COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN STATE REGISTRATION AS CLINICAL SCIENTISTS

SPECIALTY : CELLULAR SCIENCE

Association of Clinical Scientists

This document comprises a discipline-specific version of the general competence document and provides additional guidance as to how to complete the general document, Appendix 1, of the Guidelines that you must submit with your application.

Remember that the aim of the process is for the candidate to satisfy the assessor that he or she has the appropriate basic qualifications and length of experience for issue of the Certificate of Attainment, and that the training programme/period of supervised practice has enabled the candidate to achieve the basic level of competence required for registration as a clinical scientist.

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Version: Rev.02 – Re-mapping to revised HPC Competences and Re-Titled Professional Accountability competence area.

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**1-SCIENTIFIC**	Be able to demonstrate the rigorous application of scientific methods in his/her experience to date:
3a.1	• understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice	• must understand the scientific basis of the technical procedures employed in cellular science • must be able to advise on choice and preparation of samples and of categories of patients relevant to the investigations • must be familiar with the evidence for, and limitations of, the common procedures used in cellular science for the diagnosis and management of patients • must have a working knowledge of related disciplines to be able to integrate relevant cellular science results into a meaningful interpretation • must be familiar with scientific developments in cellular science and in other relevant disciplines
3a.1	• demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available	
2b.1	• experience of searching for knowledge, critical appraisal of information and integration into the knowledge base	
2b.4	• ability to apply knowledge to problems associated with the routine provision, and development, of the service	
2a.1	• ability to identify the clinical decision which the test/intervention will inform	
2a.3, 2c.1	• ability to make judgements on the effectiveness of procedures	
2a.2	• application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available	

Achievement of:	• an understanding of the principles of the physicochemical and biological methods employed in the practice of cellular science • an understanding of the design and application of guidelines and protocols that employ cellular science to investigate patient specimens • an understanding of how to integrate the results of cellular science investigations with other pathological investigations and with the clinical assessment
Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes conducted by approved specialist societies • regular tutorials organised by a nominated training supervisor to supplement local experience and attendance at national/regional training sessions • active participation in local research meetings together with evidence-based research work supervised at postgraduate level • evidence-based presentation of methodological or clinically-based research at a standard suitable for peer-reviewed publication
Assessed by:	• the locally nominated educational/project supervisor (usually of consultant level) against agreed criteria of achievement and performance • if taking a taught postgraduate course (eg MSc), outcome of the relevant course examinations

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**2-CLINICAL**	Be able to demonstrate the clinical relevance of the modality to patient care:
2a.4, 2b.2, 2c.1	• ability to provide interpretation of data and a diagnostic (therapeutic) opinion, including any further action to be taken by the individual directly responsible for the care of the patient	• must have a core body of knowledge of the applications of fundamental (basic) principles to understanding of the pathogenesis, clinical features and classification of the major categories of disorders investigated using cellular science • must have experience-based understanding of all aspects of the diagnostic process, comprising history-taking, the clinical examination, the formulation of differential diagnosis, the role of pathology and other clinical service investigations, and the consequent integration of knowledge relevant to the individual patient • must be familiar with the principles of evidence-based investigation and management (EBM) as applied to diagnosis • must have an understanding of the clinical relevance of the results of cellular science investigations for the patient and, where appropriate, family members
2b.3, 3a.1	• understanding of the wider clinical situation relevant to the patients presenting to his/her specialty	
2b.3	• ability to develop/devise an investigation strategy taking into account the complete clinical picture	
1a.5, 3a.2	• understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice	
3a.2	• awareness of the evidence base that underpins the use of the procedures employed by the service	

Achievement of:	• an understanding of the pathological features and diagnostic problems for adults and children with disorders that are investigated on tissue samples using cellular science techniques • experience of the practice of clinical and laboratory audit within areas of cellular science service
Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes conducted by approved specialist societies • participation in local research meetings and evidence of supervised and collaborative research initiatives • participation in relevant clinical audit and case study meetings • presentation of outcomes of method evaluations, protocol development and cellular science research initiatives of a standard suitable for publication • self endeavour (eg literature awareness)
Assessed by:	• the nominated training supervisor together with a nationally appointed assessor • progress through a knowledge-based postgraduate course (eg at MSc level) by formative and summative assessment

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**3-TECHNICAL**	Be able to demonstrate technical skills and an understanding of standards of practice in the modality:
3a.2	• understanding of the principles associated with a range of techniques employed in the modality	• must have achieved a high level of competence in performing analytical techniques and procedures in common use in cellular science at a standard that produces consistently valid results • must understand the required standards of practice for these techniques • must have a high level of practical competence in any special techniques relevant to an intended or actual area of specialisation • must have sufficient knowledge of the scientific, operational and material basis of these techniques to be able to recognise, solve and minimise problems connected with analytical performance • must understand from an experience base the principles and practice of quality control, external quality assessment, of audit and accreditation procedures, and of clinical and performance criteria, relevant to evaluating the reproducibility of the commonly requested cellular science investigations
2b.4	• knowledge of standards of practice expected from these techniques	
2b.4	• experience of performing these techniques	
2b.4	• the ability to solve problems that might arise during the routine application of these techniques (troubleshooting)	
2c.1, 2c.2	• understanding the principles of quality control & quality assurance	
2c.1, 2c.2	• experience the use of quality control & quality assurance techniques including restorative action when performance deteriorates	

Achievement of:	• competency in performing techniques most commonly used in cellular science, including electron microscopy, immunohistochemistry and cytochemistry, immunoassay and a range a molecular biology techniques for the evaluation of DNA and RNA status • understanding of the sources of variation that can occur in the performance of the major categories of cellular science procedures and a continued awareness of these in maintaining by example a climate of quality assurance within the laboratory • a thorough understanding of the pre-and-post analytical phases of cellular science laboratory practice in relation to the maintenance of analytical quality and operational efficiency of the service • an understanding of the potential hazards associated with the handling of tissue and other biological products in cellular science, of the controlling legislation (eg COSHH) and of procedures for risk assessment and awareness
Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes conducted by approved specialist societies • regular tutorials organised by a nominated training supervisor to supplement local experience and attendance at national/regional training sessions • continued emphasis upon quality issues during apprentice-based instruction and assessment in detailed operating procedures • active participation in seminars, discussion groups and taught courses, on the scientific basis and clinical interpretation of cellular science laboratory tests, which emphasise quality assurance, clinical performance parameters, accreditation, audit, health and safety
Assessed by:	• satisfactory progress through procedures and acquired knowledge recorded in a log-book (such as in a Grade A training manual) • progress through formative and summative assessments of a knowledge-based postgraduate (eg MSc) course that includes a substantial element of teaching and discussion of practical cellular science • the nominated training supervisor together with a nationally appointed assessor

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**4-RESEARCH AND DEVELOPMENT**	Be able to demonstrate a training in research and development:
2b.1	• ability to read and critically appraise the literature	• must be able to read and critically appraise the literature • must be able to develop aims and objectives of a project • must be able to develop a new technique or experimental protocol in cellular science • must be able to perform a new technique or experimental protocol and generate results • must be able to critically appraise results in the light of existing knowledge • must be able to present research findings to an audience of peers – both spoken and written
2b.1	• ability to develop the aims and objectives associated with a project	
2b.1	• ability to develop an experimental protocol to meet the aims and objectives in a way that provides reliable and robust data (i.e. free of bias)	
2b.1	• ability to perform the required experimental work ability to produce and present the results (including statistical analysis)	
2b.1	• ability to critically appraise results in the light of existing knowledge and the hypothesis developed and to formulate further research questions	
1b.4, 2b.1	• ability to present data and provide a critical appraisal to an audience of peers – both spoken and written	

Achievement of:	• an understanding of the current state of research in the specialty of cellular science • a basic ability to design and introduce new cellular science techniques into the laboratory • a basic ability to perform research and development relevant to the work of a clinical scientist in cellular science
Achieved through:	• participation in a supervised research project within appropriate training programmes • participation in local seminars, journal club meetings, research meetings etc • presentation of outcomes at a standard suitable for publication • self endeavour (eg literature awareness)
Assessed by:	• the nominated training supervisor together with a nationally appointed assessor

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**5-COMMUNICATION**	Be able to communicate in both the written and spoken media to colleagues, peers and patients:
1a.6	• ability to assess a situation and act accordingly when representing the specialty	• must have an ability to assess a situation and act accordingly when representing the specialty of cellular science • must be able to respond to enquiries regarding the service and to communicate effectively with colleagues within the profession • must be able to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate • must be able to educate colleagues in the outcome of problem solving and research and development activities • must have evidence of presentation of scientific material at meetings and in the literature
1a.6	• ability to respond to enquiries regarding the service provided when dealing with clinical colleagues	
1a.2, 1b.1, 1b.3	• ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate	
1b.3, 1b.4	• ability to communicate the outcome of problem solving and research and development activities	
2b.1	• evidence of presentation of scientific material at meetings and in the literature	

Achievement of:	• an ability to communicate clearly and with confidence to clinical and other professional colleagues both within and outside the profession of cellular science • an ability to educate and train others both within and outside the profession of cellular science • an understanding of all aspects of information technology pertinent to the service provision
Achieved through:	• participation in appropriate training programmes, and in post as a pre-registrant trainee in cellular science • participation in local seminars, journal club meetings, clinical meetings etc • presentations in oral and written form through the medium of seminars, tutorials, case presentations, posters and peer-reviewed publications
Assessed by:	• the nominated training supervisor together with a nationally appointed assessor

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GENERIC COMPETENCES		**SPECIFIC COMPETENCES**
HPC Standards of Proficiency Code - Clinical Scientist	**6-PROBLEM SOLVING**	Be able to deal with the unexpected and use personal initiative:
2a.2	• to assess a situation	• must appreciate that many such problems in cellular science are recognised by their timing or unusual association and that problem solving is enhanced by prior experience, training and knowledge • must have a thorough knowledge of all aspects of the service and of guidelines to deal with and anticipate problematic circumstances • must be able to recognise, and to anticipate, where an association between apparently independent events may become problematic and which merits attention • must be able to initiate and follow through the timely resolution of an impending or acute problem with confident action, direction and effective communication • must recognise and minimise circumstances that are associated with recurrence of a specific or related problem and communicate with others in circumventing this
1a.6, 2b.1	• determine the nature and severity of the problem	
1a.6, 2b.1	• call upon the required knowledge and experience to deal with the problem	
1a.6, 2b.1	• initiate resolution of the problem	
1a.6	• demonstrate personal initiative	
Achievement of:	• a detailed knowledge of all aspects of the department's operations, of their inter-relationships, and of the pre-, intra- and post-analytical factors that affect quality and service delivery • the competence to 'cover' or deputise under direction for staff discontinuity in the different aspects or areas of departmental activity, eg: scientific, technical, R&D; quality assurance, audit, accreditation; scrutiny, reporting, clinical liaison; health, safety and staff training; IT, budgeting and deputy management • the communication skills required to interact with or supervise staff required in these areas of departmental work, so as to be aware of circumstances that may lead to the development of problems	
Achieved through:	• a structured training programme that provides rotational experience of cellular science service areas and which is planned and assessed in order to increase participation and responsibility • evidence-based attendance and participation in training seminars and workshops in cellular science that include critical appraisal of clinical case scenarios and laboratory practices, that utilise problem-based learning, and that debate the principles of problem-solving • personal involvement in the recognition and solution of problems in departmental practice with opportunity for option appraisal and experience-based learning • attendance and participation in local and regional audit, clinical and managerial meetings which emphasise how problem-solving by experience enhances self-development	
Assessed by:	• outcome of knowledge-based taught courses • the nominated training supervisor together with a nationally appointed assessor	

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code – Clinical Scientist	**7-PROFESSIONAL ACCOUNTABILITY**	Be able to demonstrate an understanding of management principles and techniques, including the following:
1a.1	• Understanding of the legal and ethical boundaries of the modality, and the ethical aspects of scientific research.	• must be able to recognise legal and ethical boundaries of the modality and practice and conduct research within these boundaries • must be able to recognise the limits of his/her knowledge and skills • must understand the principles of clinical governance and be able to audit, reflect on and review practice • must understand the need for and basic requirements of accreditation schemes appropriate to the modality • must understand the importance of effective communication with colleagues and be able to function as an effective member of a multidisciplinary team • must understand the principles of appraisal and be able to supervise staff in his/her area of responsibility • must participate in an appropriate CPD scheme (after completion of training) • must have acquired a basic knowledge of health and safety requirements appropriate to the discipline • must have acquired a basic understanding of the structure and organization of the department, and relevant financial aspects.
1a.6	• Ability to recognise the limits of personal practice and when to seek advice.	
1a.7	• Ability to manage personal workload and prioritize tasks appropriately.	
1a.3, 1a.4, 2b.5, 2c.2	• Understanding of the principles of clinical governance including clinical audit, accreditation requirements relevant to the modality. The importance of confidentiality, informed consent and data security	
1b.2	• Ability to contribute effectively to work undertaken as part of a multi-disciplinary team	
1b.4	• Ability to supervise others as appropriate to area of practice. Understanding of the role of appraisal in staff management and development.	
1a.8, 2c.2	• Understanding of the need for career-long self-directed learning and the importance of continuing professional development.	
1a.5, 1a.8, 2b.4, 3a.3	• Understanding of the need for, and ability to establish and maintain, a safe practice environment.	
	• Understanding of the structure and organization of the department and how it fits into the local clinical setting, General understanding of the way the modality is structured and practised in other locations within the UK. Basic understanding of the importance of financial accountability, budgetary control and resource management.	

Achievement of:

- an understanding of the management principles and tools used in the service
- the ability to act as a professional and work effectively as part of a team
- understanding of the importance and principles of accreditation, audit, confidentiality, data security and safe working practice

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Achieved through:	• a structured taught element (eg approved MSc course or approved lecture programme), participation in appropriate training programmes and local courses on general, personnel and financial management, health and safety, audit, etc • participation in local seminars and meetings, attendance at clinical audit meetings and clinical governance committees. • attendance at departmental management meetings • involvement, under supervision, in management within the laboratory • mentoring by an experienced practitioner
Assessed by:	• the nominated local supervisor and appropriate professional body external advisor/tutors

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