

**HIGHER MEDICAL TRAINING**

**CURRICULUM**

**FOR**

**ALLERGY**

**JANUARY 2003**

Joint Committee on Higher Medical Training  
5 St Andrews Place  
Regent's Park  
London NW1 4LB

Tel: 020 7935 1174  
Fax: 020 7486 4160

Email: [HMT@rcplondon.ac.uk](mailto:HMT@rcplondon.ac.uk)

This curriculum is available on the JCHMT website:  
<http://www.jchmt.org.uk>

## TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	<b>1</b>
<b>Entry Requirements</b> .....	<b>1</b>
<b>Duration and Organisation of Training</b> .....	<b>1</b>
<b>Research</b> .....	<b>2</b>
<b>Training Record</b> .....	<b>2</b>
<b>Assessment</b> .....	<b>2</b>
<b>Flexible Training</b> .....	<b>2</b>
<b>AIM OF CURRICULUM</b> .....	<b>3</b>
<b>Subject Matter</b> .....	<b>3</b>
<b>Learning Methods</b> .....	<b>3</b>
<b>Assessment Methods</b> .....	<b>4</b>
<b>TABLE 1: CORE IMMUNOLOGICAL KNOWLEDGE</b> .....	<b>5</b>
<b>TABLE 2: LABORATORY EXPERIENCE</b> .....	<b>7</b>
<b>TABLE 3A: ALLERGY CURRICULUM: ASTHMA</b> .....	<b>9</b>
<b>TABLE 3B: ALLERGY CURRICULUM: RHINITIS</b> .....	<b>10</b>
<b>TABLE 3C: ALLERGY CURRICULUM: ATOPIC DERMATITIS</b> .....	<b>11</b>
<b>TABLE 3D: ALLERGY CURRICULUM: FOOD ALLERGY/INTOLERANCE</b> .....	<b>12</b>
<b>TABLE 3E: ALLERGY CURRICULUM: DRUG/VACCINE ALLERGY</b> .....	<b>13</b>
<b>TABLE 3F: ALLERGY CURRICULUM: INSECT VENOM ALLERGY</b> .....	<b>14</b>
<b>TABLE 3G: ALLERGY CURRICULUM: URTICARIA/ANGIOEDEMA</b> .....	<b>15</b>
<b>TABLE 3H: ALLERGY CURRICULUM: ANAPHYLAXIS</b> .....	<b>16</b>
<b>TABLE 3I: ALLERGY CURRICULUM: LATEX ALLERGY</b> .....	<b>17</b>
<b>TABLE 3J: ALLERGY CURRICULUM: ALLERGEN IMMUNOTHERAPY</b> .....	<b>18</b>
<b>TABLE 3K: ALLERGY CURRICULUM: PAEDIATRIC ALLERGY</b> .....	<b>19</b>
<b>TABLE 3L: ALLERGY CURRICULUM: “ALTERNATIVE” THERAPIES AND DIAGNOSTIC PROCEDURES IN ALLERGY</b> .....	<b>20</b>
<b>TABLE 3M: ALLERGY CURRICULUM: IMMUNODEFICIENCY</b> .....	<b>21</b>
<b>KEY OUTCOMES OF THE TRAINING PERIOD</b> .....	<b>22</b>
<b>RESEARCH AND HIGHER MEDICAL TRAINING</b> .....	<b>23</b>
<b>APPENDIX A: FUNDAMENTAL IMMUNOLOGICAL KNOWLEDGE</b> .....	<b>25</b>

## **INTRODUCTION**

Allergy is a clinical speciality which has its scientific roots in the discipline of Immunology. It requires expertise and training unique to Allergy. In addition, because of overlap with several organ-based specialities, particularly Respiratory Medicine, Dermatology and ENT, it requires knowledge of aspects of these specialities. It shares with Immunology many of the same laboratory techniques, but those who practice clinically in the speciality are unlikely to be called upon to direct service laboratory departments. They may, however, run research laboratories.

This document presents an objective-based approach to the curriculum in Allergy. It provides guidance to both trainees and educational supervisor as to the required content of the training programme.

### **Entry Requirements**

Applicants for Higher Medical Training (HMT) in Allergy must have completed a minimum of two years General Professional Training and gained the MRCP (UK) for MRCP(I).

GPT is defined as follows:

- A minimum of two years in approved posts with direct involvement in patient care and offering a wide range of experience in a variety of specialities.
- Eighteen months of the two years must be spent in posts providing experience in the admission and early follow-up of acute emergencies.
- At least six of these eighteen months must be spent on a service or services in which the emergency take is “unselected”.
- “Unselected take” is defined as acute medical intake encompassing the broad generality of medicine, i.e. not restricted to any single or small group of specialities. If any major component of acute medicine (e.g. cerebrovascular accidents, myocardial infarction) is excluded from the take, this experience must be obtained in other posts. During the period “unselected take” trainees should have an on-call commitment which averages no less than four takes per month.

Non-UK Graduates who compete for HMT Posts must provide evidence of appropriate knowledge, training and experience, particularly in the care of acute medical conditions.

### **Duration and Organisation of Training**

The duration of HMT in allergy will be a minimum of five years. The curriculum involves a thorough training in all aspects of clinical allergy spread over the five years combined with an understanding of the principles of basic immunology and immunology tests and their interpretation, as well as clinical aspects of immunology. Whereas in the immunology CCST there is a Core Training Programme (CTP) taken in the first two years, in the CCST allergy the relevant CTP elements will be spread over the five year period.

The educational supervisor will be a named Consultant Allergist and training must be based in specialist allergy centres. Trainees will be supervised throughout the programme. One consultant in their region will act as a Programme Director.

## **Research**

A period of supervised research of high quality is considered a desirable part of HMT in Allergy. A relevant research period may contribute up to twelve months towards the total duration of HMT. Some trainees may wish to spend two or three years in research, either before entering HMT or by stepping aside from clinical training after entering a programme. This is perfectly acceptable but only one full year will count towards the programme. For those undertaking an extended period of research after entering a programme and obtaining their NTN, a limited amount of additional educational credit may be granted at the discretion of the SAC for clinical work relevant to the programme undertaken in the course of research beyond the initial year.

## **Training Record**

A training record must be maintained by the trainee. It will be counter-signed as appropriate by the educational supervisor(s) to confirm the satisfactory fulfilment of the required training experience and the acquisition of the competencies that are enumerated in the speciality curriculum. It will remain the property of the trainee, and must be produced at the annual assessments.

## **Assessment**

Assessment of trainees will be based upon the standard format of annual review, including the Penultimate Year Assessment (PYA) to which particular importance attaches. Full details may be found in the introduction to the JCHMT handbook. The award of the CCST will be subject to satisfactory completion of the entire series of annual assessments.

## **Flexible Training**

Trainees who are unable to work full-time are entitled to opt for flexible training programmes. EC Directive 93/16/EEC requires that:

- Part-time training shall meet the same requirements as full-time training, from which it would differ only in the possibility of limiting participation in medical activities to a period of at least half of that provided for full-time trainees.
- The competent authorities shall ensure that the total duration and quality of part-time training of specialists are not less than those of full-time trainees.

The above provisions must be adhered to. Flexible trainees should undertake a pro-rata share of the out of hours duties (including on-call and other out of hours commitment) required of their full-time colleagues in the same programme and at the equivalent stage.

For details of appointment and funding arrangements for flexible trainees, please see the revised "Guide to Specialist Registrar Training" (February 1998).

## **AIM OF CURRICULUM**

The goal of the training programme is to enable trainees to acquire the requisite highly specialised scientific knowledge, clinical skills and laboratory skills required to diagnose and manage the complete spectrum of IgE-mediated diseases, and to differentiate these from non-IgE-mediated diseases which may require other specialist management.

Allergic diseases may manifest in a multitude of organs, including the respiratory tract, skin and gut. In addition, they may present in both adult and paediatric patients. For this reason, collaborative training in other medical specialities, particularly paediatrics, dermatology, respiratory medicine and ENT, is an essential aspect of the programme.

## **Subject Matter**

There are three main areas of subject matter included within the curriculum for allergy:

- Provision of a core body of knowledge in fundamental immunology and its applications, with particular reference to IgE-mediated diseases.
- Familiarity with the full range of laboratory tests relevant to the diagnosis and management of immunological and allergic diseases. All trainees will be expected to become familiar with the concepts of internal quality control and external quality assessment, precision, accuracy, sensitivity, specificity and the predictive value of laboratory tests. They will become familiar with the role of the diagnostic laboratory in supporting hospital and general practice services, including the interpretation of tests, provision of clinical advice regarding test selection, and clinical liaison. It is accepted that, while trainees might benefit from some practical knowledge of performing immunological laboratory tests, they will not be required to be able to perform these tests personally or oversee the performance of these tests in a hospital laboratory setting.
- Diagnosis, investigation and management of patients with a full range of disorders that might be referred to an allergy specialist as detailed below.

An objective list summary of the subject matter of the curriculum is set out in Table 1 (Core Immunological Knowledge), Table 2 (Laboratory Experience) and Tables 3A-M (Specialist Knowledge of Allergic Diseases).

## **Learning Methods**

The following learning methods will be used (summarised here and included where appropriate in Tables 1-3):

- “Apprenticeship learning” with senior staff
- Task specific on the job training
- Observation of clinical and laboratory techniques
- Searching the literature (manually and using electronic and web based learning resources)
- Attending postgraduate education courses
- Tailored clinical experience
- Small group teaching e.g. tutorials, journal clubs
- Carrying out clinical and laboratory audit

## **Assessment Methods**

Trainees will be assessed by educational supervisors. The trainee may be trained and assessed by a variety of educational supervisors (for example, by consultants from clinical and laboratory based disciplines). In addition to satisfactory generic skills (which are the subject of a separate JCHMT Curriculum Handbook), the educational supervisors will be looking for evidence of detailed and reliable history taking and recording of appropriate clinical details, accurate and systematic observation of patients, appropriate and confident physical examination, and accurate and timely diagnosis and formulation of appropriate plans. The trainees will also be expected to have a sound knowledge of core immunology and associated laboratory techniques and their limitations, and the interpretation of laboratory results. Evidence of competence for inclusion in the trainee's record will include (see also Tables 1-3):

- Assessment of competence by direct observation and critique of management by educational supervisors, as well as from other members of multi-disciplinary teams. Such assessments may be formalised in the near future and may include
  - Mini-CEX (Clinical Evaluation Exercise)
  - Direct Observation of Procedural Skills (DOPS)
  - 360° assessment
  
- Written case records and presentations
- Treatises on critical and controversial aspects of allergy management
- Evidence of teaching others
- Portfolio of literature reviews, case reports, publications, protocols and standard operating procedure.
- Completed course/degree/diploma records and certificates
- Appropriately completed clinical and laboratory audits

**TABLE 1: CORE IMMUNOLOGICAL KNOWLEDGE**

OBJECTIVE	SUBJECT MATTER	LEARNING METHODS	ASSESSMENT METHODS
<p>To be familiar with:</p> <ul style="list-style-type: none"> <li>• The core body of immunological knowledge (appendix A)</li> <li>• Type I hypersensitivity reactions</li> <li>• Hypersensitivity reactions other than Type I</li> <li>• T and B lymphocytes</li> <li>• The mechanisms of allergic inflammation: T cells, eosinophils, mast cells and their products, cytokines, lipid mediators</li> <li>• Regulation of IgE synthesis</li> <li>• The cellular and molecular immunology of asthma, rhinitis, urticaria, reactions to drugs</li> <li>• Postulated immunological mechanisms of allergen immunotherapy</li> <li>• Key targets for anti-allergic drugs and their mechanisms of action</li> <li>• The biology, aerobiology and antigenicity of allergens</li> <li>• The concept of major and minor allergenic determinants and how these cross-react</li> <li>• The epidemiology of atopy and asthma</li> </ul>	<ul style="list-style-type: none"> <li>• Textbooks</li> <li>• Journals: in particular Clin Exp Allergy, J Allergy Clin Immunol, Allergy, Paediatric Allergy Immunol, in addition to core basic immunological journals</li> <li>• Review articles</li> <li>• Literature searches and critical review</li> <li>• Meetings: annual meetings of BSI, BSACI, AAAAI, EAACI, BTS, ATS</li> <li>• Guidelines</li> </ul>	<ul style="list-style-type: none"> <li>• Supervision by educational supervisor</li> <li>• Identification of gaps in knowledge and making time to fill them</li> <li>• Searching the literature and assessing key papers critically</li> <li>• Preparing evidence-based treatises on controversial, evolving or uncommon management issues</li> <li>• Reading relevant journals and review articles</li> <li>• Attending courses, e.g. MSc Immunology, Basic and Clinical Allergy, etc</li> <li>• Tutorials</li> <li>• Electronic/web based learning resources</li> <li>• Journal clubs</li> <li>• Presentations</li> <li>• BSACI Young Allergists' Club</li> <li>• BSI Travellers' Club</li> </ul>	<ul style="list-style-type: none"> <li>• Written summaries, presentations, treatises (portfolio)</li> <li>• Written case records (portfolio)</li> <li>• Evidence of sight of "key papers" (portfolio)</li> <li>• Formal and informal examinations</li> <li>• Evidence of systematised, evidence-based approach to specialist allergy management above, based on the trainee's practical experience, and collection and appraisal of key papers, guidelines and protocols</li> <li>• Evidence of teaching others</li> <li>• Completed course/degree/diploma records and certificates</li> </ul>

<ul style="list-style-type: none"><li>• New developments in therapy, including immunotherapy and primary prevention of allergic disease</li></ul>			
---	--	--	--

**TABLE 2: LABORATORY EXPERIENCE**

OBJECTIVE	SUBJECT MATTER	LEARNING METHODS	ASSESSMENT METHODS
<p>Familiarity with the principles, sources of error and interpretation of the following laboratory tests:</p> <p>IMMUNOCHEMISTRY/SEROLOGY</p> <ul style="list-style-type: none"> <li>• Immunoglobulins</li> <li>• Immunoglobulin subclasses</li> <li>• Total and specific IgE</li> <li>• Mast cell tryptase</li> <li>• ECP</li> <li>• Autoantibodies</li> <li>• ANCA</li> <li>• Precipitins</li> <li>• Paraprotein assessment</li> <li>• Cryoglobulin assessment</li> <li>• Complement components</li> <li>• CI esterase inhibitor</li> <li>• Specific IgG titres</li> </ul> <p>IMMUNOHISTOLOGY CELLULAR STUDIES</p> <ul style="list-style-type: none"> <li>• Cell markers/sub-populations (immunodeficiency, reactive, neoplastic states)</li> <li>• Lymphocyte function/activation</li> <li>• Neutrophil function</li> </ul>	<ul style="list-style-type: none"> <li>• Laboratory equipment and environment</li> <li>• Text books</li> <li>• Review articles</li> <li>• Standard operating procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised “apprenticeship learning”</li> <li>• Task specific on the job training</li> <li>• Observation of laboratory methods</li> <li>• Personal study</li> <li>• Reading relevant journals and review articles</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of competence by direct observation and critique of management by educational supervisor</li> <li>• Collection of standard operating procedures (portfolio)</li> <li>• Evidence of sight of “key papers” (portfolio)</li> <li>• Laboratory audits</li> <li>• Formal and informal examinations</li> <li>• Evidence of teaching others</li> <li>• Completed course/degree/diploma records and certificates</li> </ul>

<ul style="list-style-type: none"> <li>• <i>In vivo / in vitro</i> cytokine production</li> </ul> <p>MOLECULAR STUDIES</p> <ul style="list-style-type: none"> <li>• Southern/Northern/Western blotting</li> <li>• PCR</li> <li>• Ig/T cell receptor gene rearrangement</li> </ul>			
---	--	--	--

**TABLE 3A: ALLERGY CURRICULUM: ASTHMA**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To define asthma</li> <li>• To distinguish between causes of cough, SOB, wheeze, airways obstruction</li> <li>• To assess asthma severity</li> <li>• To recognise triggering/exacerbating factors</li> <li>• To educate patients in self management (self administration of therapy, monitoring of PEF, symptom diary, crises)</li> <li>• To recognise and manage occupational asthma</li> <li>• To describe principles of therapy, including acute and chronic severe disease</li> <li>• To recognise unwanted effects of therapy</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• SPT/RAST</li> <li>• Allergen/occupational challenge</li> <li>• Sputum induction</li> <li>• Knowledge of aeroallergens and occupational allergens</li> <li>• Allergen avoidance</li> <li>• Lung function testing</li> <li>• Imaging</li> <li>• PEF monitoring</li> <li>• Principles of therapy (BTS/GINA guidelines)</li> <li>• Drug delivery devices</li> <li>• Monitoring effects of therapy</li> <li>• Management of acute, severe asthma</li> <li>• Aspirin desensitisation</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised training by:               <ol style="list-style-type: none"> <li>(1) consultant;</li> <li>(2) asthma and allergy specialist nurses;</li> <li>(3) respiratory function technician;</li> <li>(4) occupational physician</li> </ol> </li> <li>• Supervised management of asthma in outpatients and acutely in inpatients</li> <li>• Case studies and critical incident reports</li> <li>• Critical review of the literature</li> <li>• Attendance at relevant courses/meetings</li> <li>• Audit</li> <li>• Tutorials</li> <li>• Personal Study</li> <li>• Awareness of support groups (NAC, BAF, etc)</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of competence by direct observation and critique of management by educational supervisor:               <ol style="list-style-type: none"> <li>(1) management of acute severe and chronic asthma;</li> <li>(2) interpretation of thoracic imaging;</li> <li>(3) interpretation of lung function testing</li> <li>(4) skin prick testing;</li> <li>(5) allergen, occupational and aspirin challenge</li> </ol> </li> <li>• Written case records, presentations (portfolio)</li> <li>• Treatise on asthma management (portfolio)</li> <li>• Record of attendance at relevant meetings (portfolio)</li> <li>• Evidence of teaching others (portfolio)</li> </ul>

**TABLE 3B: ALLERGY CURRICULUM: RHINITIS**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To define seasonal and perennial rhinitis and conjunctivitis, and to distinguish between these and other causes of acute and chronic rhinitis and conjunctivitis</li> <li>• To recognise triggering/exacerbating factors</li> <li>• To investigate and manage chronic and recurrent sinusitis (structural nasal blockage, cystic fibrosis, ciliary dyskinesia, congenital and acquired immune deficiency)</li> <li>• To recognise and manage occupational rhinitis</li> <li>• To describe the principles of therapy, including immunotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• SPT/RAST</li> <li>• Knowledge of allergen and occupational challenge</li> <li>• Rhinoscopy and nasal airways assessment</li> <li>• Rhinomanometry</li> <li>• Saccharin test</li> <li>• Ciliary motility tests</li> <li>• Nasal potential measurements</li> <li>• Sweat sodium test</li> <li>• Imaging</li> <li>• Principles of therapy (BSACI guidelines)</li> <li>• Indications for immunotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised training by allergist in outpatients. Management of inpatients and outpatients, in part by attachment to ENT outpatients.</li> <li>• Involvement with assessment of airways patency, ciliary function, etc.</li> <li>• Case studies</li> <li>• Critical review of the literature</li> <li>• Attendance at relevant courses/meetings</li> <li>• Tutorials</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of competence by direct observation and critique of management by allergy or ENT consultant (core knowledge, rhinoscopy, airways patency, allergen challenge, imaging, tests of ciliary function, nasal potentials)</li> <li>• Written case records (portfolio)</li> <li>• Treatise on differential diagnosis and management of rhinitis (portfolio)</li> <li>• Record of attendance at relevant meetings (portfolio)</li> <li>• Evidence of teaching others (portfolio)</li> </ul>

**TABLE 3C: ALLERGY CURRICULUM: ATOPIC DERMATITIS**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To define atopic dermatitis and distinguish between this and other causes of dermatitis</li> <li>• To recognise complications of atopic dermatitis and its treatment</li> <li>• To recognise triggering/exacerbating factors</li> <li>• To describe the principles of therapy</li> <li>• To explain when to refer for specialist management</li> <li>• To distinguish between atopic dermatitis and contact dermatitis, and to recognise the need for referral for specialist investigation of contact dermatitis</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• SPT/RAST</li> <li>• Trials of allergen avoidance, including food allergens</li> <li>• Principles of therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised training on outpatient and inpatient management of eczema by educational supervisor and dermatology consultant</li> <li>• Case studies</li> <li>• Tutorials</li> <li>• Critical review of the literature</li> <li>• Attendance at relevant courses/meetings</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment of competence by direct observation and critique of management by allergist</li> <li>• Written case records (portfolio)</li> <li>• Treatise on eczema management (portfolio)</li> <li>• Record of attendance at relevant meetings (portfolio)</li> </ul>

**TABLE 3D: ALLERGY CURRICULUM: FOOD ALLERGY/INTOLERANCE**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To recognise the clinical sequelae of IgE-mediated food allergy, and to distinguish these from intolerance syndromes</li> <li>• To describe the natural history of food intolerance syndromes</li> <li>• To describe key food allergy syndromes (peanut, milk, etc.)</li> <li>• To explain the value and limitations of skin prick testing and RAST in food allergy diagnosis</li> <li>• To describe the advantages and disadvantages of specialised diets in food allergic/intolerant patients</li> <li>• To manage severe food allergy syndromes in the community</li> <li>• To recognise GI disorders which may mimic food allergy</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• SPT/RAST, including prick-prick testing</li> <li>• Planned exclusion/reintroduction diets</li> <li>• Diet diaries</li> <li>• Single and double blind, placebo controlled food challenge</li> <li>• Emergency therapy for severe food-induced reactions</li> <li>• Differential diagnosis from other GI syndromes (coeliac disease, lactose intolerance, dumping syndromes, IBD, etc.)</li> </ul>	<p>Supervised training by:</p> <ol style="list-style-type: none"> <li>(1) educational supervisor;</li> <li>(2) discussions with dietician attached to allergy clinic</li> </ol> <ul style="list-style-type: none"> <li>• Supervised management of outpatients</li> <li>• Case studies, critical incident reports</li> <li>• Critical review of the literature</li> <li>• Attendance at relevant courses/meetings</li> </ul>	<ul style="list-style-type: none"> <li>• Collection of food and food additive challenge protocols (portfolio)</li> <li>• Written evidence of practical experience with these protocols</li> <li>• Written evidence of competence in:               <ol style="list-style-type: none"> <li>(1) SPT and prick-prick testing with foodstuffs;</li> <li>(2) prescription and interpretation of exclusion/reintroduction diets</li> </ol> </li> <li>• Written case records (portfolio)</li> <li>• Evidence of attendance at relevant meetings (portfolio)</li> </ul>

**TABLE 3E: ALLERGY CURRICULUM: DRUG/VACCINE ALLERGY**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To explain the mechanisms of different types of reaction to drugs and their natural history</li> <li>• To recognise patterns of adverse reactions to different drugs</li> <li>• To describe mechanisms of unwanted effects of drugs</li> <li>• To analyse and manage systematically adverse drug reactions during general and local anaesthesia</li> <li>• To recognise the value and limitations of SPT/RAST testing with drugs</li> <li>• To describe the principles of drug challenge and drug desensitisation</li> <li>• To provide advice on the use of alternative drugs</li> <li>• To recognise multiple drug allergy syndromes</li> <li>• To describe the use of vaccines, their unwanted effects and contraindications.</li> </ul>	<ul style="list-style-type: none"> <li>• Systematised history of drug exposure</li> <li>• Examination</li> <li>• SPT/RAST with drugs and derivatives (e.g. major/minor penicillin determinants)</li> <li>• Knowledge of tests of cell-mediated drug reactions</li> <li>• Drug challenge and desensitisation protocols</li> <li>• Strategies to prevent allergic drug reactions</li> <li>• Assessing the immune response to vaccines</li> <li>• Assessing allergic responses to vaccines.</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised training in outpatients by educational supervisor</li> <li>• Practical experience of management of suspected drug reactions</li> <li>• Liaison with DoH and other bodies regarding vaccination programmes, indications and contraindications</li> <li>• Critical review of the literature</li> <li>• Critical incident reports</li> <li>• Attendance at relevant courses/meetings</li> </ul>	<ul style="list-style-type: none"> <li>• Written verification of competence by educational supervisor in the management of:               <ol style="list-style-type: none"> <li>(1) reactions to general anaesthetics;</li> <li>(2) reactions to local anaesthetics;</li> <li>(3) suspected reactions to antibiotics;</li> <li>(4) suspected reactions to aspirin and NSAIDs;</li> <li>(5) other drug reactions;</li> <li>(6) adverse reactions to vaccines</li> </ol> </li> <li>• Collection of drug challenge and desensitisation protocols (portfolio)</li> <li>• Written evidence of experience with these protocols (portfolio)</li> <li>• Written case records (portfolio)</li> <li>• Evidence of teaching (portfolio)</li> <li>• Evidence of attendance at relevant meetings (portfolio)</li> </ul>

**TABLE 3F: ALLERGY CURRICULUM: INSECT VENOM ALLERGY**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To explain the biology and classification of the hymenoptera</li> <li>• To explain the clinical features of local and systemic reactions to insect stings, and recognition of when these are IgE-mediated</li> <li>• To describe the natural history of venom allergy in adults and children</li> <li>• To interpret skin prick testing with serial concentrations of venom</li> <li>• To provide advice on avoidance</li> <li>• To provide advice on emergency management</li> <li>• To explain when and when not to prescribe immunotherapy</li> <li>• To explain the likely outcome of insect venom immunotherapy</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• SPT/RAST, including venom serial concentration SPT</li> <li>• Avoidance</li> <li>• Management decision</li> <li>• Advice on emergency treatment</li> <li>• Appropriate follow up</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised initial management and follow up of patients with suspected insect venom allergy</li> <li>• Performance of serial dilution SPT and intradermal skin tests</li> <li>• Extensive discussion with educational supervisor about the indications for immunotherapy in individual patients</li> <li>• Case studies, presentations</li> <li>• Critical review of the literature</li> <li>• Attendance at relevant courses/meetings</li> <li>• Audit</li> <li>• Tutorials</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment of competence by direct observation and critique of management by educational supervisor</li> <li>• Written evidence of extensive experience with practical venom immunotherapy by:               <ol style="list-style-type: none"> <li>(1) educational supervisor;</li> <li>(2) allergy specialist nurse</li> </ol> </li> <li>• Written strategy for setting up and running an immunotherapy clinic (portfolio)</li> <li>• Collection of product information and protocols for venom immunotherapy (portfolio)</li> <li>• Written case studies (portfolio)</li> <li>• Evidence of attendance at relevant courses/meetings (portfolio)</li> </ul>

**TABLE 3G: ALLERGY CURRICULUM: URTICARIA/ANGIOEDEMA**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To describe the clinical sequelae and natural history of the urticaria/angioedema syndromes</li> <li>• To recognise physical precipitants and other precipitating/exacerbating factors</li> <li>• To recognise and manage underlying vasculitis</li> <li>• To explain when and when not to investigate</li> <li>• To explain the principles of management</li> <li>• To recognise when to refer for specialised therapy</li> <li>• To describe the diagnosis, prophylaxis and management of hereditary angioedema</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• SPT</li> <li>• Physical challenge tests</li> <li>• Complement proteins</li> <li>• Thyroid function</li> <li>• C1 esterase inhibitor concentration/activity</li> <li>• Oral challenge with foods/drugs/food additives</li> <li>• Skin biopsy</li> <li>• Autoantibodies</li> <li>• Viral screens</li> <li>• Serum immunoglobulins and paraproteins</li> <li>• CXR</li> <li>• Drug management of chronic idiopathic urticaria</li> <li>• Immunosuppressive therapy, plasmapheresis, PUVA therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised training with:               <ol style="list-style-type: none"> <li>(1) educational supervisor;</li> <li>(2) consultant dermatologist</li> </ol> </li> <li>• Experience of management of hereditary angioedema:               <ol style="list-style-type: none"> <li>(1) chronically;</li> <li>(2) acute exacerbations;</li> <li>(3) prior to surgery and childbirth;</li> <li>(4) in pregnancy</li> </ol> </li> <li>• Case studies</li> <li>• Critical review of the literature</li> <li>• Attendance at relevant courses/meetings</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment of competence by direct observation and critique of management by educational supervisor and consultant dermatologist in:               <ol style="list-style-type: none"> <li>(1) investigation of urticaria;</li> <li>(2) physical challenge tests;</li> <li>(3) oral challenge tests;</li> <li>(4) skin biopsy;</li> <li>(5) management of urticaria</li> </ol> </li> <li>• Written case studies in management of hereditary angioedema (portfolio)</li> <li>• Treatise on the management of hereditary angioedema (portfolio)</li> <li>• Case studies involving vasculitis (portfolio)</li> <li>• Grey cases (portfolio)</li> </ul>

**TABLE 3H: ALLERGY CURRICULUM: ANAPHYLAXIS**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To describe the mechanisms, causes, clinical features and differential diagnosis of anaphylactic and anaphylactoid reactions</li> <li>• To describe a systematic approach to identification of aetiology</li> <li>• To recognise “at risk” patients and provide advice on prevention</li> <li>• To describe desensitisation protocols</li> <li>• To explain emergency treatment plans, including self-administration of adrenaline</li> <li>• To manage acute anaphylaxis in adults and children</li> </ul>	<ul style="list-style-type: none"> <li>• History (drugs, vaccines, latex, biological fluids, insects, foods exercise)</li> <li>• Examination</li> <li>• SPT/RAST</li> <li>• Serum tryptase</li> <li>• Challenge tests (drugs, exercise, food, etc)</li> <li>• Self-administration of adrenaline</li> <li>• Liaison with key carers</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised investigation of patients with anaphylactic reactions</li> <li>• Anaphylaxis management guidelines (e.g. Resuscitation Council)</li> <li>• Supervised challenge tests</li> <li>• Supervised desensitisation procedures</li> <li>• Critical review of the literature</li> <li>• Case studies</li> <li>• Tutorials</li> <li>• Personal study</li> <li>• Awareness of self support groups (e.g. Anaphylaxis Campaign)</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment of competence by direct observation and critique of management by educational supervisor</li> <li>• Written evidence of practical experience in management of acute anaphylaxis</li> <li>• Evidence of familiarity with protocols for management of acute anaphylaxis (portfolio)</li> <li>• Collection and knowledge of relevant challenge and desensitisation protocols (portfolio)</li> <li>• Written evidence of practical experience with these protocols</li> <li>• Written case studies (portfolio)</li> <li>• Critical incident reports (portfolio)</li> </ul>

**TABLE 3I: ALLERGY CURRICULUM: LATEX ALLERGY**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"><li>• To describe the natural history, aetiology and spectrum of clinical sequelae of latex reactions</li><li>• To recognise “at risk” groups</li><li>• To explain routes of exposure to latex</li><li>• To recognise cross-reactivity of latex allergen with other allergens</li><li>• To describe the practical management of latex allergy</li><li>• To describe the principles of latex avoidance and the use of latex alternatives at home and at work</li></ul>	<ul style="list-style-type: none"><li>• History</li><li>• Examination</li><li>• SPT/RAST</li><li>• Patch testing</li><li>• Advice about hospital care, including avoidance of exposure to latex rubber</li><li>• Occupational strategy for prevention of latex allergy in staff</li></ul>	<ul style="list-style-type: none"><li>• Supervised management of outpatients and inpatients with latex allergy</li><li>• Systematic familiarity with items at home, work, hospital which may contain latex</li></ul>	<ul style="list-style-type: none"><li>• Written assessment of competence by direct observation and critique of management by educational supervisor</li><li>• Written case studies (portfolio)</li><li>• Evidence of attendance at relevant courses (portfolio)</li><li>• Evidence of relevant teaching (portfolio)</li><li>• Treatise on management of latex allergy (portfolio)</li></ul>

**TABLE 3J: ALLERGY CURRICULUM: ALLERGEN IMMUNOTHERAPY**

<b>OBJECTIVE</b>	<b>SUBJECT MATTER</b>	<b>LEARNING METHODS</b>	<b>ASSESSMENT METHODS</b>
<ul style="list-style-type: none"> <li>• To describe postulated immunological mechanisms of immunotherapy</li> <li>• To describe the efficacy and limitations of immunotherapy</li> <li>• To recognise the indications and contraindications</li> <li>• To describe different desensitisation regimes and their relative advantages and disadvantages</li> <li>• To explain appropriate monitoring prior to, during and after desensitisation injections</li> <li>• To explain the advantages and disadvantages of different allergen preparations for immunotherapy (adsorbed, soluble, allergoids, etc)</li> <li>• To describe experimental immunotherapy regimes (oral, sublingual, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• History</li> <li>• Examination</li> <li>• Monitoring</li> <li>• Preparation and administration of allergen vaccines</li> <li>• Appropriate timing and choice of desensitisation regime</li> <li>• Management of trivial and severe reactions, including anaphylaxis</li> <li>• Dosage adjustments according to previous reactions</li> </ul>	<ul style="list-style-type: none"> <li>• Supervised decision making regarding the suitability of outpatients for immunotherapy</li> <li>• Immunotherapy guidelines (BSACI, EAACI, AAAAI)</li> <li>• Practical experience of the running of an immunotherapy clinic</li> <li>• Practical knowledge of allergen injections</li> <li>• Critical review of the literature</li> <li>• Case studies</li> <li>• Audit</li> <li>• Critical incident reports</li> <li>• Tutorials</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Written evidence of competence to run an immunotherapy clinic</li> <li>• Assessment of competence by direct observation and critique of management by educational supervisor</li> <li>• Written evidence of supervised and unsupervised management of these clinics</li> <li>• Written case studies ((portfolio)</li> <li>• Collection and critical review of immunotherapy guidelines (portfolio)</li> <li>• Collection of literature about the nature and efficacy of different allergen vaccine preparations (portfolio)</li> <li>• Collection of trials and meta-analysis of immunotherapy (portfolio)</li> </ul>

**TABLE 3K: ALLERGY CURRICULUM: PAEDIATRIC ALLERGY**

OBJECTIVE	SUBJECT MATTER	LEARNING METHODS	ASSESSMENT METHODS
<ul style="list-style-type: none"> <li>• To recognise the special considerations for the management of allergic disease (asthma, eczema, rhinitis, food allergy) in children</li> <li>• To describe the dietary requirements of the infant and the child</li> <li>• To distinguish between IgE-mediated and non-IgE mediated milk allergy syndromes and differential diagnosis from inflammatory bowel disease, lactose intolerance and other congenital and acquired food allergy/intolerance syndromes</li> <li>• To describe the management of food allergy/intolerance: knowledge of milk formulae</li> <li>• To recognise congenital immune deficiency syndromes (immunoglobulin deficiency) and other congenital syndromes which may present to an allergist (cystic fibrosis, etc)</li> <li>• To manage paediatric allergy in the community: liaison with key carers (parents, schools, sports)</li> </ul>	<ul style="list-style-type: none"> <li>• Paediatric history and examination, including milestones and centiles</li> <li>• Paediatric drug ranges and dosages; particularly for asthma, rhinitis, anaphylaxis</li> <li>• Paediatric asthma, rhinitis, sinusitis and anaphylaxis management, including inhaler devices</li> <li>• Manifestations of food allergy, and management of severe food anaphylaxis in the community</li> <li>• Paediatric food challenge</li> <li>• Paediatric bowel investigation, including endoscopy and intestinal biopsy</li> <li>• Tests for lactose intolerance</li> <li>• Paediatric ENT examination, and management of chronic sinusitis and nasal polyps</li> <li>• Paediatric asthma management</li> <li>• Liaison with community paediatric teams for management of children at school</li> </ul>	<ul style="list-style-type: none"> <li>• Training under the supervision of:               <ol style="list-style-type: none"> <li>(1) allergist and/or consultant paediatric allergist/gastroenterologist/chest physician</li> <li>(2) asthma and allergy specialist nurse;</li> <li>(3) ENT surgeon;</li> <li>(4) dietician</li> </ol> </li> <li>• Attendance at relevant courses</li> <li>• Critical review of the literature</li> <li>• Tutorials</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Written assessment of competence by direct observation and critique of management by educational supervisor and/or consultant paediatric allergist or gastroenterologist or chest physician in the management of paediatric:               <ol style="list-style-type: none"> <li>(1) asthma;</li> <li>(2) rhinitis;</li> <li>(3) sinusitis;</li> <li>(4) food allergy and intolerance syndromes;</li> <li>(5) special diets/formulae;</li> <li>(6) anaphylaxis;</li> <li>(7) urticaria/angioedema</li> <li>(8) resuscitation</li> </ol> </li> <li>• Evidence of collection of paediatric management protocols (food challenge, asthma, anaphylaxis)</li> <li>• Written case studies (portfolio)</li> <li>• Evidence of attendance at relevant courses (portfolio)</li> </ul>

**TABLE 3L: ALLERGY CURRICULUM: “ALTERNATIVE” THERAPIES AND DIAGNOSTIC PROCEDURES IN ALLERGY**

OBJECTIVE	SUBJECT MATTER	LEARNING METHODS	ASSESSMENT METHODS
<ul style="list-style-type: none"> <li>• To describe unproven procedures for allergy diagnosis (Vega testing, leucocytotoxic tests, hair analysis, applied kinesiology, auricular cardiac reflex) and treatment (homoeopathy, enzyme-potentiated desensitisation, hypnosis acupuncture)</li> <li>• To describe the principles of “clinical ecology”: diagnosis (Miller technique), diseases (multiple chemical sensitivity, total allergy syndrome, <i>Candida</i> hypersensitivity syndrome) and treatment (neutralisation vaccines, etc)</li> <li>• To describe aetiological and psychological facets of chronic (“post-viral”) fatigue syndrome (myalgic encephalomyelitis)</li> </ul>	<ul style="list-style-type: none"> <li>• Management of patients who have consulted “alternative allergists” and have been misdiagnosed or given unconventional diagnoses such as <i>Candida</i> hypersensitivity syndrome</li> <li>• Management of patients with ME</li> <li>• Journal and textbook articles</li> <li>• Clinical ecology journals</li> <li>• Publications from specialist societies for homoeopathy, acupuncture, etc</li> <li>• Publications of the RCP</li> </ul>	<ul style="list-style-type: none"> <li>• Critical but unbiased and open-minded review of the literature</li> <li>• First hand experience of alternative allergy treatment and diagnosis, from centres to high street shops</li> <li>• Attendance at relevant conferences and meetings</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of competence by direct observation and critique of management by educational supervisor</li> <li>• Written case studies (portfolio)</li> <li>• Evidence of attendance at relevant courses (portfolio)</li> <li>• Evidence of collection of “alternative allergy” literature and practices (portfolio)</li> </ul>

**TABLE 3M: ALLERGY CURRICULUM: IMMUNODEFICIENCY**

OBJECTIVE	SUBJECT MATTER	LEARNING METHODS	ASSESSMENT METHODS
<ul style="list-style-type: none"> <li>• To recognise congenital and acquired immunodeficiency syndromes, including antibody and cell mediated disorders, complement deficiencies and defects in neutrophil function</li> <li>• To obtain some experience of management of intravenous and subcutaneous immunoglobulin therapy, including available preparations</li> <li>• To have a working knowledge of the long term management of infections, including opportunistic infections</li> <li>• To have a working knowledge of the management of the immunosuppressed patient</li> <li>• To describe the principles of vaccination and immunisation</li> </ul>	<ul style="list-style-type: none"> <li>• History and examination</li> <li>• Genetic studies</li> <li>• Immunoglobulins, classes and subclasses</li> <li>• Specific antibody titres and responses to vaccination</li> <li>• Functional analysis of complement components: CH50, AH50</li> <li>• Cell surface and cytoplasmic markers for assessment of immunodeficiency</li> <li>• Lymphocyte function tests</li> <li>• Functional assessment of neutrophils and macrophages</li> <li>• Cytokine production <i>in vitro</i></li> </ul>	<ul style="list-style-type: none"> <li>• Supervision by educational supervisor</li> <li>• Secondment to local or regional centres for immunodeficiency diagnosis and management</li> <li>• Liaison with immunology and microbiology laboratories, infection control teams</li> <li>• Collection of management protocols and key guidelines</li> <li>• Attendance at relevant courses</li> <li>• Tutorials</li> <li>• Personal study</li> </ul>	<ul style="list-style-type: none"> <li>• Assessment of competence by direct observation and critique of management by educational supervisor and/or consultant microbiologist, immunologist</li> <li>• Case studies (portfolio)</li> <li>• Evidence of attendance at relevant courses (portfolio)</li> <li>• Evidence of sight of “key” papers (portfolio)</li> </ul>

## **KEY OUTCOMES OF THE TRAINING PERIOD**

On completion of training, trainees will:

- Recognise the role of allergens in all relevant diseases, identify clinically significant allergens and provide advice on avoidance wherever appropriate.
- Be familiar with performance and interpretation of skin prick tests and RAST as applied to allergy diagnosis.
- Be aware of the definition, diagnosis, differential diagnosis and management of asthma and seasonal and perennial rhinitis and conjunctivitis. This includes principles of patient education, management of acute and chronic severe disease and management of unwanted effects of therapy, and familiarity with the principles and scopes of rhinoscopy, rhinomanometry, ciliary motility tests and general ENT examination procedures when assessing a patient with chronic rhinitis.
- Be able to define atopic dermatitis and distinguish between this and contact dermatitis and other causes of dermatitis, and be familiar with the principles of therapy of atopic dermatitis, the role of allergen avoidance, the complications of therapy and the need for referral for Specialist investigation of contact dermatitis.
- Be able to recognise the clinical sequelae of IgE-mediated food allergy, and to distinguish these from intolerance syndromes, to be familiar with the advantages and disadvantages of skin prick testing, exclusion diets, diet diaries and single and double-blind placebo-controlled food challenge in the diagnosis of food allergy, and to recognise gastro-intestinal disorders which may mimic food allergy and referred patients for appropriate specialist investigation.
- Be able to analyse and manage adverse reactions to drugs, including general and local anaesthetics, antibiotics and other drugs, and be familiar with the principles of drug challenge and desensitisation and provide advice by of the use of alternate drugs in allergic patients.
- Be familiar with the clinical features of local and systemic reactions to insect stings, and recognition of when these are IgE-mediated; be familiar with the natural history of these reactions in adults and children and be able to provide patients with insect venom allergy who would advice and avoidance and emergency treatment, as well as when and whether not to prescribe immunotherapy.
- Be able to describe the mechanisms, common causes, clinical features and differential diagnosis of anaphylactic and anaphylactoid reactions, and to organise the systematic approach to the identification of aetiology, to explain emergency treatment plans, including self-administration of adrenaline in adults and children and to provide management plans to patients prescribed adrenaline auto-injectors, written where necessary, with appropriate liaison between allergist, general practitioner, community paediatrician and school where appropriate.
- Be able to describe the efficacy, limitations, indications and contra-indications for allergen immunotherapy and be familiar with different desensitisation regimens, and the advantages and disadvantages of different allergen preparations for immunotherapy, and be familiar with appropriate monitoring prior to, during and

after desensitisation injections, including the management of trivial and severe reactions.

- Be able to manage allergic diseases in children as well as adults, and to recognise the differences in the natural history of allergic diseases and approaches to allergen avoidance and treatment in children, and to diagnose and manage allergic diseases affecting the respiratory tract, skin and gut in children.
- Be able to recognise unproven procedures for allergy diagnosis and treatment, and to exclude allergy as a cause of polysymptomatic illness and psychiatric illness.
- Have a sound knowledge of basic immunological mechanisms with particular reference to IgE-mediated mechanisms and the cellular and molecular pathology of organ-based allergic diseases such as asthma, rhinitis, food and drug allergy and atopic dermatitis.
- Be familiar with laboratory methods used in immunology and in particular allergy diagnosis, with knowledge of the concepts of internal quality control and external quality assessment, precision, accuracy, sensitivity, specificity and predictive values of the tests.
- Be able to liaise with other clinical colleagues for the optimum management of patients under their care.
- Have the ability to work as part of multi-disciplinary team within the clinical sphere of their activity.
- Be able to explain the details of diagnosis, natural history, outcome and required therapeutic measures to their clinical colleagues, along with patients and their carers.
- Be aware of relevant sources of information including computerised databases and have the skills to use information resources to keep up to date with the latest developments in this rapidly developing field.
- Be aware of patient support organisations and how to liaise effectively with them.
- Have the requisite skills to maintain their Continuing Professional Development.

## **RESEARCH AND HIGHER MEDICAL TRAINING**

Educational Supervisors and trainees are recommended to consult the Department of Health Publication entitled: Academic and Research Medicine: Supplement to a Guide to Specialist Registrar Training (March 1996).

The following points are intended to help the trainer and trainee in assessing, defining and crediting research opportunities. It is desirable that all trainees be exposed to research. Research can operate at several levels including:

- Exposure to the principles and practice of research methodology.
- Research training for a higher degree such MD, PhD.
- Some clinicians would wish to combine consultant clinical practice with national/international competitive research.

- Some trainees will enter Specialist training already in the possession of a higher degree.

The successful prosecution of research within a structured HMT programme will require flexibility from both trainees and educational supervisors with significant interaction and support from Postgraduate Deans, Trusts and Higher Education Institutions. In assessing, defining and crediting research options and activities the following should be considered:

- Trainees with no prior formal experience in research should spend the equivalent of one year of training time carrying out research. This year would be credited time within the training programme. Some programmes may incorporate an allotted time period (e.g. one day a week) dedicated to research.
- Consideration should be given to allowing trainees to attend relevant taught MSc courses, preferably away from their home centre.
- Individuals who wish to take significant time out of the training programme to pursue an MD or PhD would be able to take their NTN's with them. Current recommendations indicate that the returning trainees will be guaranteed re-entry to a Higher Medical Training post. The vacated training post may be filled by the use of Locums or Fixed-Term Training appointments. In the case of Centre-to-Centre rotation/secondments, there may arise the possibility of training alternating with respect to time out and occupancy of vacated training slots. These constructs would need close interaction of educational supervisors, trainees and Postgraduate Deans.
- The young medical trainees should recognise that the increased length in training time that allows the incorporation of significant and competitive research is an asset to their individual aspirations and careers.
- Some trainees may wish to pursue substantive MRC, Wellcome, Royal Society, etc. Training Fellowships to pursue a career in academic Allergy ultimately with some consultant level practice. Consideration should be given within defined centres to training programmes which could accommodate and facilitate such individual aspirations.

Research must be appropriately supervised, with systematic monitoring of trainees' progress. This should form part of the trainees' training records.

## **APPENDIX A: FUNDAMENTAL IMMUNOLOGICAL KNOWLEDGE**

### Principles of body defence

- Cell injury/death and inflammation
- Non-specific defence mechanisms (barriers/humoral/cellular)
- Specific defence mechanisms (humoral/cellular)

### Complement

- Genetics, structure, function, control in defence and in disease
- Deficiencies

### The acute phase response and inflammation

### Cells of myelomonocytic lineage, NK cells and non-specific defence

- Ontogeny, structure, phenotype, function and activation
- Chemokines and migration from the blood vasculature
- Complement and Fc receptors, adhesion molecules
- Phagocytosis, intracellular/extracellular killing
- Respiratory burst and secretory products

### The basis of specific immunity

- Antigens: types, structures, processing and presentation
- Immunogenetics: polymorphisms, generation of diversity and rearranging gene families
- Immunoglobulins: structure, function and antigen binding
- Major Histocompatibility Complex: structure, function and regulation
- T cell receptors: structure, function and antigen binding

### T and B Lymphocytes

- Ontogeny, phenotype, subpopulations
- Receptor/ligand interactions and cell activation
- Effector functions

### Organisation of the lymphoid system

- Primary and secondary lymphoid organs
- Population dynamics
- Lymphocyte migration
- Mucosal and other compartments of the lymphoid system

### Cytokines, chemokines and immunomodulators

- Cytokines and Chemokines: origin, structure, effects, site(s) of action (receptor), metabolism regulation and gene activation
- Inflammatory mediators (e.g. leukotrienes, prostaglandins and platelet-activating factor): origin, structure, effect, site(s) of action (receptor), metabolism and regulation

### Hypersensitivity mechanisms

- IgE mediated: acute and late phase reactions
- IgE, IgA-, and IgM-mediated: opsonization, complement fixation, antibody dependent, cell-mediated cytotoxicity, stimulation and blocking
- Immune complex mediated: physicochemical properties and clearance
- Cell-mediated: participating cells, effector mechanisms and granuloma formation
- Other: natural killer cells; lymphokine-activated killer cells and cutaneous basophil hypersensitivity

### Immunoregulation

- Tolerance: clonal selection, suppression and antigen paralysis
- Cell-cell interactions: help and suppression
- Idiotype networks: inhibition and stimulation
- Mechanisms of autoimmunity

### Transplantation immunology

- Histocompatibility: major and minor antigens and principles of cross matching
- Graft rejection: mechanisms
- Graft-versus-host reactions and their mechanisms

Tumour immunology

Tumour markers: leukaemias and lymphomas; cancer immunology

Oncogenes: translocation and breakpoints

Immunotoxicology

Mechanisms of adverse reactions to xenobiotics

*In vivo* and *in vitro* evaluation of immunotoxic compounds

Clinical aspects of immune disorders induced by drugs or environmental chemicals

Immunotherapy

Drugs

Antibodies

Recombinant molecules

Others