



COLLEGE OF MEDICINE  
POSTGRADUATE MEDICAL  
EDUCATION CENTER

# KSU FELLOWSHIP PROGRAMME IN PATHOLOGY (MEDICAL BIOCHEMISTRY)

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DEPARTMENT OF  
PATHOLOGY &  
LABORATORY MEDICINE

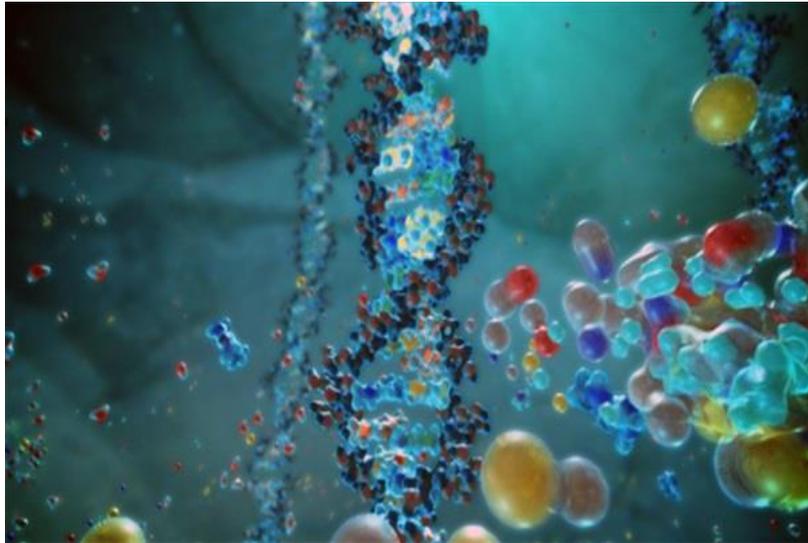
CLINICAL BIOCHEMISTRY UNIT

2018



**College of Medicine**  
Department of Pathology & Laboratory Medicine  
Postgraduate Medical Education Centre

## **KSU Fellowship Program in Pathology (Medical Biochemistry)**



**2018**

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# PART I

## INTRODUCTION:

Medical Biochemistry is a division of the laboratory medicine that is generally concerned with analysis of bodily fluids, which are useful for diagnostic and therapeutic purposes. Many of clinical decisions are made based on laboratory test results, the majority of which are Biochemistry.

In 1971, King Saud University (KSU) established the Medical Biochemistry Unit at the College of Medicine. The unit, which is a part of the Department of Pathology and Laboratory Medicine, offers an excellent diagnostic service for the patients at King Saud University Medical City (KSU-MC) Hospitals; using fully automated analyzers: Amino-acid Analyzer for amino acid analysis, Gas Chromatogram with Mass Spectrometer (GC/MS) for urine organic acids analysis, HPLC for vitamins and catecholamines, ICP-MS for trace metals analysis, Tosoh G8 for HbA1C analysis, BN Prospec for serum proteins and Apo-lipoproteins and Minicap electrophoresis system for serum protein electrophoresis to mention but a few. Moreover, a variety of courses is offered, including: medical biochemistry, molecular biology and genetics, for both undergraduate and postgraduate medical students. These courses emphasize on recent findings and relevant fundamental background information.

The Clinical Biochemistry Unit laboratories at KSU-MC analyzes close to 4.2 million tests per year making about 70% of the pathology laboratory's total workload employing advanced laboratory automation (**Table 1**). The Routine Biochemistry unit consists of the following subunits with the average volume of tests they execute per year are as follows; the Routine Chemistry lab, 3,697,757 tests, endocrine lab, 338,465 tests, the TDM and toxicology, 33,510 tests, and urine chemistry bench, 54,596 tests.

The Special Biochemistry Laboratory and the Inherited Metabolic Disease Laboratory (IMDL) together executed about 63,812 tests per year.

In addition to the academic, diagnostic and research activities, the unit also offers annual training courses and workshops in different branches of medical biochemistry, in which the most recent knowledge of medical and clinical biochemistry are presented.

Under the umbrella of Vice-Deanship of Postgraduate and Research at the college of medicine, which is directly supervised by the Postgraduate Medical Education Centre, a diverse group of postgraduate programs is available for graduated medical doctors. KSU Fellowship Pathology Program (Medical Biochemistry) is one of these programs. The program will be conducted at the clinical biochemistry laboratories at College of Medicine, KSU; in collaboration with other units of the pathology department and laboratory medicine at:

- King Abdul-Aziz Medical City, National Guard Hospital.
- King Faisal Specialist Hospital and Research Center.
- Prince Sultan Military Medical City.

The four institutions agreed to provide all facilities available, with regard to: Residency Training Committee Staff (**Table 2**) and other members by request from Hematology, Immunology, Microbiology and Molecular Genetics\Cytogenetics units; education; equipment; and specimens for the training program. More details about the number of the participated faculty staff are in **Table 3**.

The KSU Fellowship Pathology Program in Medical Biochemistry is the only program currently offered in the Kingdom for medical graduates.

## **NAME OF THE PROGRAM:**

KSU Fellowship Pathology Program (Medical Biochemistry).

## **VISION:**

In compliance with the vision of the College of Medicine, the graduates from the KSU Fellowship Pathology Program (Medical Biochemistry) will lead the field with major impact on the healthcare of the Saudi community and contribute significantly to the practice of the Laboratory Medicine.

## **MISSION:**

- To help in the interpretation and follow up of clinical biochemistry laboratory results.
- To establish and maintain clinical quality standards.
- To liaise with physicians to customize the laboratory services according to the physicians' needs.
- To educate and train undergraduate students, postgraduate candidates and staff.

## **OBJECTIVES OF THE PROGRAM:**

1. To prepare a highly qualified clinical biochemist.
2. To provide residents with knowledge and skills for laboratory services and management.
3. To encourage initiation and participation in scientific research.

The detailed objectives for each of the five academic years of the program are discussed with program structure.

## **ADMISSION REQUIREMENTS:**

### **Applicants must:**

1. Fulfill the general requirements of KSU for admission to postgraduate studies.
2. Hold MBBS degree and have graduated within the last 5 years.
3. Pass an interview and a selection examination prior to admission.
4. Secure a letter of approval from his/her sponsor/employer that he/she would be a full-time resident all through the programme.

## DEGREE REQUIREMENTS:

1. Residents will abide by the rules and regulations of King Saud University Fellowship Programme in medical fields.
2. The program will require successful completion of 4 years with an optional opportunity to add one more year for subspecialty training (Post-Fellowship Subspecialty Training).
3. **Training:** will include formal lectures, seminars and practical sessions; carrying out a research project during the third year of training to be completed before the end of the fourth year; and the attendance of the relevant scientific meetings.
4. **Evaluation:** Residents will be evaluated in theoretical and practical skills by continuous assessments and final examination at the end of every year. In addition, an oral examination will be held at the end of the fourth year.
5. **Examinations:** As detailed in the general policies for the KSU Fellowship Program in Pathology. In short:
  - A. **R1, R2 & R3 Exams:** Will be assessed as following:
    1. Continuous assessment: 30%.
    2. Final Exam: 70%.
  - B. **R4 Exam:** At the end of the fourth year of the program and consists of the following:
    1. Written Exam (Essays and MCQs): (40%).
    2. Practical Exam: (40%).
    3. Oral Exam: (20%).
6. The candidates have to pass with a score not less than 60% in each part of the examination. However, the resident has to score a total of 70% in the whole examination in order to be considered as pass.
7. **Academic degree:** The residents who have successfully completed the training program will be awarded a certificate from KSU entitled “KSU Fellowship Pathology Program (Medical Biochemistry)” and will be eligible

to obtain a license as senior registrar in Medical Biochemistry from the Saudi Council for Health Specialties.

8. The KSU Fellowship Pathology Program (Medical Biochemistry) has great similarity to the topics and subjects covered by MRCPATH (Chemical Pathology).

## **LEAVE:**

Leave eligibility and stipulations applicable to the residents in the program:

1. A total of 30 days' vacation leaves per year, which may be split into 2 parts depending on the department's requirements.
2. Only One Eid holiday per year.
3. Study leave (for conferences or preparing for an exam):
4. Residents may apply individually for 7 days of study leave per year after approval from the program committee and department chairman.
5. If the interruption is due to sickness, a medical report should be submitted to the program committee.
6. Leave without pay and carry-over of leave days to the next year are NOT allowed.
7. The maximum period for interruptions due to sick leave or maternity leave or other reasons including the annual leave should not exceed 90 days during the same year of training in the program.
8. The Maternity leave for females will be (90) days during the whole period of the program and can be divided per resident's request.

## Correspondence:

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**Table 1: Clinical Biochemistry Unit Annual Test Volume**

<b>Subunits</b>	<b>Test Volume</b>
Routine Biochemistry	3,697,757
TDM and Toxicology	33,510
Hormones	338,465
Urine Chemistry	54,596
Special Biochemistry & Inherited Metabolic Disease Laboratory.	63,812
<b>Overall Total</b>	<b>4,188,140</b>

**Table 2: Residency Training Committee**

<b>Name</b>	<b>Affiliation</b>
Dr. Rana M. Hasanato (Program Director)	College of Medicine, KSUMC*
Dr. Ahmed Mujamammi (Program Deputy Director)	
Dr. Khalid M. Sumaily	
Dr. Essa Sabi	
Dr. Zeyad Kurdee	
Dr. Usman Ghani	
Dr. Sumbul Fatmah	
Dr. Waleed Al-Omair	KFSH & RC**
Dr. Samia Sobki	PSMMC***
Dr. Waleed El-Tamimi	KAMC-NG****

\* King Saud University Medical City

\*\* King Faisal Specialist Hospital and Research Center

\*\*\* Prince Sultan Military Medical City

\*\*\*\* King AbdulAziz Medical City, National Guard Hospital

**Table 3: Number of Participated Faculty Staff**

Specialty	KSU	Non-KSU
Clinical Biochemistry	7	<u>KAMC-NG:</u> 2
		<u>KFSH &amp; RC:</u> 2
		<u>PSMMC:</u> 4
Microbiology	7	Internal arrangement by trainers in the assigned hospitals.
Hematology	5	
Immunology	3	
Molecular Genetics and Cytogenetics	2	



## The Second year (R2)

### Objectives:

By the end of the Second Year (R2), the residents will be able to:

1. Acquire the basics of medical biochemistry and clinical correlations.
2. Comprehend the role of quality control (QC), quality assurance (QA) in the management of a clinical biochemistry laboratory.
3. Take part in internal medicine clinical rotations to acquire skills for selection and interpretation of appropriate laboratory tests and follow up of patients.
4. Acquire hands-on training in a clinical biochemistry laboratory in terms of techniques, principles, QC, QA, laboratory management and interpretation of results.

### Subject and Period

#### First 8 months:

- 1) **Formal lectures: (4 hours / week) for 26 weeks:**

#### Clinical correlations and analytic procedures:

- Amino acids and Proteins
- Nonprotein Nitrogen Compounds
- Enzymes
- Carbohydrates
- Lipids and Lipoproteins
- Electrolytes
- Blood Gases, pH, and Buffer Systems
- Trace and Toxic Elements
- Porphyrins and Hemoglobin
- General integration of metabolism
- Nutrition and vitamins

- 2) **Training in clinical biochemistry laboratories at KSUMC** (4 hours / week).
- 3) **Quality control, quality assurance and laboratory management:** Basis and field training
- 4) **Interpretation of the clinical biochemistry laboratory results.**
- 5) **Seminars and journal club** (once / week): (assessment: presentation of 2 seminars/year).

#### Last 4 months:

- 1) **Training in clinical biochemistry laboratories at KKUMC** (1 day / week) for 4 weeks.
- 2) **Interpretation of the clinical biochemistry laboratory results.**
- 3) **Annual vacation:** One month

## The Third year (R3)

### Objectives:

By the end of the Third Year (R3), the residents will be able to:

1. Acquire and integrate the basic and clinical concepts of toxicology and therapeutic drug monitoring, molecular biology, cytogenetics, tumor markers and endocrinology.
2. Acquire hands-on training in the clinical biochemistry laboratories of joint training hospitals in Riyadh.
3. Conduct biochemical research in the field of laboratory medicine by applying knowledge and skills acquired throughout program.

### Subject and Period

**1) Formal lectures: (3 hours/week) for 25 weeks:**

- Molecular Biology
- Toxicology and therapeutic drug monitoring
- Tumor markers

**2) Clinical endocrinology course (self-study and group discussions):**

- Hypothalamic and Pituitary Function
- Adrenal function
- Gonadal Function
- The Thyroid Gland
- Calcium Homeostasis and Hormonal Regulation

**3) Training in Molecular biology and Cytogenetics laboratories at (KSUMC) for 3 weeks each.**

**4) Seminars and journal club (once / week): (Assessment: presentation of 2 seminars/year).**

**5) Research project: Conducting a small research project (2 months)**

**6) Training in clinical biochemistry laboratories (6 months) at 2 of the following hospitals:**

- a) Prince Sultan Military Medical City.
- b) King Faisal Specialist Hospital & Research Center
- c) King AbdulAziz Medical City, National Guard Hospital

**7) Annual vacation: One month**

## The Fourth year (R4)

### Objectives:

**By the end of the Fourth Year (R4), the residents will be able to:**

1. Comprehend the role of clinical biochemistry laboratories in immunochemistry and management of inherited metabolic disorders.
2. Implement advanced training in laboratory quality assurance under the supervision of a consultant.
3. Acquire hands-on training in the clinical biochemistry laboratories of KSU-MC and joint training hospitals in Riyadh.
4. Accomplish their research project and write a research report.

### Subject and Period

**1) Formal lectures: (2 hours/week) for 10 weeks:**

Immunochemistry (Basic and applied)  
Inherited Metabolic Disorders (Basic and applied)

**2) Advanced training in clinical biochemistry laboratories at KSUMC (8 hours per week):**

- Laboratory organization
- Verification of results (Under supervision of the consultant)
- Endocrine lab.
- Blood gases
- Special Biochemistry and IMDs Labs.

**3) Training in clinical biochemistry laboratories (4 months) at 2 of the following hospitals:**

- a) Prince Sultan Military Medical City.
- b) King Faisal Specialist Hospital & Research Center
- c) King AbdulAziz Medical City, National Guard Hospital

**4) Research project:** Completing the project and sitting for the defense (4 months).

**5) Seminars and journal club** (once / week): (Assessment: presentation of 2 seminars / year).

**6) Annual vacation:** One month

## Post-Fellowship Subspecialty Training Year (Optional)

### Objectives:

**By the end of this year, the graduate will be able to:**

1. Acquire training in one of the approved subspecialties.
2. Demonstrate skills for proper management of a clinical biochemistry laboratory.
3. Demonstrate skills for proper interpretation of laboratory results.

### Subject and Period

- 1) Advanced training in one of the clinical biochemistry laboratory divisions at KSU-MC (11 months).
- 2) Seminars and journal club (once / week): (Assessment: presentation of 2 seminars / year).
- 3) Annual vacation: One month

## RECOMMENDED TEXTBOOKS

1. Clinical chemistry: Principles, procedures and correlations. 7<sup>th</sup> edition 2013 by Bishop ML, Duben-Engelkirk JL and Fody EP. Lippincott W & W.
2. Clinical diagnosis and management by laboratory methods, 23<sup>rd</sup> edition, by Henry JB. WB Saunders Company. 2017
3. Essential Endocrinology: 4<sup>th</sup> edition, by Brook C & Marshall N., Blackwell Scientific Publisher.
4. Harper's Biochemistry: 29<sup>th</sup> Edition by Murray RK, Granner DK, Mayes PA, Rodwell VW, Appleton & Lange, 2012.
5. Lecture notes on Clinical Biochemistry: 9<sup>th</sup> edition, by Smith, AF, Beckett GJ & Walker SW., Blackwell Scientific Publisher, 2016.
6. Lippincott's Illustrated Reviews: Biochemistry. 7<sup>th</sup> edition by Champe PC, Harvey RA, Ferrier DR, Lippincott William & Wilkins London, 2017.
7. Tietz Fundamentals of clinical chemistry: 7<sup>th</sup> ed. By Burtic CA and Ashwood E. Saunders Comp, 2015.

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