



Program SPECIFICATION FOR Ph.D Degree in Immunology & Allergy

Code: 1708800

University: Alexandria

Faculty: Medical Research Institute

Program Specification

A- Basic information

1- Program title: Ph.D. Immunology and allergy

2- Program type:

single

Double

multiple

3- Department(s): Immunology & allergy

4- Coordinator: Prof . Dr. Soheir Rizk Demian

5- External evaluator(s): Prof.Dr. Mohamed Abbas Elbarawy

6- Last date of program specification approval: 8/1/2017

B- Professional Information

1- Program aims:

By the end of this program the students should:



Provide the students with knowledge, skills and critical awareness to make has significant contribution to research and services provided by the department

By the end of this program the student should:

1. Know and recognize the molecular cell biology with emphasis on genetic model, transcription, protein synthesis, structural cell biology and cell signaling.
2. Acquire and add knowledge on various approaches of experimental design including concepts like appropriate number of animals, proper control, applicable design types and good clinical practice.
3. Review molecular Immunology including molecular components of the immune response and contribution of molecular immunology to current developments in the field.
4. Discuss genome structure, mitochondrial DNA, modes of inheritance as well as the genetics of MHC as regards structure, function, variability and role in transplantation.
5. Acquire a comprehensive view of modern immunology at the molecular and cellular level. disorders, bioinformatics, and the ethical, social and legal issues in genetic medicine.
6. Acquire knowledge on the diagnosis and investigation of clinical cases which have underlying immunopathology.
7. Develop interactive abilities.
8. Acquire and add knowledge on hypersensitivity reactions, Gell and Coombs classification of hypersensitive reactions, the mechanism of action of the different types of allergens, the different types of hypersensitivity reactions and how to manage them.
9. Discuss immune response to tumors; oncogenesis and escape
10. Know the HLA genetics, polymorphism and nomenclature, understand HLA typing methods, Ab screening and cross matching as well as the procedures and work ups for solid organ and BM transplantation.
11. Describe concepts of immunology to blood banking procedures
12. Integrate concepts and relate ideas covered in different parts of the degree programme.
13. Proficient in conducting research .
14. Use information technology to increase the immunology knowledge.

2- Intended learning outcomes (ILOs)

a- knowledge and understanding:

- a1-** Discuss the development of cells and cellular functions at the molecular level.
- a2-** Understand research methodology and evidence based medical research.
- a3-** Explain the mechanisms for the generation of antibody diversity



- a4-** Recall genome structure and function.
 - a5-** Comprehend how the immunological cells and molecules interact in defending the body against invading microorganisms
 - a6-** Recall immune mediated diseases
 - a7-** Review scientific information through different medical search engines.
 - a8-** Understand the build up of scientific paper.
 - a9-** Recall different molecules that share in immunological hypersensitivity reactions.
 - a10-** Understand immune response to tumors, the different mechanisms of oncogenesis, evasions of the different tumors to the immune response and the diagnosis and investigations of clinical cases which have underlying immunopathology.
 - a11-** List the evidence for use, and limitations of, the common procedures used in the diagnosis and management of patients and donors
 - a12-** Understand the different mechanisms of haemolytic diseases, haemolytic disease of newborn and drug induced haemolytic anaemia, microbiology, haematology and medical technology which underlie the practice of transplantation, the evidence for use, and limitations of, the common procedures used in the diagnosis and management of patients and donors.
 - a13-** Describe characteristics of common blood group systems, the appropriate pre- and post-transfusion testing associated with components, the pathophysiology and laboratory investigation of transfusion reactions and hemolytic disease of the newborn.
- b- Intellectual skills:**
- b1-** Interpret, analyze and evaluate basic immunologic information to solve problems
 - b2-** Illustrate the basis of immune system and demonstrate the innate immune mechanisms.
 - b3-** Relate immunoglobulin structure with its function, illustrate the origin of antibody diversity and the role of adhesion molecules in immune response.
 - b4-** Illustrate the types, structure and organization of MHC genes, relate structure of HLA to function and illustrate the concept of polymorphism with regards to genes encoding T cell receptors.
 - b5-** Interpret immunodiagnostic tests in correlation with clinical data.
 - b6-** Compare different cellular immunological techniques, interpret data derived from laboratory techniques to understand underlying cellular functions of the immune system.
 - b7-** Illustrate the role of apoptosis in immune regulation.
 - b8-** Develop the ability to use scientific and systemic thinking in topics presented and improve interactive proficiency.
 - b9-** Illustrate thinking skills through demonstrating logical and critical thinking on reading scientific literature within the area of Immunology .
 - b10-** Distinguish between protective and hazards defense mechanisms.
 - b11-** Illustrate inter-relation between allergic reactions and discuss differential diagnosis based on clinical signs.



b12- Distinguished between oncogene and protooncogenes and hazards defense mechanisms and illustrate the diagnostic procedures which utilize the immune response to reach the final diagnoses of different types of tumours.

b13- Construct the algorithm to diagnose and evaluate autoimmune diseases.

b14- Illustrate evidence based medical approach to issues related to donor-recipient matching and demonstrate when a process or test is out of control, suggest possible reasons for this and select an appropriate solution from a range of alternatives.

b15- Relate immunologic theory to performance of procedures in the blood bank and serology laboratory.

c- professional and practical skills:

c1- Initiate the use of safety procedures and personal protective equipment in the laboratory, outline the procedure for labeling, handling and disposing of potentially infectious material.

c2- Gain skills to perform different tests in immunodiagnosis and apply quality control standards in immunodiagnostic tests.

c3- Develop skills to perform and interpret results of different cellular immunological techniques.

c4- Gain skills to diagnose and investigate clinical cases which have underlying immunopathology.

c5- Gain skills to differentiate between different allergic reactions .

c6- Outline the procedure for labeling, handling tumor specimens. Initiate the use of safety procedures and personal protective equipment in the laboratory to make stained slides from tumor specimen

c7- Acquire skills for performing tests of autoimmunity

c8- Plan and execute safely a series of transplantation experiments and analyze experimental transplantation results and determine their strength and validity

c9- Perform and interpret ABO blood grouping and Rh typing and resolve ABO discrepancies and promoting excellence in diagnosing immunohematological disease.

d- General and transferable skills:

d1- Communicate through group discussion

d2- Work as a part of team

d3- Develop skills in information technology

d4- Develop skills for oral presentation

d5- Develop skills in reading and research

d6- Develop skills to work safely in a laboratory environment



3- Academic standards

3a External references for standards (Benchmarks)

Generic Academic Reference Standards of the National Authority for Quality Assurance and Accreditation of Education (NAQAAE)

Date of Academic Reference standards (ARS) approval by Institute Council: 5/6/2014

3b Comparison of provision to selected external references

Generic Academic Standards	PhD of Immunology
A1-Basic facts , theories, of the specialty and related subjects/ fields	<p>a1- Recognize the development of cells and cellular functions at the molecular level.</p> <p>a3- Explain the mechanisms for the generation of antibody diversity</p> <p>a4- Recall genome structure and function.</p> <p>a5- Comprehend how the immunological cells and molecules interact in defending the body against invading microorganisms</p> <p>a6- Recognize immune mediated diseases</p> <p>a9- Recall different molecules that share in immunological hypersensitivity reactions.</p>
A2- Mutual relation between professional practice and effects on environment	<p>a2- Understand research methodology and evidence based medical research</p> <p>a10- Understand immune response to tumors, the different mechanisms of oncogenesis, evasions of the different tumors to the immune response and the diagnosis and investigations of clinical cases which have underlying immunopathology.</p> <p>a12- Understand the different mechanisms of haemolytic diseases, haemolytic disease of newborn and drug induced haemolytic anaemia.</p>
A3- Recent advances in the field of practice	a7- Review scientific information through different medical search engines.



<p>A4-Details of ethical & legal practice A5 -Quality standards of the practice</p>	<p>a11- List the evidence for use, and limitations of, the common procedures used in the diagnosis and management of patients and donors</p>
<p>A6- Design, conduction & publishing of scientific research</p>	<p>a8- Understand the build up of scientific paper. Design, conduction & publishing of scientific research through thesis</p>
<p>A7- Ethical considerations in different types of scientific research</p>	<p>a8- Understand the build up of scientific paper. Recognize Ethical considerations in different types of scientific research through thesis</p>
<p>B1- Analyze, deduce, extrapolate & evaluation of information</p>	<p>b1- Interpret, analyze and evaluate basic immunologic information to solve problems b2- Illustrate the basis of molecular cell biology b3- Illustrate the basics of the use of new technologies in the area of immunology b4 Illustrate the isotyping switching and its importance in immune system b5- Differentiate the various modes of inheritance b6- Differentiate between specific and non specific response b7- Illustrate the immunopathology of the different diseases. b10- Illustrate the basis of hypersensitivity.</p>
<p>B2- Solve the majority of problems in the specialty according to the available data (complete or incomplete)</p>	<p>b1- Interpret, analyze and evaluate basic immunologic information to solve problems b8- Illustrate the use scientific and systemic thinking in topics presented.</p>
<p>B3- Conduct research studies that add to the existing specialty knowledge</p>	<p>Conduct research studies that add to the existing specialty knowledge through thesis and assignments</p>



<p>B4- Publish scientific articles/papers (in indexed journals)</p>	<p>Publish scientific articles/papers (in indexed journals) through thesis</p>
<p>B5- Plan and implement (or supervise implementation of) enhancement & Improvement approaches to practice</p>	<p>b9- Identify scientific problems within the area of immunology and design strategies for investigating the problems. Also through student questionnaire</p>
<p>B6- Take decisions in various professional situations (including dilemmas & controversial issues)</p>	<p>b9- Identify scientific problems within the area of immunology and design strategies for investigating the problems b11- Distinguished between oncogene and protooncogenes and hazards defense mechanisms and illustrate the diagnostic procedures which utilize the immune response to reach the final diagnoses of different types of tumours. b12- Evaluate disciplines related to transfusion and transplantation science in order to be able to integrate information into a wider context</p>
<p>B7- Add to the specialty field through creativity & innovation</p>	<p>b9- Identify scientific problems within the area of immunology and design strategies for investigating the problems. Add to the specialty field through creativity & innovation through thesis</p>
<p>B8- Manage discussions on basis of evidence and proofs</p>	<p>b5- Differentiate the various modes of inheritance b13- Demonstrate knowledge of immune-hematological principles and procedures</p>
<p>C1- Competent in all basic and all required advanced professional skills (to be determined according to the specialty board/ department)</p>	<p>c1- Gain skills to perform different techniques for protein separation, PCR and fractionation of cell extraction. c2- Conduct the correct handling procedure for various laboratory specimens. c3- Gain experience in conducting experiments to isolates the different types of cells c4- Perform and understand the principle of tests specific for different</p>



	<p>diseases</p> <p>c6- Gain skills in setting a research experimental model to study the role of the immune response in oncogenesis</p> <p>c7- Gain skills to differentiate self-tolerance and autoimmunity</p>
C2- Write and appraise reports	<p>c6- Gain skills in setting a research experimental model to study the role of the immune response in oncogenesis</p> <p>c9- Perform and supervise the tests and procedures necessary to provide diagnosis of haemolytic disease of newborn</p>
C3- Evaluate and improve methods and tools used in specialty	<p>c8- - Plan and execute safely a series of experiments on transplantation</p> <p>Also through student questionnaire</p>
C4- Use technology to advance practice	<p>c1- Gain skills to perform different techniques for protein separation, PCR and fractionation of cell extraction.</p> <p>c5- Gain skills to perform different immunological techniques in separation, detection and purification of allergens</p>
C5- Plan professional development courses to improve practice and enhance performance of juniors	<p>c8- Plan and execute safely a series of experiments on transplantation</p>
D1- Communicate effectively using all methods	<p>d1- Communicate through group discussion</p>
D2- Use information technology to improve his/her professional practice	<p>d3- Develop skills in information technology</p>
D3- Teach and evaluate others	<p>d4- Develop skills for oral presentation</p>
D4- Perform self appraisal & seek continuous learning	<p>d5- Develop skills in reading and research</p>



D5- Use different sources of information to obtain data	d3- Develop skills in information technology d5- Develop skills in reading and research
D6- Work in teams as well as a member in larger teams	d2- Work as a part of team
D7- Manage scientific meetings and appropriately utilize time	d4- Develop skills for oral presentation

4- curriculum structure and contents

4.a program duration:4 years)

4.b program structure :

4.b.i- No. of hours per week in each year/semester:

Semester	Core Courses	Elective Courses
	No. of hours	No. of hours
First semester	7	



Second semester	5	2
Third semester	2	5
Fourth semester	1	2

4.b.ii- No. of credit hours Lectures Practical Total

 Compulsory Elective Optional

4.b.iii- No. of credit hours of basic science courses
(elective from other departments except for computer
and statistics)

No. %

4.b.iv- No. of credit hours of courses of social sciences
and humanities.

No. %

4.b.v- No. of credit hours of specialized courses

No. %

4.b.vi- No. of credit hours of other courses (e.g.
statistics, computer)

No. %

4.b.vii- Field Training

No. %



4.b.viii- Program levels (in credit-hours system)

Student is required to pass at least 12 credit hours with CGPA not less than C+ before submitting a thesis proposal.

5- Program Courses

5.1- Compulsory (15CH)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1708801	Molecular Cell Biology	2	1	2
1708802	Research Topics in Biomedical Science	1	1	-
1708803	Molecular Immunology II	3	2	2
1708804	Immunogenetics	2	2	-
1708805	Cellular & Molecular Immunology	2	1	2
1708806	General Clinical Immunology II	3	2	2
1708807	Interactive Immunology	1	1	-
1708808	Journal Club	1	1	-

5.2- Elective I (6CH)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1708809	Hypersensitivity reactions II	2	1	2
1708810	Tumor Immunology II	2	1	2
1708811	Specific Autoimmunity II	2	1	2



1708812	Transplantation II	2	1	2
1708813	Immuno-haematology II	2	1	2

5.3- Elective II (3CH)

Code No.	Course Title	No. of credit hours	No. of hours /week	
			Lecture	Practical
1701820	Biochemistry	3	2	2
1705820	Haematology	3	2	2
1706820	Bacteriology	3	2	2
1712820	Medical Biophysics	3	2	2
1721821	Computer	3	2	2
1717820	Chemical Pathology	3	2	2
1713820	Genetics	3	2	2
1721820	Medical Statistics	3	2	2

5.4- Optional – (none)

6- Program admission requirements

7- Regulations for progression and program completion



For the progression and completion of the program to obtain the degree of Ph.D. in Immunology and allergy, the student must complete 24 credit hours with CGPA of at least C+ and submit a thesis validity report.

For the progression and completion of the program to obtain the degree of Msc the student must:

- 1- Complete 24 credit hours with CGPA of at least C+.
- 2- Submit a thesis validity report by an examination committee approved by the department council and their members include at least two external examiners.

8- Evaluation of Students enrolled in the program.

Tool evaluation	Intended learning outcomes being assessed
Written	a1- Recall the general description of immune system and describe different molecules that share in immunological cellular interaction. a2- Recognize the basic structure of immunoglobulin molecule, describe the complement system, the organization and expression of immunoglobulin genes. a3- Recall the MHC genes regarding their types, structure, and organization, the structure and functions of HLA types, the genes generating polymorphism and the genes



	<p>encoding T cell receptors.</p> <p>a4- Discuss the different modalities of immunodiagnosis, types of immunodiagnostic techniques e.g. ELISA, RIA, immunofluorescence, etc. and tests for molecular immunology.</p> <p>b1- Interpret, analyze and evaluate basic immunologic information to solve problems</p> <p>b2- Illustrate the basis of immune system and demonstrate the innate immune mechanisms.</p> <p>b3- Relate immunoglobulin structure with its function, illustrate the origin of antibody diversity and the role of adhesion molecules in immune response.</p> <p>b4- Illustrate the types, structure and organization of MHC genes, relate structure of HLA to function and illustrate the concept of polymorphism with regards to genes encoding T cell receptors.</p>
Practical	<p>c1-Initiate the use of safety procedures and personal protective equipment in the laboratory, outline the procedure for labeling, handling and disposing of potentially infectious material.</p> <p>c2- Gain skills to perform different tests in immunodiagnosis and apply quality control standards in immunodiagnostic tests.</p> <p>c3- Develop skills to perform and interpret results of different cellular immunological techniques.</p> <p>c4- Gain skills to diagnose and investigate clinical cases which have underlying immunopathology.</p> <p>c5- Gain skills to differentiate between different allergic reactions .</p>



	<p>c6- Outline the procedure for labeling, handling tumor specimens. Initiate the use of safety procedures and personal protective equipment in the laboratory to make stained slides from tumor specimen</p> <p>c7- Acquire skills for performing tests of autoimmunity</p> <p>c8- Plan and execute safely a series of transplantation experiments and analyze experimental transplantation results and determine their strength and validity</p> <p>c9- Perform and interpret ABO blood grouping and Rh typing and resolve ABO discrepancies and promoting excellence in diagnosing immunohematological disease.</p>
Oral	<p>a5-Recall proper understanding of functions of different immune cells in relation to primary and secondary immune response and immunological memory and the relationship between mucosal immune system and different immune cells.</p> <p>a6- Understand the difference between the peripheral and central apoptosis, pathways of apoptosis and how the immunological cells and molecules interact in defending the body against invading microorganisms & role of apoptosis in this.</p> <p>b5-Interpret immunodiagnostic tests in correlation with clinical data.</p> <p>b6- Compare different cellular immunological techniques, interpret data derived from laboratory techniques to understand underlying cellular functions of the immune system.</p> <p>b7- Illustrate the role of apoptosis in immune regulation.</p> <p>d1-Communicate through group discussion</p>



	<p>d2- Work as a part of team</p> <p>d3- Develop skills in information technology</p>
<p>Semester Work</p>	<p>b8- Develop the ability to use scientific and systemic thinking in topics presented and improve interactive proficiency.</p> <p>b9- Illustrate thinking skills through demonstrating logical and critical thinking on reading scientific literature within the area of Immunology .</p> <p>b10- Distinguish between protective and hazards defense mechanisms.</p> <p>b11- Illustrate inter-relation between allergic reactions and discuss differential diagnosis based on clinical signs.</p> <p>b12- Distinguished between oncogene and protooncogenes and hazards defense mechanisms and illustrate the diagnostic procedures which utilize the immune response to reach the final diagnoses of different types of tumours.</p> <p>b13- Construct the algorithm to diagnose and evaluate autoimmune diseases.</p> <p>b14- Illustrate evidence based medical approach to issues related to donor-recipient matching and demonstrate when a process or test is out of control, suggest possible reasons for this and select an appropriate solution from a range of alternatives.</p> <p>b15- Relate immunologic theory to performance of procedures in the blood bank and serology laboratory.</p> <p>d1- Communicate through group discussion</p> <p>d2- Work as a part of team</p> <p>d3- Develop skills in information technology</p> <p>d4- Develop skills for oral presentation</p>



	d5- Develop skills in reading and research d6- Develop skills to work safely in a laboratory environment
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Evaluation of the Program

Evaluator	Tool	Sample
1- Senior students	Interview	At least 50 %
2- Alumni	Interview	Representative sample
3- Stakeholders (Employers)	Interview	Representative sample
4- External Evaluator(S) or External Examiner (s)	Reports	Dr /Mohamed Abbas Elbarawy
5- Other		

Dates of Previous editions/revisions:

Editions/Revisions Number	Date
Edition no.1	2009
Edition no. 2	2011
Edition no.3	5/6/2014
Edition no.3, revision no.1	12/2014
Edition no.3, revision no.2	10/2016



Program coordinator:

Name: ... Prof. Dr. **Soheir Rizk Demian**

Signature:

Department Head:

Name: ... Prof. Dr Eman Aly Rashwan

Signature:

Date of Department Council Approval: 6/9/2017

