In the Name of God

Islamic Republic of Iran

Ministry of Health and Medical Education

Deputy Ministry for Education

Pathology

Degree: Specialty

Program Description

Technological advances in biology related sciences, including medicine, have led to fundamental changes, such as ease, accuracy and greater efficacy in prevention, diagnosis and treatment of diseases. Different therapeutic-diagnostic tools and methods are among the many examples developed in medical sciences. The effective use of these facilities requires the acquisition of new, relevant and sufficient knowledge and extra budget that implies the need for revision of medical education. Considerable progress in the field of diagnosis based on laboratory medicine has turned this area of medical knowledge into one of the main components for healthcare provision.

Development, the emergence of new needs and improved quality, accuracy, sensitivity and specificity of laboratory methods for diagnosis mandates training of physicians, who have chosen to study pathology as a specialty and finally their professional career, to be revised every few years and to make sure it complies with new science and the needs of the society.

Definition and Duration of the Training Program:

Pathology is one of the clinical specialties, including anatomical pathology and laboratory, in which graduates gain the insight, skills and ability for appropriate and necessary diagnostic laboratory measures. through suitable methods and tools and interpretation of the reason for changes based on patient's clinical status.

This course takes 4 years.

Aims:

1-In the next 10 years, Iran will be one of the top countries in the region and in the international level, in terms of educational standards, research production and medical services provision related to pathology.

2-To train specialists, aware of modern scientific issues, competent, responsible and sensitive to the health of individuals and society in the field of pathology.

Admission Requirements

- B.D.S./D.M.D./D.D.S or equivalent certificates for the applicants of Specialty
- Certificate of Internship or Certificate of Practice

Language Requirements:

- Language requirements: Evidence of English Proficiency on the TOEFL or IELTS tests. The minimum score for TOEFL PBT, TOEFL iBT and IELTS is 533, 72 and 5.5 respectively.
- Applicants from Persian (Farsi) Speaking countries (They shall both speak and write in Persian) who have applied for graduate Degree-based programs may be exempted, based on the decision of the department, from submitting any certificates regarding their English Language Proficiency. Nevertheless, they are required to hand in their English language certificate which meets SUMS' minimal language proficiency requirements, within one year from commencing their studies at SUMS.

Expected Competencies at the End of the Program

General Competencies*

Specific Competencies and Skills

At the end of the program learners will be competent in the following skills:

- Bone marrow aspiration, flow cytometry and cytochemistry
- Morphology of white and red blood cells
- Tests related to disorders - membrane, enzyme and synthesis of hemoglobin in red blood cells - Hemoglobin disorders including electrophoresis, HPLC, capillary electrophoresis, etc.
- Quality control testing and device calibration - Standard management in the hematology lab
- Culture of various body fluids and tissues - Preparation of culture media, quality control testing - Different methods of fixation and staining used in microbiological tests - Evaluation of differential culture media and galleries for gram-negative bacteria and interpretation of results
- Oxidase, coagulase, catalase tests, quantitative testing including CAMP, OF etc.
- Antibiogram and its quality control tests - Diagnostic algorithmic interpretation of bacteria including strep, staphylococcus - Report of microbiological test results and antibiogram - Types of antibiotic resistance and how to diagnose and manage them
- Culture for mycobacterium and related differential tests
- Standard management of microbiology laboratory and hospital infection control - Writing and using standard operating procedure (SOP) and data interpretation, and final report preparation
- Sampling, transport and culture of various body fluids and tissues
- Urine analysis techniques including biochemical and microscopic tests - Methods for diagnosis of urinary crystals - Special staining (Hansel and crystal violet, safranin) - Biochemical tests of urine and providing relevant solutions (Benedict) - Bence-Jones protein urine test - Determination of urine concentration
- 24-hour urine analysis
- Standard management in the laboratory and urine quality control tests - Writing and using standard operating procedure (SOP) and data interpretation, and final report preparation
- Direct stool test - Different methods for stool concentration to separate parasites from fecal debris
- Morphology of types of protozoa and larvae of different worms with species of nematodes, cestodes and flatworms - Scotch test
- Tests for malabsorption
- OB test and preparation of Meyer solution
- Standard management at the parasitology laboratory - Report of parasitology test results
- Sampling for the isolation of common viruses infecting human - Management of transporting different tissue or fluid samples from patients with suspected viral infection

- Immunology and molecular methods such as immunofluorescence and PCR for detection of viruses
- Observation of different culture media for the isolation of viruses - Familiarity with the use of electron microscope to detect viruses
- Standard management in the virology lab
- Solution preparation and dilution in biochemical tests
- Calibration and quality control of biochemistry laboratory equipment and hormonology, including photometers, spectrophotometers, and auto-biochemistry analyzers, types of centrifuges, ISE and flame photometers, chemiluminescence system, nephelometer or turbidimeter, blood gas machine and gamma counter, electrophoresis and chromatography, chemiluminescence system, centrifuge and SPECT and auto-analyzer, calibration and working with PH meters
- Biochemical tests of blood and body fluids - Interpretation and report of critical values
- Preparation of distilled water, deionized water and distilled water grading system
- Quality control management within biochemistry department and familiarity with Levey-Jennings charts and Westgard rules - Standard management and documentation, and quality assurance biochemistry laboratory - Daily working with automated systems
- Measurement of serum complement and immunoglobulins levels with SRID and nephelometry
- Serological tests and their interpretation, such Widal-Wright and Coombs Wright tests and 2ME test and its interpretation, ASO, CRPRF - Serology tests by agglutination method and their interpretation including infectious mononucleosis
- Immunoassay tests, including RIA and ELISA
- PPD skin test and its interpretation
- Measurement and identification of tumor marker levels - Measurement and identification of autoantibodies
- Direct and indirect fluorescence test - FIA and CLIA
- Interpretation of serum and urine protein electrophoresis - Cryoglobulins test
- Interpretation of HLA cross match test and HLA typing - Evaluation of the immune system in patients with immune deficiency and its related tests
- Laboratory evaluation of allergic patients and a variety of techniques
- Laboratory evaluation of cellular immunity
- Quality control for ELISA
- Standard management and documentation in immunology and serology laboratory
- ABO slide and tube typing - Cross match and tests to determine RH and Du and interpretation of direct and indirect Coombs - Antibody screening test and tests to determine the levels of anti-A, anti-B, anti-AB, anti-R reagents
- Paternity exclusion testing
- Isolating and culturing stem cells
- Standard management of immunohematology laboratory and documentation - Familiarity with the concept of haemovigilance and transfusion rules
- Management of sample preparation, sample storage for different molecular microbiological, genetic and oncology tests - Standard management of molecular lab

- Purification of DNA and RNA on different samples of whole blood, plasma, serum, tissue and paraffin blocks - Electrophoresis of DNA and hybridization and its methods - Using manual methods for purification of nucleic acids
- Using SPECT in molecular laboratory
- Qualitative and quantitative PCR methods and the analysis of PCR test results
- The manners for sending and storing the sample for karyotype - Interpretation of karyotype tests
- Cell culture, harvest on samples, bonding method
- FISH and CISH tests and their interpretation - Sequencing
- Laboratory quality management - Laboratory financial resources management - Common laboratory software management - Process management before the test - Testing process management and results quality control - Process management after testing results quality - Management of laboratory environment and facilities - Management of laboratory staff - Management of laboratory equipment - Management of laboratory documentation - Management of laboratory health and safety - Management of equipment purchase and storage for laboratory - Management of errors and non-compliance cases in the laboratory
A) Management of pathology laboratory: - Management of types of fixators and tissue maintenance, a variety of histochemistry stain in histopathology laboratory - Macroscopic pathology techniques of body organs, photography of pathology specimens - Management of tissue processing technique, tissue embedding - Using a variety of microscope to examine tissue samples, including optical microscope, electron microscope, immunofluorescence, polarization, phase-contrast B) Familiarity with tissue pathological changes of different organs in the areas mentioned C) Interpretation and preparation of standard pathology report D) Quality control in anatomic pathology
Autopsy and necropsy
Using frozen section procedure, skills in preparation of tissue slices
Direct immunofluorescence techniques and their interpretation, familiarity with immunohistochemical method and determination of panels for tumor and non-tumor wastes and its interpretation
Head and neck pathology
Pathology of the nervous system and muscles
Pathology of the GI Tract, Liver, Biliary Tract, and Pancreas
Pathology of respiratory system, mediastinal tumors, and cardiology
Hematopathology
Pathology of male and female genital tract
Pathology of Kidney and urinary tract
Pathology of skin
Pathology of bone and soft tissue
Endocrine pathology

Educational Strategies, Methods and Techniques *

Student assessment

A. Assessment Methods

Students will be evaluated by the following methods.
Written/Oral
Interactive computer test
OSCE/DOPS
Logbook assessment, article assessment and other performance based assessments

B. Periods of Assessment

Students are assessed in terms of theoretical and practical knowledge at least once a year under assistant program executives.
For annual improvements, residents are required to participate in the Exams scheduled by the Secretariat of the Council for Graduate Medical Education.

Ethical Considerations*

*Note: The related document(s) can be found at http://hcmep.behdasht.gov.ir/.

The overall structure of the course:

Educational ward, unit, or setting	Duration (month)	Residency year
Familiarity with surgical pathology, cellular pathology and diagnostic necropsy	24	First to fourth
Clinical Biochemistry	4	First to fourth
Serology, medical immunology	3	Second to fourth
Pathology of body fluids	1	Second to fourth
Hematology, coagulation and hematopathology	5	First to fourth
Medical virology	1	Third and fourth
Medical mycology	1	Third and fourth
Medical bacteriology	4	First to fourth
Medical parasitology	1	Third and fourth
Transfusion medicine and immunohematology	2	First to fourth

Important Notice:

The above features the curriculum of the Pathology Program designed and approved by the Iranian Ministry of Health and Medical Education. Given the fact that Shiraz University of Medical Sciences is constantly improving and updating itself to meet the international academic standards and the state of the art, and based on the availability of facilities, devices, ward, laboratories, etc. at SUMS, all the SUMS curricula are approximately 20% subject to change.