Correspondence

Position statement: training programme in immunology of the European Board of UEMS Medical Biopathology

1. Introduction

UEMS Medical Biopathology is a Section covering the specialities of Laboratory medicine except Anatomical Pathology/Cytology. Its role is to maintain high educational standards whilst simultaneously ensuring that the vital role of Medical Biopathology in medical practice is recognised within the European Union. It is organised within the European Union of Medical Specialists (UEMS) as depicted below.

UEMS is a professional organisation for specialist physicians, appointed by the national organisations of the member states and informally associated with organisation of the European Union.

1.1. History and organisation

On 20 July 1958—1 year after the treaty of Rome was signed—representatives delegated by the professional organizations of medical specialists of the European Community...
The aims of the European Board of Medical Biopathology

The aims of the European Board of Medical Biopathology are defined in the Statutes of the European Board of Medical Biopathology (Document MB/94.05 Art. 2.0). They are that the Board should:

1. Recommend the standards required for training specialists in Medical Biopathology.
2. Make proposals in relation to the quality and content of training programmes.
3. Recommend procedures to facilitate the free movement of Biopathologists throughout the European Union.
4. Recommend the criteria to which Training Centres should conform.
5. Examine the content and quality of training programmes in various countries of the European Union.
6. Facilitate the exchange of specialist trainees between training centres in various countries of the European Union to ensure a better quality of training.
7. Institute a recognition of quality and competence by establishing a Fellowship of the European Board of Medical Biopathology (FEBMB).

I.3. Fellowship of the European Board of Medical Biopathology

Medical Biopathologists who fulfil the criteria for the recognition of quality and competence will be conferred with the Fellowship of the European Board of Medical Biopathology. Individuals who are already registered medical specialists in one EU country have an automatic right to practice in another EU country. The fellowship of the European Board of Medical Biopathology confers no additional rights and is not a mandatory qualification. However, it is hoped that it will facilitate travel and movement within Europe for those individuals from countries who are full- or associate members of UEMS. It is also felt that Fellowship of the European Board of Medical Biopathology will help in aligning the practice of Medical Biopathology in the various EU countries and in providing a more uniform standard for training for Medical Biopathology.

2. Training programme in immunology [1]

The curriculum in Immunology embraces both the laboratory and clinical aspects of the specialty as defined by the International Union of Immunological Societies (IUIS) (see below) and is designed to cater to trainees wishing to practice either across the broad spectrum of the specialty or to concentrate predominantly on laboratory or clinical immunology. Given the immunological principles that underlie allergic disease, there is inevitably a certain degree of overlap between this curriculum and the curriculum for Allergology and Clinical Immunology [2]. The areas of overlap reflect the wide diversity in the practice of allergy and immunology across the constituent countries of the European Union [3]. The Immunology curriculum, as set out here, is by no means meant to be prescriptive but does serve as a useful model for harmonizing training programmes in Immunology throughout Europe.

2.1. Definition of the field according to IUIS (International Union of Immunological Societies)

“Clinical immunology is a clinical and laboratory discipline dealing with the study, diagnosis and management of patients with diseases or disease processes resulting from disordered immunological mechanisms, and conditions in which immunological manipulations form an important part of therapy and/or prevention” [4,5]. Immunological diseases may have both adult and pediatric presentations. While it is recognized that many immunologists will have responsibilities in both clinical and laboratory areas, the extent of their responsibilities in the different areas will vary. Many immunologists will work entirely in the laboratory.

2.2. Objectives of training

The Board of Medical Biopathology have set out as objectives of training the acquisition of the following:

1. Detailed knowledge of principles of Immunology.
2. Specialized knowledge of the immune-mediated diseases.
3. Interpretative skills so that a clinically useful opinion can be derived from the laboratory data.
4. Technical knowledge of laboratory immunology including the implementation of quality control and quality assurance procedures.
5. Experience in research and development.
7. Generic issues common in all laboratories.

2.3. Subject matter

2.3.1. Fundamental immunology
The following teaching/learning methods are suggested:
(A) All trainees will be expected to acquire the core body of knowledge necessary to understand the principles and to give consultative advice on the appropriate use of laboratory tests for prevention, diagnosis and treatment of the following immune-mediated diseases:

1. Immune responses to bacteria, viruses and parasites
   Intrahepatic immunity in infection, primary and secondary humoral immune responses, cell mediated immune responses.
2. Immunodeficiency diseases
   (Ab, T-cell, complement, phagocytes).
   Secondary immunodeficiency (immunology of HIV infection): immunopathogenesis, immune monitoring of HIV(+ ) subjects: aging and the immune system. Others (induced by surgery of trauma, secondary to infectious diseases, cancer etc.).
3. Autoimmune diseases
   Systemic diseases: systemic lupus erythematosus, rheumatoid arthritis, Sjögren syndrome, systemic sclerosis, ankylosing spondylitis, vasculitis syndromes (Wegener granulomatosis, cryoglobulinaemic vasculitis, etc.).
   Organ specific diseases: immunologic renal diseases, autoimmune thyroid diseases, diabetes and related autoimmune diseases, immunologic diseases of the gastrointestinal tract, autoimmune liver diseases, myasthenia gravis, immunologic diseases involving the nervous system, autoimmune skin blistering diseases.
4. Transplantation immunology
   Histocompatibility: major and minor histocompatibility complex, organ transplantation and hematopoietic stem cell transplantation, concepts in choosing graft-donor/recipient, immune tolerance/grant rejection, graft-versus-host reaction (mechanisms).
It is essential that the trainee has detailed knowledge of the techniques required to direct a diagnostic Immunology Laboratory service.

2.3.3. Diagnostic Immunology
To provide the trainee with the knowledge and skills required to direct a diagnostic Immunology Laboratory service.

5. Immunology of neoplasia
   Lymphoproliferative diseases, tumor immunology, cancer immunotherapy.

6. Allergic diseases
   Immediate hypersensitivity syndromes, including anaphylaxis, immediate and delayed hypersensitivity diseases due to food allergens, aerosol allergens, drugs, etc.

7. Reproductive immunology
   Immunologic events and infertility, immunologically mediated abortion (autoimmune, alloimmune).

8. Immunotoxicology (drug or environmental induced immunodisorders)

9. Immunoprophylaxis/vaccines
   Immunization: indications, contraindications and prevention of adverse reactions.

10. Immunotherapy including immunosuppression
   Steroids, azathioprine, cyclophosphamide, cyclosporin, tacrolimus, sirolimus, and other agents as they enter clinical use; immunoglobulin replacement, gene therapy as well as immunomodulation (interleukins and interferons, monoclonal antibodies, colony stimulating factors, cytokines and their receptors, apheresis, oral tolerance). Indications, adverse reactions.

11. Immune system and nutrition
   Nutritional influences on immunity—vitamins, trace elements.

(B) To provide the trainee with the skills and knowledge required to assess and treat patients with primary and acquired immunodeficiency diseases as well as rheumatic diseases and vasculitic disorders. Trainees should have detailed competence to undertake immunoglobulin replacement therapy and be competent to undertake immunosuppressive therapy, immunomodulatory therapy (therapeutic monoclonals, cytokines (IL-2, gamma-IFN) etc.) and plasma exchange. All immunologists will have detailed knowledge and be aware of the clinical consequences of HIV infection, its epidemiology and prevention, current ideas about treatment and techniques required for monitoring HIV-induced disease. In the case of autoimmune rheumatic diseases, trainees need to be able to assess and treat patients, where appropriate in partnership with the rheumatologists or relevant organ-based specialists. Trainees need also to be able to liaise with other clinical colleagues for the optimum management of patients under their care, e.g. organ-based specialists, allergists, pediatricians.

2.3.3.1. Diagnostic Immunology
To provide the trainee with the knowledge and skills required to direct a diagnostic Immunology Laboratory service. It is essential that the trainee has detailed knowledge of the following laboratory assays and is able to provide interpretative advice on the clinical significance of the results obtained.

(A) Principles of techniques and methods
1. Immunochemical procedures
   Trainees should be familiar with procedures for purifying serum protein fractions such as gel filtration and chromatography, purifying antibodies by immunoadsorption, labelling relevant proteins.

2. Techniques
   *Immunochrometry and molecular biology:* radial immunodiffusion, nephelometry/turbidimetry, protein electrophoresis, immunofixation, isoelectric focusing, direct and indirect immunofluorescence, chemiluminescence, enzyme linked immunoassays (ELISA), radioimmunoassays, western (protein) blotting. Southern (DNA) blotting, Northern (RNA) blotting, polymerase chain reaction, sequencing.
   *Cellular immunology:* isolation of cell (sub)populations, cell culture techniques. Preparation of cell suspensions and cell subset separations, flow cytometry, cell sorting (by flow or magnetic), microtitre plate cell culture techniques, cell and supernatant harvesting, ELISAPOT, lymphocytotoxicity, cell cryopreservation.

(B) Diagnostic procedures
   - Soluble effectors of specific immunity
     1. Qualitative and quantitative estimation of immunoglobulins in serum and other body fluids.
     2. Qualitative and quantitative estimation of paraproteins.
     3. Identification and characterization of cryoglobulins.
   - Quantitation of immunoglobulin subclasses.
   - Assessment of specific antibody production.
   - Innate immunity soluble effectors
   - Quantitation of complement components including classical and alternate pathways and their inhibitors.
   - Functional analysis of complement hemolytic activity (classical and alternate pathway): CH 50, AH 50.
   - Autoimmunity diagnostic procedures
     9. Autoantibodies including ANA, ANCA and rheumatoid factor as well as autoantibodies to dsDNA, ENA, GBM, cardiolsins, smooth muscle, mitochondrial, gladin, endomyosium, tissue transglutaminase, gastric parietal cell, intrinsic factor, thyroid, skin, pancreatic islets, adrenal, ovarian, acetyl-choline receptor, etc.
   - Allergy diagnostic procedures
     10. Measurement of total and specific IgE.
   - Delayed type hypersensitivity tests.
   - Cellular immunity assays
     11. Immunophenotyping of immunodeficiencies and lymphoproliferative diseases. DNA analysis.
     12. Lymphocyte function tests by determining proliferation after stimulation with mitogens and antigens and

- Histopathology procedures  
  Trainees must have knowledge of basic histopathology and be familiar with immunopathological changes seen in patients with immunologically mediated diseases affecting skin, kidney, etc.  
- Good laboratory practice  
  (18) Quality assurance and control are mandatory. Knowledge of laboratory accreditation and costing of laboratory tests and budgetary control are very important issues.  

2.4. Length of training  

The UEMS recommends that post-graduate training in immunology should be a minimum of 5 years. The board of the specialist section of biopathology recommends that a period of clinical training should be an integral part of the training of all medical biopathologists. All immunologists should have at least 1 year of clinical experience as part of their postgraduate training. For trainees who plan to practice predominantly in clinical immunology, the period of clinical training in total will last at least 3 years. Part of this clinical experience should be in congenital and acquired immunodeficiencies, autoimmune and rheumatic diseases (including systemic vasculitis). In addition, other areas that may be suitable are internal medicine including infectious diseases, transplantation medicine, haematology, pediatrics, nephrology and endocrinology. Trainees in clinical immunology will be required to have at least 2 years of laboratory immunology experience. For trainees wishing to practice predominantly in laboratory immunology, 4 years of laboratory practice will be required. They may wish to gain appropriate experience in other areas of laboratory medicine relevant to the practice of diagnostic immunology (haematology, molecular biology, microbiology, clinical chemistry, etc.).  

2.5. Generic issues  

- Research and developmental experience  
  Throughout their training individuals should be encouraged to critically assess and evaluate published work. The training should allow the individual to be actively involved in research.  
- Data management skills  
  The trainee should gain experience in all aspects of laboratory planning, budgetary control and management. The trainee should also gain experience in formulating departmental policies and developing leadership skills.  
- Health and safety requirements  
  The trainee should be familiar with all health and safety issues including their legal aspects.  

2.6. Practice of immunology across Europe  

Information is available in the article “State-of-the-art of Clinical Immunology in Europe” [3] and updates are available on EFIS-CIG website link http://www.inserm.fr/servcom/sfi.nsf/397fe8563d75f39bc12563f60028ec43/dfc85e45e6121ab41256813004c96d9?OpenDocument.  

References  


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