatory and legal framework
- SIG-Policies and Practice Guidelines to develop and harmonize policies, guidelines, procedures
- SIG-Education to work on a coherent education program, from undergraduate to CPD
- SIG-Communication to develop and implement a communication platform

As an example, the SIG-Regulatory is working towards its goal through the next Kuwait International Pharmacy Conference (KIPC). The conference aims, in part, at establishing a series of recommendations to support the development and implementation of clinical pharmacy in Kuwait.

Director, Dr Jacinthe Lemay

Kuwait Pharmacy Bulletin

The Kuwait Pharmacy Bulletin (KPB) is registered internationally with ISSN number 1028-0480 and published by Kuwait University Press. The editorial team consists of Yunus Luqmani, Leyla Hassan Sharaf and Samuel Koshy. It continues to be produced quarterly by the Faculty of Pharmacy. At the end of December 2018 we have completed 22 annual volumes amounting to a total of 88 issues since its inception in the spring of 1997.

The Bulletin is a non-profit publication distributed free of charge to academics within the Kuwait University Health Sciences Centre and other Faculties of the University, to hospital pharmacies and other Ministry of Health centres and practising pharmacists around the country. In addition it is also sent to a number of Universities and Medical/Pharmacy schools throughout the Gulf and Middle eastern regions. Distribution has been continued under the supervision of Mr Faleh Al Ajmi and Ms Noor Al Saffar.

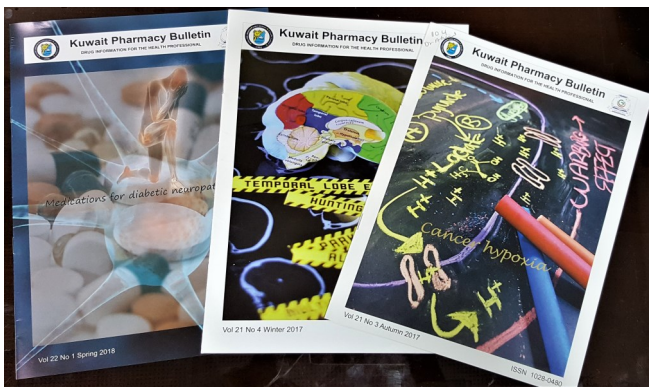
Our principal aim is to provide instructive articles on a range of drug-related and medical topics that we hope will be of interest to a wide academic and professional readership in both pharmacy and medicine. We are particularly reaching out to practitioners to encourage them to maintain an active interest in the scientific progress and achievements in the medical field. We feel this should be one of the objectives of the University, to disseminate knowledge beyond our confines. To our knowledge this bulletin remains the only such production from the Health Sciences Centre.

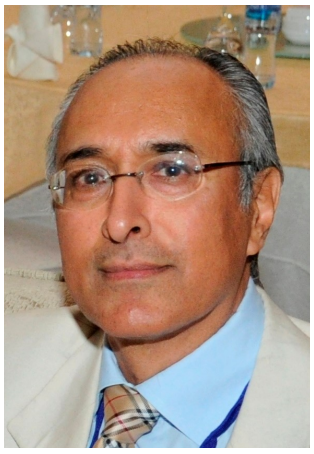
We have continued with the standardised format of the bulletin which has been refined over the past several years. We have tried to introduce a diverse range of topics to promote the integration of pharmacy and medicine and to maintain its appeal to both the scientific and the general healthcare community. While we maintain the essentially scientific nature of the publication we also include a mix of less technical and general material to make for easier and lighter reading.

We have adhered to the 16 page production and its organisation into regular sections; a *lead article* dealing in detail with some aspect of pharmaceutical medicine, sections entitled *Test your knowledge* (which includes a prescription question), offering readers some MCQ brain teasers, *Topical issues and controversies* presenting new interesting developments around the world, *In the news*, presenting short articles of important events/medical milestones, *News from the FDA* giving information on newly approved medicines of general interest, as well as highlighting warnings about commonly used drugs and a list of *newly registered products* approved by the MOH for use in medical practice in Kuwait. This information is provided by the Pharmaceutical and Herbal Medicines Registration and Control Administration Quality Assurance.
The front cover (designed by Ajwan Behbehani) has now been individualised and adapted to reflect the topic of the main article

Except for the lead article, the material included in the KPB is adapted, edited or compiled from a range of mostly web-based sources, taking copyright permission where appropriate. We have followed our past practice of asking our recently graduated students to provide the lead article from their final year research projects. We plan to continue this trend and encourage more participation from our student body.

Prof Yunus Luqmani (Managing Editor)

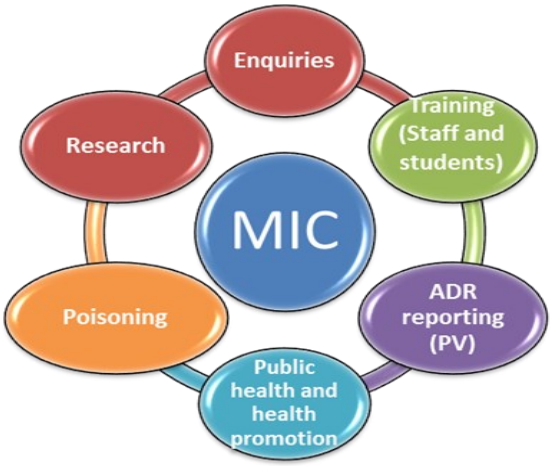




Kuwait Medicines Information Centre

Medicines information centers have been recognised by the WHO as a core component of national programmes to promote the rational use of medicines. The Kuwait Medicines Information Centre (KU-MIC) at the Faculty of Pharmacy, Kuwait University was established in 2014, to support the development of medicines information centres across Kuwait, serve as a focal point for all medicines information services, support healthcare professionals in providing therapeutic and pharmaceutical advice, plan educational programmes and provide training to students as an aspect of overall clinical training (BPharm and PharmD).

Since 2014, KU-MIC has trained over 50 pharmacists across Kuwait on basic medicine information skills, as well as conducted a regional workshop in the Pharmaceutical care conference in Muscat, Oman (2018). In 2016, the biggest Take back programme in Kuwait "TARSHED" was conducted by KU-MIC (Dr Eman Abahussain and Ph Shaima Abdulmajed) in primary care polyclinics at the MOH and proved very successful. Recent activities include the collaboration of KU-MIC staff with pharmacists at MOH, Dr Bedour Qabazard and Mr Sam Koshy, in developing a master sheet for antidotes availability in public and private hospitals in Kuwait, and are currently developing, in collaboration with the MOH, Expert Consensus Guidelines on Stocking of Antidotes in Kuwait.



Director
Dr Dalal Al-Taweel

Education & Training Coordinator
Ph. Asmaa Al-Haqan

Health promotion Coordinator
Ph. Shaima Elmetennawy

Office of Consultations, Services and Training

Dr Monerah Al Soraj

The OCST was established on January 7, 2009 upon the receipt of the approval letter from the Secretary General of Kuwait University. Its organisational structure follows the one mentioned in the University President Decree number 1072 dated May 11, 2008.

The OCST is composed of three units:

- Consultations Unit
- Training Unit
- Accounting Unit

These three units are controlled by a board of representatives from all Departments of the Faculty, the Continuous Professional Development (CPD) officer and the Director.

Dr Monerah Alsoraj (Director & CPD Officer)
Dr Tania Bayoud (Department of Pharmacy Practice)
Dr Mohsen Hedaya (Department of Pharmaceutics)
Dr Fatima Al-Awadhi (Department of Pharmaceutical Chemistry)
Dr Jacinthe Lemay (Department of Pharmacology and Therapeutics)

Services offered during the last academic year:

- Workshop on “Medicines Information Skills for Pharmacists” in collaboration with Medicines Information Center (FoP) and Center for Research Support and Conferences (FoM) and Kuwait Pharmaceutical association (KuPHA) given by *Dalal Al-Taweel*, *Asmaa Al Haqan, & Shaimaa Abdel-Maguid*

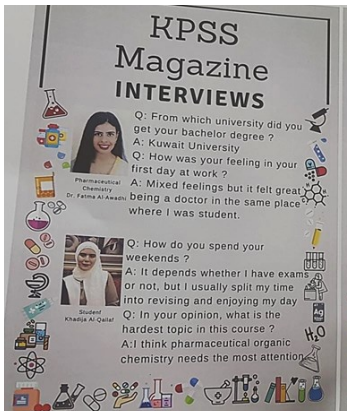
- Workshop on “Inflammatory bowel disease (IBD): An update for healthcare providers”, in collaboration with Center for Research Support and Conferences (FoM) and Kuwait Pharmaceutical association (KuPHA) given by *Maitham Khajah*

- Established collaboration with the scientific committee in Mubarak Hospital, to provide series of lectures, seminars, campaigns and workshops for their pharmacy department

KPSS activities

World Diabetes Day

Magazine interviews



Breast Cancer Awareness month

Graduation ceremony of class of 2018

بسم الله الرحمن الرحيم

قسم طلبة كلية الصيدلة وخريجيها

أُقْسمُ باللهِ الْعَظيم أنْ أُراقبَ اللهَ في مُزاولتي لِمهْنَتي، باذلاً في أَدائِها جُهْدي بِكلِ صِدقٍ وَأَمانةٍ ومُحافِظاً على شَرَفِها وَسِرِيَتِها ، ومُتعاوناً مع زُملائي بما يُحَقِقُ الرقيَّ والتَّقدمَ في الرِّعايةِ الصيدلانيةِ لجميعِ الْمر ضى.

واللهُ على ما أَقولُ شهيد.

In the name of God, the most merciful, the most gracious

I swear in the name of God, the Greatest that I shall practice my profession within his guidance, that I shall put my ceaseless effort with loyalty and truthfulness, that I shall maintain its integrity and secrecy, that I shall be cooperative with all my colleagues for the sake of advancement and development in pharmaceutical care for all patients

May God be witness to all I said

Harnessing the power of nature

"Preparing Medicine from Honey", from a Dispersed Manuscript of an Arabic Translation of De Materia Medica of Dioscorides. Prescribed to cure weakness and loss of appetite. A doctor holds a gold cup while stirring the boiling honey and water in a cauldron as he prepares to scoop it up for the seated patient. The architectural setting suggests that the drugs are being produced in a pharmacy.