University of Jordan

School of Medicine

Department of Pathology, Microbiology and Forensic Medicine

Study plan for the certificate of higher specialization in Clinical Laboratory/Microbiology and Immunology

Content

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1. General rules and conditions

The study plan conforms to the valid regulations of granting the certificate of higher specialization in Medicine and the certificate of higher specialization in Dentistry and describes the criteria for granting the certificate in higher specialization in Clinical Laboratory/Microbiology and Immunology.

The prerequisite for admission is holding the certificate of "Doctor of Medicine (M.D.)" or equivalent.

The current maximum number of contemporaneous residents in the academic program is two.

2. Special conditions

None.

3. Duration of the residency training

Four years of full-time training (at least 40 hours per week).

4. Program description

The Clinical Laboratory/Microbiology and Immunology residency program offers comprehensive training that enables the resident to develop thorough knowledge and skills in diagnostic Microbiology and Immunology. In addition, the residency program offers adequate training in other Clinical Laboratories including rotations in the following sections: Clinical Chemistry and Endocrinology, Hematology, the Blood Bank, Histopathology, Molecular Diagnostics and Cytogenetics. The resident also acquires administrative experience which includes involvement in quality assurance and reviewing the policies and procedures.

The resident is expected to receive training and to gain hands-on experience in all aspects of the Clinical Laboratory including instrumentation and data processing, with particular focus on the Clinical Microbiology and Immunology aspects including the isolation, identification and antimicrobial susceptibility testing of bacteria, mycobacteria and fungi, the detection and identification of viruses and parasites, using the traditional and molecular techniques,

serologic testing of infectious diseases, testing for immune deficiencies, testing for autoantibody and autoimmune disorders, flow cytometry and histocompatibility testing and transplantation immunology.

The training program also includes educational activities with at least once-weekly journal clubs, case presentations or lectures on advanced laboratory techniques. The resident is expected to hold teaching and supervising responsibilities for interns, undergraduate and master's students at both the theoretical and practical levels.

In addition, the resident should be able to provide educational assistance to other Clinical Laboratory staff and where applicable to the general public.

Our mission: To train residents to gain knowledge and skills necessary for excellent patient care through high quality of Clinical Laboratory testing and consultations.

Vision: To be the leading Clinical Laboratory program in resident training nationally and in the region.

Values: Excellence, respect, dedication and patient service.

5. Residency curriculum

Postgraduate Year 1 (PGY-1)

Clinical Microbiology-1 & Microscopy (5 months)

Clinical Immunology & Serology-1 (4 months)

Clinical Chemistry-1 (1 month)

Hematology-1 (1 month)

Elective rotation and research (1 month)

Postgraduate Year 2 (PGY-2)

Histopathology (3 months)

Clinical Immunology & Serology-2 (2 months)

Clinical Chemistry-2 (2 months)

Blood Banking and Transfusion Medicine (2 months)

Hematology-2 (2 months)

Elective rotation and research (1 month)

Postgraduate Year 3 (PGY-3)

Clinical Microbiology-2 (4 months)

Clinical Immunology & Serology-3 (3 months)

Clinical Chemistry-3 (1 month)

Endocrinology (1 month)

Molecular Diagnostics-1 (1 month)

Cytogenetics (1 month)

Elective rotation and research (1 month)

Postgraduate Year 4 (PGY-4)

Clinical Microbiology-3 (5 months)

Clinical Immunology & Serology-4 (3 months)

Infectious Diseases & Infection Control (2 months)

Molecular Diagnostics-2 (1 month)

Elective rotation and research (1 month)

6. Conditions for year-to-year advancement in the residency program

The resident performance must be continuously evaluated by the consultants in the Clinical Laboratory and each resident is given a mark by the end of the academic year. The resident must get a passing score to advance to the next year. The evaluation includes:

1. Clinical evaluation throughout the year accounting for 30% of the final mark including the following aspects:

    a. Attendance.

    b. Preparation and participation in different educational sessions.

    c. Communication skills.

    d. Clinical medical skills (competencies according to required skills and duties as defined in the study plan for each residency year).

    e. Compliance to documentation requirements.

    f. Compliance to quality, patient safety, infection control and clinical policies.

2. Practical and oral examination accounting for 30% of the final mark divided as follows:

    a. Practical exam: 20%.

    b. Oral exam: 10%.

3. Written exam in the form of multiple-choice questions accounting for 40% of the final mark.

For graduation from the program, the resident must pass a final exam at the end of fourth year, in addition to having an accepted or a published research paper in a scientific journal accredited by the University of Jordan.

Upon graduation the resident should be able to provide expert consultations on clinical interpretation of microbiologic and immunologic tests, manage a Clinical Laboratory and ensure the safety and quality in the Clinical Laboratory.

7. The resident log book

The resident log book provides a documentation for the clinical, academic and research activities conducted by the resident. Each Clinical Laboratory medical director is advised to review and sign the entries on weekly basis. The resident must submit a copy of their logbook to the program director by the end of each rotation. The following laboratory procedures and techniques should be reported as entries in the log book on daily basis together with academic sessions:

Clinical Microbiology & Microscopy

- Morning session for microbial identification.
- Antimicrobial susceptibility testing.
- ZN staining and mycobacterial culture.
- Culture media, stain and reagent preparation.
- Microbiologic culturing of patient specimens including blood culture.
- Gram staining.
- Stool examination for ova and parasites.
- Urine analysis.
- Seminal fluid analysis.

Clinical Immunology & Serology

- Routine serologic and immunologic testing.
- ELISA.
- Indirect immunofluorescence testing.
- Direct immunofluorescence testing (skin and kidney biopsies).
- HLA typing.
- Flow cytometry.

Clinical Chemistry

- Routine testing for electrolytes, LFTs and KFTs.
- Serum and urine protein electrophoresis.
- Immunofixation.
- Testing for amino acids.
- Renal stone analysis.

Histopathology

- Gross pathology.
- Microscopic examination using different histochemical stains.
- Cytopathology.
- Immunohistochemistry.
- Frozen sections.

Hematology

- CBC & differential.
- Blood film examination.
- Bone marrow aspirate examination.
- Coagulation workup.
- Hemoglobin electrophoresis

Blood Banking and Transfusion Medicine

- Blood unit collection and processing.
- Blood typing and cross matching.
- Infectious disease screening.
- Minor blood group testing.

Infectious Diseases

- OPC attendance.
- Ward rounds and consultations.
- Infection control.

Molecular Diagnostics

- RNA & DNA extraction.
- Conventional PCR.
- Quantitative PCR.

Cytogenetics

- Karyotyping.
- FISH.

8. Rotation goals and objectives

FIRST YEAR (PGY-1), Microbiology and Immunology (1)

Clinical Microbiology-1 and Microscopy (5 months)

This rotation covers the basic techniques and diagnostic methods used in the field of Clinical Microbiology. These include sample collection, transport and processing, culture media and stain preparation, staining smears for direct examination, microscopic examination, and culture techniques including streaking, fishing and obtaining pure subcultures. Aseptic techniques are to be adhered to with all specimens. The rotation will cover the laboratory testing of specimens sent for bacteriologic, both aerobic and anaerobic, mycobacteriologic, fungal and parasitic investigation. In addition, the rotation covers the routine microscopic examination of clinical specimens and biological fluids that are not covered in other rotations, particularly urine samples. Moreover, this rotation covers the techniques of phlebotomy and processing of specimens.

Clinical Immunology and Serology-1 (4 months)

This rotation covers introduction to the Clinical Immunology laboratory, performing serological tests on patients' specimens and reporting results under supervision. The resident should follow patients' results and correlate the results of serologic tests with other results of the laboratory investigations done for the patient.

Hematology-1 (1 month)

This rotation covers general Hematology which includes specimen collection and processing for the determination of hemoglobin, packed cell volume, WBCs, the differential count, ESR, platelets and RBC indices.

Clinical Chemistry-1 (1 month)

This rotation covers routine diagnostic procedures in general Clinical Chemistry including specimen collection and processing, chemical reactions utilized and the principles of instrumentation of compounds and elements in the blood.

SECOND YEAR (PGY-2), Microbiology and Immunology (2)

Histopathology (3 months)

This rotation covers processing of specimens sent for histologic investigation including gross examination, dissection, and blocking, and smear preparation and staining for microscopic examination. This includes tissue and cytology samples. The rotation also covers the basic skills in identification of pathological changes in different tissues.

Clinical Immunology and Serology-2 (2 months)

This rotation covers the tests specialized immunologic tests including enzyme immunoassays and immunofluorescence.

Hematology-2 (2 months)

This rotation covers special Hematology which includes specimen collection and processing for the determination of the reticulocyte count and the study of hemoglobinopathies involving blood films, hemoglobin electrophoresis and fragility testing. It also covers preparation and the study of bone marrow samples. In addition, this rotation cover the coagulation work-up.

Clinical Chemistry-2 (2 months)

This rotation covers special Clinical Chemistry which includes sample collection and processing in the performance of specialized procedures such as electrophoresis, chromatography and immunofixation.

Blood Banking and Transfusion Medicine (2 months)

This rotation covers routine and specialized procedures performed in blood banking. It includes donor selection, collection of blood, separation of blood into components, screening of blood for infectious agents, blood group (major and minor) determination and compatibility testing including antibody screening and identification, and cross matching.

THIRD YEAR (PGY-3), Microbiology and Immunology (3)

Clinical Microbiology-2 (4 months)

This rotation covers the identification and susceptibility testing for bacterial, mycobacterial and fungal isolates from the clinical specimens using the manual and automated techniques. The microbial identification includes distinguishing different colonial morphologies, the use of a battery of biochemical and serologic tests in addition to microscopic testing using different stains and performing assays for microbial toxins. In addition, the resident should acquire the skills in the interpretation of antibiotic sensitivity profiles. Moreover, the rotation also covers microscopic examination of urine and stool specimens for parasites.

Clinical Immunology and Serology-3 (3 months)

This rotation covers more specialized immunologic testing including direct immunofluorescence, tissue typing and flow cytometry for immunophenotyping, enumeration of CD34+ stem cells, diagnosis of PNH and investigation of immunodeficiencies. In addition, the rotation covers other immunologic tests with the resident assuming a senior role.

Molecular Diagnostics-1 (1 month)

This rotation covers processing of specimens sent for molecular testing and the principles of nucleic acid isolation, amplification and hybridization, particularly for testing of human viruses.

Clinical Chemistry-3 (1 month)

This rotation covers specialized Clinical Chemistry procedures performed on biological fluids starting from their collection to reporting of results. It includes determination of lipids in blood, determination of certain elements in blood such as heavy metals, performing analysis of urine and stool specimens for certain tests such as reducing substances, catecholamine metabolite determination and analysis of urinary stones.

Endocrinology (1 month)

This rotation covers diagnostic procedures utilized in the investigation of endocrinologic disorders in addition to clinical pharmacology (drug monitoring). It includes specimen collection and processing for the determination of hormones and drugs in biological fluids. In addition, the rotation covers the principles of radioimmunoassay, chemiluminescence and spectrophotometry.

Cytogenetics (1 month)

This rotation covers the common techniques of karyotyping. It includes specimen collection and processing of the different types of samples such as blood or products of conception, their culture, harvesting, banding and reporting of results.

FOURTH YEAR (PGY-4), Microbiology and Immunology (4)

Clinical Microbiology-3 (5 months)

This rotation covers the areas included in Clinical Microbiology-1 and -2, but the resident will read, and report results under supervision of a consultant. The resident is expected to act more independently, follow patients through contact with senior residents in charge of the concerned ward or OPC. Moreover, the resident should suggest and initiate relevant investigations needed to reach a diagnosis.

Clinical Immunology and Serology-4 (3 months)

This rotation covers the areas included in Clinical Immunology and Serology-1, -2 and -3, but the resident is given a senior role in interpretation and reporting of results.

Infectious Diseases & Infection Control (2 months)

This rotation covers the issue of nosocomial infections. The resident is attached to an infectious disease physician and to the office of infection control in the hospital. The resident is supposed to participate in their daily activities including detection of cases and their follow-up and implementation of measures for the prevention and control of nosocomial infections. The department will obtain a permission for the resident to attend some of the meetings of the infection control committee of the hospital. In addition, the resident is supposed to attend ID clinic and inpatient consults.

Molecular Diagnostics-2 (1 month)

This rotation covers advanced molecular diagnostics tests such as viral load testing and virus genotyping. In addition, the rotation covers molecular diagnosis of genetic diseases and genetic markers of tumors.

9. Scientific activity, research and conference attendance

The resident is encouraged to actively participate in scientific activities in the Department that include weekly journal clubs, case studies and seminars on advanced technologies implemented in the Clinical Laboratory. Residents are also encouraged to attend national and international meetings and workshops of scientific societies and teaching hospitals. In addition, the resident should be involved in at least one research project with contribution to at least one paper that is published or accepted for publication by a scientific journal recognized by the University of Jordan.

10. Overall intended learning outcomes (ILOs) of the program

Upon successful completion of the higher specialization in Clinical Laboratory/Microbiology and Immunology program, the resident should be able to:

1. Perform and interpret various laboratory assays
2. Provide consultations to the patients and referring physicians regarding the laboratory results and their clinical significance
3. Manage the various aspects of the clinical laboratory including logistics, personnel, finance, maintenance, and training of the clinical laboratory technicians
4. Resolve any discrepancy in the laboratory results resulting from human errors or interferences
5. Participation of teaching activities related to patient care with other departments in an independent way.
6. Participate in managing complications resulting from laboratory errors and devising policies to decrease the incidence of said mistakes.
7. Implement and follow quality control policies.
8. Actively participate in public education of the importance of screening tests.

Contact information:

Clinical Microbiology and Parasitology Laboratory:

Professor Azmi Mahafzah, MD, PhD. Consultant Clinical Pathologist

Dr. Malik Sallam, MD, PhD. Consultant Clinical Pathologist

Clinical Immunology and Serology Laboratory:

Professor Azmi Mahafzah, MD, PhD. Consultant Clinical Pathologist

Dr. Malik Sallam, MD, PhD. Consultant Clinical Pathologist

Clinical Chemistry and Endocrinology Laboratories

Dr. Malik Sallam, MD, PhD. Consultant Clinical Pathologist

Hematology Laboratory

Dr. Tariq Al-Adily, MD. Consultant Hematopathologist

Blood Bank

Professor Azmi Mahafzah, MD, PhD. Consultant Clinical Pathologist

Dr. Tariq Al-Adily, MD. Consultant Hematopathologist

Molecular Diagnostics and Cytogenetics Laboratories

Dr. Malik Sallam, MD, PhD. Consultant Clinical Pathologist

Histopathology Laboratory

Professor Mousa Al-Abbadi, MD. Consultant in Anatomic Pathology

Professor Maha Shomaf, MD. Consultant in Anatomic Pathology

Dr. Fatima Obeidat, MD. Consultant in Anatomic Pathology

Dr. Nisreen Abu Shahin, MD. Consultant in Anatomic Pathology

Dr. Tariq Al-Adily, MD. Consultant Hematopathologist

Dr. Heyam Awad, MD. Consultant in Anatomic Pathology

Dr. Maram Abduljaleel, MD. Consultant in Anatomic Pathology

Infectious Diseases

Professor Faris Bakri, MD. Consultant in infectious diseases

Chairman of the Department of Pathology, Microbiology and Forensic Medicine:

Professor Abdelkader Battah, MD, PhD. Professor of Toxicology

Residency Program Director:

Dr. Malik Sallam, MD, PhD. Assistant Professor of Microbiology and Immunology

Program Director: Dr. Malik Sallam Signature: ---------- Date: 20-01-2021

Head of curriculum committee/Department: Dr. Mohammad Al-Salem Signature: ----------

Head of Department: Prof. Dr. Abdelkader Battah Signature: ----------

Dean: Prof. Dr. Yaser Rayyan Signature: ----------

Copies to:
-Head of the Department
-Assistant Dean for Quality Assurance
-Program File