

# Portfolio for Assessment for the ACS Certificate of Attainment

**Candidate:**    **XXX    XXXXXXXX**

**Specialty:**    **Clinical Immunology**

**Route TWO**

## ACS Note:

- This was highlighted by assessors as a good example of how to produce a successful portfolio. It is NOT a template, nor the only successful style.
- It has been anonymised by the author with his permission to publish it on our website to help others – for which we are very grateful. Within this are contained only the initial sections of the portfolio - obviously the actual personal evidence which would form the larger latter section cannot be provided in this sample. They would be copies of certificates, abstracts, reports, audits etc annotated as appropriate. There are NO whole papers or presentations included – just the relevant evidence.
- The candidate had spent many years in research in various countries attaining a PhD before undertaking a formal “Grade A” training in the UK and applying immediately after that using prior experience in this Route TWO application rather than waiting an extra year for Route ONE. This approach can lead to problems of insufficient experience (especially clinical) but in this case was not.
- Current applications would not use the term Grade A since it is now redundant with the demise of the Whitley Council – a better term now being “Pre-registration training”.
- The contents page gives the assessors a good and clear overview of what to expect
- All pages were numbered in the footer for ease of navigation (NB the actual page numbering in this edited sample will NOT match the Contents page).
- There were no superfluous page separators included or other extraneous pages
- There are 3-4 pieces of evidence for each competence area – neither single pieces of evidence nor superfluous lists of tens of papers etc – selective choice providing quality not quantity
- Where relevant the author clearly indicates the part they played
- Where relevant the author indicates not only what was done but the benefit attained – sometimes given in the evidential section – supporting script was headed “What I learned from this”.
- The candidate closely followed the guidance in the ACS documentation.

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**COMPETENCES REQUIRED FOR APPLICANTS  
TO ATTAIN STATE REGISTRATION AS CLINICAL SCIENTISTS**

<b>MODALITY:</b>	Clinical Immunology	<b>SUBMODALITY:</b> (if applicable)		<b>APPLICANT'S NAME:</b>	XXXXX XXXXXX
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**APPENDIX 1**

**This set of documents must be completed and returned in your portfolio.  
Please complete the three header sections above on each page.  
Refer to the Specific Competences document for guidance in completing this document.  
Use typescript or black ink and block capitals for all sections.**

**EXPERIENCE:** The candidate should be able to demonstrate that he/she has worked in an environment that has enabled the individual to receive training and gain experience relevant to the competences set out below.

**1-SCIENTIFIC**

<b>HPC Standards of Proficiency Codes for Clinical Scientist</b>	<b>AREA OF COMPETENCE</b>	<b>INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED</b>
3a.1p	<ul style="list-style-type: none"> <li>understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice</li> </ul>	A2-A4, B1, C8 A1.1-A1.3, 1.5, A2.1, A2.2, A2.8, A3.2, A3.9, 3.10
3a.1g	<ul style="list-style-type: none"> <li>demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available</li> </ul>	A2, A3, B1-B4, C3, C6, E2-E5, F9, A1.1-A1.3, 1.5, A2.1, A2.2, A2.8, 5.2- 5.4
2b.1g 2b.1p	<ul style="list-style-type: none"> <li>experience of searching for knowledge, critical appraisal of information and integration into the knowledge base</li> </ul>	A1-A3, B1- B6, C8, D1, D2, E1, E3, E4, E5, E7 A1.1-A1.3, A2.1, A2.2, A2.8, A3.2, A3.3, A4.8, A5.2, A5.3, A5.4
2b.1g	<ul style="list-style-type: none"> <li>ability to apply knowledge to problems associated with the routine provision, and development, of the service</li> </ul>	B1-B4, E1-E6, F7-F9 A2.1, A2.2, A3.1, A3.5, A3.6 A5.1- A5.4, A6.6, A6.7,
2a.1p	<ul style="list-style-type: none"> <li>ability to identify the clinical decision which the test/intervention will inform</li> </ul>	C3-C6, E1, E4, E5, E7, F9 A3.1, A3.7-3.10, A5.2-A5.4, A5.8, A6.7
2c.1p	<ul style="list-style-type: none"> <li>ability to make judgements on the effectiveness of procedures</li> </ul>	B2-B5, D1, D2, E2-E6, F9 A2.8, A5.1-A5.4, A5.6, A6.6, A6.7
3a.2g	<ul style="list-style-type: none"> <li>application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available</li> </ul>	C3-C6, D1, E1, E3-E7, F9 A3.1-A3.3, A3.5, A3.6, A5.1, A5.4, A5.8, A6.7

## 2-CLINICAL

HPC Standards of Proficiency Codes for Clinical Scientist	AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
2b.1p	<ul style="list-style-type: none"> <li>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</li> </ul>	B2, B3, C3-C6, E1, E3-E6, E7, F9 A2.1, A2.2, A2.8, A3.1, A3.5-A3.10 A5.1, A5.2, A5.3, A6.6, A6.7
3a.1p	<ul style="list-style-type: none"> <li>understanding of the wider clinical situation relevant to the patients presenting to his/her specialty</li> </ul>	C3-C6, C8, E1, E5-E7, F8. A3.1, A5.2, A5.3, A5.4, A5.6, A5.8, A6.6
2b.3p	<ul style="list-style-type: none"> <li>ability to develop/devise an investigation strategy taking into account the complete clinical picture</li> </ul>	D1, D2, E3-E7, F7-F9 A3.1, A4.2, A4.4, A5.2, A5.3, A5.4, A5.8 A6.7
3a.2p	<ul style="list-style-type: none"> <li>understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice</li> </ul>	C3-C6, C8, E3, E4, E5, E7, A3.1, A5.2, A5.3, A5.4, A5.6
3a.2p	<ul style="list-style-type: none"> <li>awareness of the evidence base that underpins the use of the procedures employed by the service</li> </ul>	C3-E5, E7 A3.1, A3.4, A3.5, A3.6, A3.10, A5.2, A5.3, A5.4

### 3-TECHNICAL

HPC Standards of Proficiency Codes for Clinical Scientist	AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
3a.2p	<ul style="list-style-type: none"> <li>understanding of the principles associated with a range of techniques employed in the modality</li> </ul>	A1-A4, B1-B6, C3-C6, C8 A1.1, A1.2, A1.5, A2.1, A2.2, A2.8, A3.1-A3.3, A3.8, 3.9
3a.2p	<ul style="list-style-type: none"> <li>knowledge of the standards of practice expected from these techniques</li> </ul>	C3-C6 A3.1, A3.4, A3.5, A3.7, A3.8, A3.9
2b.4p	<ul style="list-style-type: none"> <li>experience of performing these techniques</li> </ul>	A1-A4, B1-B6, C3-C6, A1.1, A1.5, A2.1, A2.2, A2.8, A3.4, A3.5-A3.10
2b.4p	<ul style="list-style-type: none"> <li>the ability to solve problems that might arise during the routine application of these techniques (troubleshooting)</li> </ul>	B2, B5, B6, C3, E1, E2, E4, F7, F8, F9 A2.8, A5.1, A6.6, A6.7
2c.2g	<ul style="list-style-type: none"> <li>understanding of the principles of quality control and quality assurance</li> </ul>	F5, F6 A3.5, A6.2, A6.3, A6.4
2c.1p	<ul style="list-style-type: none"> <li>experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates</li> </ul>	E2, F5, F6, F9 A3.5, A6.3

## 4-RESEARCH AND DEVELOPMENT

HPC Standards of Proficiency Codes for Clinical Scientist	AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
2b.1p	<ul style="list-style-type: none"> <li>ability to read and critically appraise the literature</li> </ul>	A2-A4, B4-B6, D1, D2, E3-E5 A1.1-A1.3, A2.1, A2.2, A2.8, A3.10, A4.8, A5.2-A5.4
2b.1p	<ul style="list-style-type: none"> <li>ability to develop the aims and objectives associated with a project</li> </ul>	A2-A4, B4-B6, D1-D4, E5, E6 A1.1, A1.2, A1.3, A2.1, A2.2, A2.8, A4.1- A4.7, A4.9
2b.1p	<ul style="list-style-type: none"> <li>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)</li> </ul>	A2-A4, B4-B6, D1-D3, E5, E6, F9 A1.1, A1.2, A2.1-A2.8, A4.1- A4.9, A5.4, A5.6
2b.1p	<ul style="list-style-type: none"> <li>ability to perform the required experimental work ability to produce and present the results (including statistical analysis)</li> </ul>	A2-A4, B4-B6, D1-D3, E5, E6 A1.1, A1.2, A2.1-A2.8, A4.1- A4.8, A5.4
2b.1p	<ul style="list-style-type: none"> <li>ability to critically appraise results in the light of existing knowledge and the hypothesis developed and to formulate further research questions</li> </ul>	A2-A4, B5, B6, D1-D5 A1.2, A2.1, A2.8, A4.6, A4.8, A4.9, A5.4
2b.1p	<ul style="list-style-type: none"> <li>ability to present data and provide a critical appraisal to an audience of peers – both spoken and written</li> </ul>	A2-A4, D1-D3, E5, Section G A1.4, A2.3-A2.7, A4.1-A4.5, A5.5

## 5-COMMUNICATION

HPC Standards of Proficiency Codes for Clinical Scientist	AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
-	<ul style="list-style-type: none"> <li>ability to assess a situation and act accordingly when representing the specialty</li> </ul>	B2-B3,C3, C9, E3-E7, A2.8, A4.7, A5.2-A5.4, A5.8
1b.2p	<ul style="list-style-type: none"> <li>ability to respond to enquiries regarding the service provided when dealing with clinical colleagues</li> </ul>	B2-B3, B7, C3, C9, E3-E5 A5.2, A5.3, A5.4, A5.8, A6.6
1b.4g	<ul style="list-style-type: none"> <li>ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate</li> </ul>	C3, C9
1b.5p	<ul style="list-style-type: none"> <li>ability to communicate the outcome of problem solving and research and development activities</li> </ul>	A2-A4, B4-B6, C3, C9, D1-D3, E3, E5, F7 F8, Section G A1.4, A2.3-A2.7, A5.2-A5.5, A5.8, A6.6
2b.1p 1b.5p	<ul style="list-style-type: none"> <li>evidence of presentation of scientific material at meetings and in the literature</li> </ul>	A2-A4, B4-B7, D1-D3, E5, Section G A1.4, A2.3-2.7, A4.1- A4.5, A5.5

## 6-PROBLEM SOLVING

HPC Standards of Proficiency Codes for Clinical Scientist	AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
2a.2g 2c.1g	<ul style="list-style-type: none"> <li>to assess a situation</li> </ul>	A2-A4, B2-B6, D1-D3, E2-E4, E7, F7- F9 A2.8, A4.4, A4.7, A5.1-A5.4, A5.8, A6.6, A6.7
2b.1g	<ul style="list-style-type: none"> <li>determine the nature and severity of the problem</li> </ul>	B2-B6, D1-D3, E2-E4, E7, F7- F9 A2.8, A4.4, A4.7, A5.1-A5.4, A5.8, A6.5- A6.7
2b.1g	<ul style="list-style-type: none"> <li>call upon the required knowledge and experience to deal with the problem</li> </ul>	B2-B6, D1-D3, E2-E4, E7, F7- F9 A2.8, A4.4, A4.7, A5.1-A5.4, A5.8, A6.5- A6.7
2b.1g	<ul style="list-style-type: none"> <li>initiate resolution of the problem</li> </ul>	B2-B6, D1-D3, E2, E3, E4, E7, F7- F9 A2.8, A4.4, A4.7, A5.1-A5.4, A5.8, A6.5- A6.7
-	<ul style="list-style-type: none"> <li>demonstrate personal initiative</li> </ul>	B2-B6, D1-D3, E2, E3, E4, E7, F7- F9 A2.8, A4.4, A4.7, A5.1-A5.4, A5.8, A6.5- A6.7

## 7-MANAGEMENT

HPC Standards of Proficiency Codes for Clinical Scientist	AREA OF COMPETENCE	INDICATE SECTION(S) IN PORTFOLIO WHERE COMPETENCE IS DEMONSTRATED
1a1.g	<ul style="list-style-type: none"> <li>Understanding of the legal and ethical boundaries of the modality, and the ethical aspects of scientific research.</li> </ul>	C8 A3.1, A4.8
1b.1g, 1a.5g	<ul style="list-style-type: none"> <li>Ability to recognise the limits of personal practice and when to seek advice.</li> </ul>	C3-C6, E3-E7 A3.1, A5.2, A5.4
1a.6g	<ul style="list-style-type: none"> <li>Ability to manage personal workload and prioritize tasks appropriately.</li> </ul>	B1-B6, C3, D1-D3, E5 A2.8, A3.1, A4.7, A5.4
2c.2g 1a.3g	<ul style="list-style-type: none"> <li>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</li> </ul>	C3, C8, D1, D2, F4- F6, A3.5, A6.2, A6.3
1b.3g	<ul style="list-style-type: none"> <li>Ability to contribute effectively to work undertaken as part of a multi-disciplinary team</li> </ul>	B2-B7, D3, E5-E7, F2 A2.5-A2.8, A4.9, A5.4, A5.6, A5.8
	<ul style="list-style-type: none"> <li>Ability to supervise others as appropriate to area of practice. Understanding of the role of appraisal in staff management and development.</li> </ul>	B1, B3, B5-B7, C3, D1, D3, E6, F1 A2.2, A2.8, A4.7, A5.6
1a.7g 1a.8g	<ul style="list-style-type: none"> <li>Understanding of the need for career-long self-directed learning and the importance of continuing professional development.</li> </ul>	A2, C1-C8, SECTION G A1.2, A1.4, A1.3, A3.1, A3.7,
3a.3g	<ul style="list-style-type: none"> <li>Understanding of the need for, and ability to establish and maintain, a safe practice environment.</li> </ul>	C7, F3 A6.1
	<ul style="list-style-type: none"> <li>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.</li> </ul>	C1, F4,

**Note:**

**The above are the generic competences that must be met by all Clinical Scientists. These competences have also been mapped onto specific subjects. Copies of these can be obtained from the ACS Administrative Office and the website.**

## **Introductory Covering Report-Summary.**

Since I gained my first degree in XXXX, I have worked continuously in laboratories in academic research, regulatory or clinical sectors in the UK and USA. This has given me a considerable breadth of experience which has contributed both directly and indirectly to obtaining the generic competencies required for the attainment of state registration as a clinical scientist. The post is funded jointly by the XXXXX and the XXXXX. The purpose of the post is to develop cellular immunology service provision whilst training in all aspects of diagnostic clinical immunology. The Immunology laboratories in XXXXX are unusual in that they comprise both clinical immunology (paraprotein/autoantibody/ allergy) housed at the XXXXXX along with Transplant Immunology (H&I) based at XXXXX. Cellular Immunology, for technical reasons, is associated with the Transplant Immunology laboratories and my experience as a trainee clinical scientist crosses two modalities (Clinical Immunology and H&I).

My immunology education began in earnest in XXXX when I began working in what was then called the Department of XXXXX at the University of XXXXX under the guidance of Dr XXXXX. During this time, I worked on a number of NK cell related projects leading to me being awarded a Ph.D in XXXX (after part time study). This was a good start to my immunology training and I learned many skills. As well as a good level of practical skills, I also learned about searching the scientific literature and incorporating this knowledge into my current work as well as good written and oral communication skills. I also had the opportunity to regularly attend scientific meetings and to present my research findings. Whilst the focus of my research was centred on experimental immunology at this time, I did conduct a clinically based study considering the effect of rhIL-2 on NK cells *in vitro* from patients with Hodgkins and non Hodgkin's lymphoma. This was an important learning experience with respect to obtaining and testing clinical samples.

After completing my Ph.D I worked in two separate post doctoral positions. I was a Research Fellow working at the XXXXX and following my return to England I worked as a Research Assistant at XXXXX. Both of these positions involved basic immunology research. In my first post doctoral position, I continued my interests in tumour immunology and I had the chance to continue working on NK and T cell anti-tumour responses using both animal models as well as human cells from healthy volunteers and cancer patients. This position gave me the chance to improve my technical skills whilst exposing me to many different areas of immunology through attending the numerous seminars given by both internal and external speakers. I subsequently worked on projects looking at the host immune response to filarial parasites and also vaccination protocols against those organisms. This project involved learning about a different arm of the immune system and so was very useful in this respect. The practical work in this project initially involved a large component of basic molecular biology techniques, as well as some biochemistry and immunology, so many new practical skills were learned. Also at this time, I had the opportunity to supervise BSc final year and MSc project students as well as run a number of immunology tutorials. I also supervised the work of a research technician in this project.

In XXXX, I took up the position of scientist at XXXXX at the XXXXXXXXX and I was promoted to a more senior position in XXXX. This work was a mixture of regulatory and research and also had a supervisory role. My initial role was to participate in Granulocyte Colony Stimulating factor (G-CSF) importation testing. My primary responsibility within this work was to test the biological activity of batches of G-CSF provided by a major pharmaceutical company using an in-house G-CSF bioassay. This work was very important as the G-CSF being tested (manufactured by a US based company) could not be used clinically in Europe until it had been successfully validated by

a laboratory in Europe. I also analysed the G-CSF by Western Blotting. This was time consuming and the G-CSF potency testing required careful analysis and good (accurate) technical skills. In order to perform both the routine G-CSF testing along with research and development work required good organisational skills and the ability to prioritise my work. We also participated in the pharmaceutical company's quality control scheme and were successfully audited by them on two occasions.

During this time I had the opportunity to participate in research which I found to be very rewarding. I had two major areas of research work at XXXXX. The first was related to the G-CSF potency testing as it considered the stability of G-CSF under different experimental conditions. This work had obvious implications for its clinical use. I also performed studies in vaccination strategies against *B.pertussis* as well as considering the effect of IL-12 on host response to *B.pertussis* infections. This was a successful collaboration with two other scientists and I greatly enjoyed working in a team. This work resulted in a series of publications and the abstracts of these reports are shown in appendix 2. This research work gave me further opportunity to develop my research skills. In this case, however, I had a greater autonomy than in previous positions and I enjoyed the greater responsibilities that went with the position. Also during this time I was given greater managerial responsibilities. I had a supervisory role within the laboratory and again enjoyed the greater responsibilities that this provided.

In January XXXX I took up the position of Grade A/B scientist in the XXXXXX at XXXXX based at XXXXXXX. This move allowed me to utilise my experience and knowledge in immunology in a clinical setting. My specific specialised role within the diagnostic laboratory together with my participation in a formal Grade A clinical scientist training programme has allowed me to achieve all of the specific competencies required for state registration. During my training I have worked closely with two grade A clinical scientists in Immunology, as well as two SpR in Immunology and the Grade A trainees in H&I. The Immunology laboratories have two grade C clinical scientists (Immunology and H&I) in addition to two grade B positions. The trust in XXXXX is the largest in the Country and is therefore an excellent centre to see how sample testing contributes to the diagnosis of allergy, myeloma, autoimmune disease and primary and secondary immunodeficiencies. During this time I became familiar with all the laboratory techniques performed in the various laboratories as well as learning of the value of these tests in the diagnosis of various underlying conditions.

I have had the opportunity to conduct some patient focussed research whilst at XXXXX. Two separate projects have been successfully completed and two or three others are either at the early stages or are about to start (as of Jan 07). A study was planned and performed looking in detail at the B cell compartment in patients with Common Variable Immunodeficiency and a separate study investigated NK cell receptor expression in patients who suffered from recurrent *Herpes simplex virus-1* infections. In both of these cases the results have been presented as poster presentations at International Immunology meetings and manuscripts are about to be sent off to Immunology journals. I have had the opportunity whilst in the department to apply for a number of small research grants. These are outlined in the main section of this report.

As well as this, a number of assays have been developed. These include the B cell phenotyping and NK receptor expression assays required for the studies mentioned above. In addition to this I have developed a Treg (CD4<sup>+</sup>CD25<sup>+</sup>Foxp3<sup>+</sup>) phenotype screen and also assays to detect interferon- $\gamma$  and IL-12 receptor expression as well as IFN $\gamma$  cytokine generation following PHA stimulations. I have also developed the immune reconstitution studies on patients following bone marrow transplantation which involves a number of phenotypic and functional studies. I have also

worked on the optimisation of a number of assays routinely performed in cellular Immunology labs as part of service provision.

I have collaborated with the renal transplant scientists on a number of patients giving cellular immunology expertise to help with some of their more problematic patients and am about to collaborate with a colleague at XXXXX with a breast cancer research project.

I had supervisory and training roles whilst working at XXXXX and XXXXX. I supervised a SpR in Immunology with his MSc research project and am currently a co-supervisor for a MPhil student. In addition to this I am fully involved with the training of BMS and Clinical Scientist in cellular immunology. I also regularly attend the senior staff meetings at SJUH site and am also the radiation protection officer for the Dept. Throughout my training I have attended a variety of meetings, seminars and tutorials both internal and external which have added to my understanding of how a Clinical Immunology laboratory functions. I have made presentations at such events on numerous occasions. I look forward to continuing and expanding my work as a Registered Clinical Scientist in Immunology.

## Section A: Pre Grade A Experience.

**A1 Introduction.** I gained my first degree in XXXX (see appendix 2, A1) and have since been in continuous employment in laboratories in both the UK and USA in academic research as well as in regulatory and clinical sectors. Details of my previous positions and career progression prior to beginning my Grade A training is contained in my *employment history* document found in appendix 2 (A1.1). This background has given me considerable breadth of knowledge and experience which has contributed to me obtaining the generic competencies required for state registration.

**A2 PhD Studies** I obtained my Ph.D whilst working as a Research Assistant within the Department of XXXXXXXXXXXX XXXXXXXXXXXX at the University of XXXXXXXXXXXX in XXXX under the supervision of XX X. XXXX. The title of my thesis was *A Study of the XXXXXXXXXXXX XXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXXX XXXXXXXXXXXX XXXXXXXXXXXX XXXX XXX XXXXXXXXXXXX XX XXXXXXXXXXXX XXXXX XXXXXXXXXXXX XXXXX XX XXXXXXXXXXXXt XXXXXXXXXXXX*. A summary of this thesis as well as a copy of my PhD certificate is included in appendix 2 (A1.2, A1.3). I was responsible for all the bench work associated with this project as well as obviously writing the thesis (including literature searches performed in the days prior to computer searches which meant many hours spent in the library). Experience was gained in adequate record keeping as well as in experimental design and evaluation of results. Also during this time, I conducted a clinical study considering the IL-2 response, and in particular the generation of Lymphokine Activated Killer (LAK) cells, from peripheral blood mononuclear cells from patients with Hodgkin's and Non Hodgkin's lymphoma. This brought me into contact with members of the clinical staff. In particular, my co supervisor for this project was Dr. XXXXX XXXXXXXX. During my studies, I had the opportunity to present my work in oral and poster presentations at national and international meetings.

**A3 Research Fellow.** My first post doctoral position was in the Department of XXXXXXXXXXXX at the XXXXXXXXXXX XXXXXXX XXXXXXXXXXXX in XXXXXXXXXXXX. Whilst there I studied the expression and biological role of granule serine proteases (granzymes) and considered their role in anti-tumour T cell responses. I also made significant contributions to a number of publications as outlined in the enclosed bibliography (A1.4). This was an exciting period of training for me, working in a post doctoral position in one of the premier laboratories in the world. In addition to gaining additional practical skills, I also had the opportunity to attend the many meetings arranged to hear both internal speakers as well as the visiting scientists. I regularly attended the XXXXXXXXXXX XXXXXXX external speaker seminars in which eminent speakers from many different areas of immunology presented their latest ideas and data. I also had the opportunity to regularly present my results in the laboratory seminar program and in the yearly retreat. This was obviously very valuable as it gave me a thorough understanding of many aspects of immunology as well as providing a good level of information in wider scientific disciplines.

**A4 Post Doctoral positions at XXXXXXXXXXX XXXXXXX.** Whilst working in the Department of XXXXXXXXXXXX at XXXXXXXXXXX XXXXXXX under the supervision of Dr. XXXXXXX XXXXXXX, I studied the immune response to parasitic filarial nematode infections, in particular *B.malayi* as well as the intestinal parasite *N. brasiliensis*. These were very challenging projects and involved developing expertise in molecular biology techniques in order to generate protein from a number of expression systems. The

time spent in the laboratory at XXXXXXXXXX XXXXXXXX on this study was ultimately useful in two significant ways: it firstly provided a good background in parasitic immunology and in particular the host response to nematode worms and also the way the parasite interacts with the host to induce the down regulate of the immune response against it. I also became competent in many molecular biology techniques through using them daily in a number of projects involving expression systems and gene cloning and sequencing. As well as the practical experience, I became familiar with the theory that underpins these techniques. I have enclosed the relevant two pages of my Grade A logbook to highlight this experience (A1.5).

## **Section B: Clinical Scientist Training (2001-2003)**

**B1 (Senior) Scientist at XXXXX.** I took up my appointment as a scientist within the Division of XXXXXXXXXXXXXXXX at the XXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXX and XXXXXXXX working under the guidance of Dr XXXXXX XXXXXXXX in January XXXX. The Institute provides independent testing of biological medicines as well as performing some appropriate research and development functions. Further details regarding XXXXX can be found on their website ([www.XXXXXX.XX.XX](http://www.XXXXXX.XX.XX)). I was promoted to Senior Scientist in 2001 and worked within the Division until December 2003. My period of grade A training began in January 2001 whilst working at XXXXX. My role at XXXXX encompassed both regulatory and research functions and also involved the direct supervision of junior staff. A summary of my basic responsibilities and research interests throughout my five years at XXXXX are outlined in *Responsibilities and Research Interests* document (A2.1). This document was written in 2002 as part of the preparation for an external review of The Division of XXXXXXXXXXXXXXXX. This was an external process to review and analyse the scientific direction of the Division. I have also included a letter from Dr XXXXXX XXXXXXXX the Head of the Division of XXXXX that confirms my role within the Department (A2.2).

**B2 G-CSF Testing.** As part of my initial duties at XXXXX, I performed importation batch testing of human Granulocyte Colony Stimulating Factor (G-CSF) for a pharmaceutical company. G-CSF is a cytokine widely used in medicine to treat neutropenia as well as being used to generate bone marrow cells for use in bone marrow transplantation. My involvement in this work was to compare the potency of batches of G-CSF with a standard preparation of the cytokine using the G-CSF sensitive cell line GNFS-60 in a bioassay. This work was very important as the G-CSF being tested (manufactured by a US based company) could not be used clinically in Europe until it had been successfully validated by a laboratory in Europe. Also included in the batch testing was analysis of G-CSF preparations by western blotting. In this case the presence of a band at the appropriate molecular weight was identified. The samples were also analysed by HPLC by Dr XXXXX XXXXXXXX (Division of XXXXXXXXXXXXXXXX). The data on each batch was compiled into a summary report by the head of the Division, Dr. XXXXXX XXXXXXXX and this was sent to the Company. Within the timescale of this study we were successfully audited and also took part in their quality control system. It was my sole responsibility to advise the HOD as to the potency and Western blot results of each batch of G-CSF tested.

**B3 Chemokine Standardisation Studies.** One of my initial additional responsibilities at XXXXX was to establish methods for the measurement of the biological activity of chemokines and the generation of new standard preparations. In collaboration with my

colleague XXXXX XXXXXXXXXX I established a method of measuring the chemotactic activity of a number of  $\alpha$  and  $\beta$  chemokines using novel chemokine receptor transfectant cell lines. This work concluded in the generation, quantification, aliquoting and storage of a SDF-1 $\alpha$  preparation and this reference material is now generally available upon request. My role within this work was both practical (including assay development and evaluation) and also in supervising a member of staff in their work.

**B4 Research.** I had the opportunity to initiate and participate in a number of research projects (see below, and appendix 2). This work can be divided into two main areas of research, namely work on the stability of G-CSF preparations and vaccination experiments using a murine aerosol challenge *B. pertussis* model.

**B5 G-CSF Research.** This work can be divided into two: The main body of work focussed on the stability of different G-CSF preparation in serum and considered the mechanism of protection of the more resistant G-CSF preparations. The second part of this research focussed on the sensitivity of G-CSF preparations to human neutrophil elastase degradation. This work built on the previous serum degradation work both technically and scientifically. Using different G-CSF preparations with different glycosylation status, I showed that the sugar residues present on glycoylated G-CSF were important for protection against elastase degradation and showed that neutrophil derived elastase is not the factor in serum responsible for G-CSF degradation. I have enclosed the abstracts from the two publications arising from this work as evidence in appendix 2 (A2.3, A2.4).

**B6 Vaccination Experiments.** This work was a collaboration between me and Dr XXXXX XXXXXX in the Division of XXXXXXXXXXXXXXXX and Dr XXXXXXXX XXXX in the Dept of XXXXXXXXXXXXXXXX both at XXXXX. We compared the immunological nature of the protection obtained using a relatively new acellular vaccine (ACV) preparation compared with the established whole cell vaccines (WCV) in a *B.pertussis* aerosol challenge model. From our initial studies we concluded that both vaccines protected mice against challenge using *B.pertussis*. Whilst we agreed with published studies that the WCV protected via a predominantly Th-1 derived mechanism, the ACV protected by a Th-1/ Th-2 independent mechanism (in contrast to other reports in the literature). In contrast to other studies, we focussed on the effects on lymphocytes in the pulmonary environments. We also published studies on the effect of IL-12 (both protein and DNA vaccines) using the *B. pertussis* aerosol challenge model. It was of great interest to find that treatment of mice with IL-12 protein prior to infection with *B.pertussis* led to a delayed clearance of bacteria from the lungs compared to untreated mice. This work was published in three papers (A2.5, A2.6, and A2.7) and was also presented in two posters at the Modern Vaccines Adjuvant and Delivery meeting, held in Dublin on XXXX XXXX XXXX. We also performed some preliminary work using attenuated laboratory strains of Salmonella as a potential vector for DNA plasmids with a view to their potential clinical utilisation.

**B7 The XXXXX External Review.** During my time at XXXXX the Division of XXXXXXXXXXXXXXXX underwent a XXXX (XXXXXXXXXXXX XXXXXXX XXXXXXXXXXX XXXXXXXXXXX) review in which the activities of the whole division were assessed by external examiners and recommendations made as to the suitability and quality of the work being performed. As a senior scientist within the division at that time, I made a full contribution into both the planning and execution of the day itself. An important part of this was the preparation of the documentation (in the form of a Divisional report).

Additionally I also prepared posters describing our work (listed in Section G at the end of this report).

For an in depth consideration of what I gained, learned and contributed from my 5 years at XXXXX, see please refer to *reflection on XXXXX* document in appendix 2 (A2.8).

## Section C: Grade A Training (2004-2006)

**C1** I joined the Dept of XXXXXXXX XXXXXXXXXXXXXXX and XXXXXXXXXXXX in XXXXXXXX XXXX, based in the XXXXXXXX XXXXXXXXXXXXXXX XXXXXXXXXXXX at XX XXXXXXX XXXXXXXXXXXXXXX Hospital in XXXXX. I was employed as a Grade B Scientist (reflecting my past experience) with the brief to develop the Cellular Immunology Service provision and also to develop a range of immunology tests for use in patients post bone marrow transplant. An important part of this position was to successfully complete Grade A training in Clinical Immunology. As part of this training, therefore, whilst based at XXXX, I also spent time training in all sections of the laboratories at XXXXX XXXXXXXX XXXXXXXXXXXXXXX (see below). On the first day of employment at XXXX I was given a Departmental Induction and at a slightly later date a general induction into the XXXX site. From these meetings (and also emphasised by my attendance at departmental lab meetings and Senior Staff meetings), I gained an understanding of the structure and organisation of the department and how it fits into the local clinical setting.

**C2 Sample Reception:** This was largely covered at the XXXX site where all samples are booked in by the staff of the laboratory as they arrive. The importance and significance of sample labelling was understood and acted upon in the light of the new Pathology Labelling policy as was the use of the appropriate tube for the appropriate test. I also learned of the correct policies and procedures for sending samples through the post to other labs as well as the correct procedures for handling high risk samples.

**C3 Cellular Immunology Laboratory.** The cellular Immunology laboratory obtains samples from patients with primary and secondary immunodeficiencies. The scope and complexity of this work is outlined in a letter from XX. XXXX XXXX, one of the Clinical Immunologists at XXXXX (A3.1). All components of cellular immunology were covered and expertise acquired in all aspects of this laboratory including sample reception and updating results (use of the computer system/Telepath). An important part of this study was the attendance at the *Advanced Flow cytometry Course* held at York University (Sept 14-16, 2005). A certificate of attendance is included as evidence in appendix 2 (A3.2). I found this course of great value as it exposed me to many theoretical and practical aspects to flow cytometry as well as learning about many other uses of flow (for example platelet and red blood cell analysis). I also had the opportunity to attend a Becton Dickinson flow cytometry day (XXXXXXX XXXX where I gave an oral presentation. The schedule for that meeting is included in appendix 2 (A3.3). I also became aware of the processes involved in results authorisation during my time in this laboratory. Within my time in all the clinical labs issues such as patient confidentiality, informed consent, updating results and handling telephone requests were all addressed. As high risk samples are tested routinely in this laboratory, I became familiar with the use and disposal of these samples. I have enclosed a summary of the laboratory tests performed in Cellular Laboratory as well as a letter from the BMS 3 from this laboratory (XXXX XXXX) as evidence of my

competency in this area of work (A3.4, A3.5). Research and development functions were also performed in this laboratory as outlined in section D and E (below). I have additionally listed how my work in cellular Immunology has impacted the service provision capabilities of the laboratory (A3.6).

**C4 Immunology Laboratories at XXXX.** I worked in all sections of the Clinical Immunology laboratories during 2004/2005 spending the majority of the time in the protein and autoantibody sections. A letter from XXXX X XXXX is included in Appendix 2 (A3.7) as evidence of my training in this regard. In the protein laboratory I gained 'hands on' experience in gel electrophoresis on serum and urine samples looking for/at paraproteins. Both urine and serum samples are analysed by means of gel electrophoresis using a semi automated Sebia hydrsys system using the relevant SOPs. Protein gels are stained with amido black and urine with acid violet. Following the running of the gel, the bands from individual samples are visually examined looking for any obvious abnormalities, especially to the  $\gamma$  bands. The technical details and clinical consequences of the results can be found in a reflective document which describes my experience in that laboratory (A3.8). The work in this laboratory also gave me some experience in using telepath and, in particular, the use of worksheets in that system. In addition it was my first experience in using a semi automated gel system and complemented my previous wide experience in running various gels manually in a research environment.

**C5 Measurement of Immunoglobulins and other immunologically relevant molecules on the BNII Analyser.** Experience was gained in the use of the Behring Nephelometer II to obtain concentrations of immunologically important molecules. In particular, we used this technique to obtain levels of rheumatoid factor, haptoglobins, ceruloplasmin, Immunoglobulins A,G,M and IgG subclasses 1-4,  $\alpha$ 2 macroglobulins,  $\alpha$ 1 antitrypsin,  $\alpha$ 1 acid glycoprotein,  $\beta$ 2 microglobulin, anti-streptolysin and Ig light chains. In addition, I gained experience in the calibration procedures and the use of controls with this system. This was valuable 'hands-on' experience in using an automated platform for protein measurements in a high through put environment which I thoroughly enjoyed. As well as running the samples I also learned about the importance (and gained practical experience in) the use of the controls and calibrations in this system.

**C6 Autoantibody Laboratory.** I gained experience in autoantibody testing using both automated and non automated systems using indirect immunofluorescence on relevant frozen tissues as substrate. This involved checking Telepath and generating relevant worksheets for each test. Automated indirect immunofluorescence was performed to assess for anti-nuclear antibodies (ANA), anti-neutrophil cytoplasmic antibodies (ANCA) and liver, kidney, stomach tissue block. Additionally, GBM antibodies were also assessed using kidney tissue on a daily basis. In addition, a number of other autoantibody tests were performed manually using relevant tissues as substrates: anti-purkinje cells, adrenal, pancreatic islet cells, anti skin, anti-endomysial antibodies. Other less frequent tests requested include anti-ovary, testis, cardiac and striated muscle antibodies are performed as appropriate. In all cases, positive and negative controls were used. The use of the positive controls allowed experience to be gained in interpretation of rare staining patterns. Additionally I became familiar with many staining patterns as well as learning of their clinical significance. A review of what I learned from my secondment in this laboratory is enclosed in appendix 2 (A3.9).

**C7 Health and Safety.** Within Immunology, health and safety issues are taken very seriously. Procedures are performed in line with SOPs which are informed by COSH and risk assessments. Appropriate PPP are worn at all times. Since we test a high number of high risk samples in the Cellular section (largely from patients with retroviral illnesses), we are very aware of the need of adequate safety measures that need to be in place when using and disposing of these samples. An SOP (SOPC016) documenting the safe use of these samples informs our policies in this regard. I have read and am aware of the relevant safety policy outlined in the Departmental Safety Manual. In addition, our departmental safety officer regularly updates the whole department of the latest legislation and policies and generates relevant documentation. She has additionally organised practical sessions outlining the use of the spillage kits that are present in all laboratories. I am responsible for the safe use and disposal of isotopes on XXXX (according to local rules and relevant SOPs (C008, 009)).

**C8 Training meetings.** I regularly attended the monthly lab meetings on XXXXX XX with the XXXXXXXX XXXXXXXX group. I also attended weekly XXXXX XXXXXXXX seminars and regularly contributed to this series of meetings. In addition to this I attended and contributed to weekly Immunology training meetings which consisted of laboratory technique tutorials, case studies and paper reviews in a journal club format. I have included in Appendix 2 (A3.10) the first page of a review of a paper entitled *A chimeric human cat fusion protein blocks cat induced Allergy* that I presented to the clinical immunology training group in May XXXX. Further information on presentations given is also included in Section G.

**C9 Phone Enquiries.** I gained experience in answering phone calls regarding the immunology tests performed and results obtained. General enquiries regarding the repertoire of tests performed and the type of samples required for each test were routinely answered. The results, once authorised, can be faxed upon request. All phone calls are logged in the lab phone log so that a permanent record is kept. A copy of all results faxed from XXXX laboratories is also kept within the lab. The importance of patient confidentiality and data security was appreciated and acted upon. I have also gained experience in dealing with phone calls from the wider scientific and clinical communities (including nurses, secretaries) and also on occasions directly with members of the public.

## **Section D: Research Activities.**

**D1 NK Receptor Analysis in patients with recurrent HSV-1 infections.** I supervised an SpR in Immunology with this project that formed his research project as part of his M.Sc studies. It involved the flow cytometric analysis of patient NK receptor expression compared with NK receptor expression in a control population obtained from age matched healthy donors. My role with this study was to help in the search of the literature to decide which NK receptors to analyse, establishing the antibody staining flow cytometry protocol using the NK receptor antibodies. I also gave significant help in the data analysis and supervised the M.Sc report writing. In addition, I established a flow based NK assay for use in this study to assess NK activity in these patients. A manuscript describing this work entitled *Natural Killer cell Receptor Expression in patients with Severe and Recurrent HSV-1 Infections* has been submitted to *Cellular Immunology* (the abstract is included in appendix 2 A4.1) and a poster presented at the 1st joint Meeting of European National Societies of Immunology (Sept XXXX). A further poster was presented on this work at the

BSI congress in XXXXX in XXXX. The abstracts for these posters are included in appendix 2 (A4.2, A4.3). The experience gained here was largely in respect of supervising a SpR in his M.Sc project. Additionally I had the chance to set up and validate both the use of the NK antibody panel as well as the functional flow cytometry based NK assay which was technically challenging. Finally it was very rewarding to have the opportunity to present my data at Immunology meetings and to write and submit a manuscript for publication.

**D2 B Cell Subset Analysis in COVID patients.** A panel of antibodies to analyse the B cell compartment was used in confirmed COVID and other patients with suspected primary antibody immunodeficiency. My involvement in this work was to design and optimise the use of the B cell antibodies and to test the samples. This work was very challenging and required a large initial effort to establish and validate the results. In particular the use of anti-IgM and anti-IgD antibodies needed careful monitoring. This project was described in a poster presented at the 1st joint Meeting of European National Societies of Immunology in September 2006 (A4.4). This work was of great clinical interest in the light of the lack of consensus in a number of published studies. It also gave me the opportunity to compare the data obtained from the cellular part of this study with other immunology results obtained from the patients (immunoglobulin and specific antibody levels) in order to obtain as complete a picture as possible regarding the state and possible failures in the immune system. Finally I had the chance to obtain the clinical details from these patients and to discuss these in detail with the Clinical Immunologists from our department thus gaining experience in seeing the clinical significance of laboratory tests performed. In both the B cell and NK research work described above, ethical approval was obtained from the Local Ethics committee and informed consent was given by the patients.

**D3 Dietary Influences on MHC class II Expression.** This is a collaboration with members of the XXXXXX XXXXXX team at XXXX. We have also had preliminary meetings and taken advice from Dieticians based at XXXX XXXXX on this project. This will form basis of a MPhil project for a member of the department and I am helping in a supervisory manner within this project as well as taking the lead in some developmental work. We have applied for and received £1000 from the XXXX R&D fund (see appendix 2). A poster describing some preliminary work performed on this project was presented at the British Society for Histocompatibility and Immunogenetics (BSHI) at their annual meeting in XXXXX in Sept XXXX where it was judged to be the best poster at the meeting (the abstract is included in appendix 2 (A4.5)). I have additionally included a small report suggesting the best ways of approaching this work in Appendix 2 (A4.6). A document outlining what I have learnt from my research at XXXX is also included in Appendix 2 (A4.7).

**D4 Research Grants Applied for.** The XXXXXX Department at XXXX NHS Trust has small amounts of money (up to £1000) available for R&D projects. These allow small focussed studies to be started and I have been successful on a number of occasions listed in appendix 2 (A4.8). Also included in appendix 2 (4.9) is a document sent to Dr. XXX XXXXXX regarding my collaboration with him on a Breast cancer immunology study. The use of these grants along with the money provided in my training budget has allowed me to demonstrate competence in budget control and resource management. This is reinforced by my attendance at the senior staff meetings where budgetary issues are addressed and also by my responsibility for ordering reagents etc for the Cellular laboratory.

**D5. Refereeing Papers from Journals.** I have been requested to review a number of manuscripts and to express an opinion as their suitability for publication. These studies have been on NK cell biology and functions and have largely originated from the journal *cytokine*.

## **Section E. Developmental Work.**

**E1 B cell panel.** As outlined in paragraph D2 this was initially developed as a research protocol, it has now being introduced as a routine test. As with a number of tests in Cellular Immunology all requests for this test need to be checked with the Clinical Immunologists prior to the sample being taken.

**E2 Optimisation of the T Cell PHA response.** On taking up my post within Immunology in January XXXX the T cell mitogen test was a well established test within the laboratory. This is a standard immunological assay, although it was clearly working inconsistently and was less than optimal in our laboratory. A systematic dissection of the technique used was undertaken. A key part of this work was the trouble shooting element. More details of this work can be found in a report in appendix 2 (A5.1). This was a challenging project as many components of the assay could have potentially been responsible for the low and inconsistent proliferation responses. Since corrective measures have been put in place the assay is now working consistently well.

**E3 Development of CD4<sup>+</sup> CD25<sup>+</sup> Treg cell assay.** A small boy was admitted to the XXX hospital. Preliminary clinical indications and immunology tests suggested that IPEX syndrome could be responsible for the patients' symptoms. There were no standard laboratory tests in our laboratory specific for this condition. As it is due to a deficiency in CD4<sup>+</sup> CD25<sup>hi</sup> regulatory T cells, we were asked if we could test for the presence of these cells in this individual. I have provided a report of this case in appendix 2 (A5.2). This was a very useful and rewarding exercise as it involved the setting up and interpretation of a new phenotyping procedure within a few days and led to the diagnosis of IPEX leading to the patient having a bone marrow transplant which ultimately led to a cure. It provided good experience in bench skills (including ultimately setting up intracellular staining for FOXP3) and also involved learning about IPEX syndrome and Treg cells as well as the necessity for literature searches and the application of information into the laboratory assays.

**E4 IL-12R and IFN $\gamma$  Receptor Expression from Patient with abnormal mycobacterial Infections.** I have introduced a number of techniques to screen suitable patients for the expression of IFN $\gamma$ /IL-12 receptor and also IFN $\gamma$  and IL-12 protein synthesis. During this initial start up work, a patient at XXX hospital was very unwell with atypical mycobacterial infections and the clinical picture was consistent with a possible diagnosis of IFN $\gamma$ /IL-12 deficiency at either receptor or protein level. To further elucidate the immune characteristics of this patient the expression of IFN $\gamma$  and IL-12 receptors and the generation of IFN $\gamma$  following stimulation with PHA/PPD was assessed. A report of this work is included in appendix 2 (A5.3).

**E5 Bone Marrow Immune Reconstitution Studies.** An important element of my work at XXXXX was to develop a service provision based within the Cellular Immunology Laboratory to monitor the immune reconstitution on patients following bone marrow transplantation. As much of this data is potentially novel, this work has clear overlap with the research section but with obvious clinical implications. Prior to this work starting, there was minimal evaluation of immune reconstitution of BMT patients (full blood counts provided by Haematology and immunoglobulin assessments performed by clinical Immunology). The developmental work on relevant assays began in 2004-2005. Following a series of meetings with Dr. XXXXXX XXXX, Director of BMT in XXXXX, it was decided to put in place a programme of testing that would assess a broad range of immunological phenotypes and functions beginning at Day 100 post transplant and continuing until full reconstitution had occurred. I have included a document outlining my experience with this work and what I have learned from performing it in appendix 2 (A5.4). The initial findings from this study were also presented at the BSI Congress in XXXXXX (February XXXX) as an oral presentation. A copy of the abstract is included in appendix 2 (A5.5).

**E6 Establishing a Flow Cytometry Method for Screening Erythrocytes Using an EMA Screen.** The Cellular Immunology Laboratory received a request for help from the Haematology Department to set up a flow cytometry based assay to monitor the integrity of erythrocyte membranes. The role of Cellular Immunology in this study was to set up the flow cytometry analysis of erythrocytes and to help with the analysis of patient samples. A report on this work is included in appendix 2 (A5.6). This formed the basis of a BSc project from an individual from Haematology. The abstract from the BSc report is found in appendix 2 (A5.7). My roles within this study were at a number of levels. I was involved in the opening discussions; I performed preliminary experiments in conjunction with colleagues in Haematology to define the optimal staining procedures and the most appropriate instrument settings to use in this assay and I analysed a number of samples. This was an interesting project as I had the opportunity to use the flow cytometer to monitor a different cell to our usual repertoire of tests. This test is about to become a routine test offered by Haematology and they will continue to take advantage of the flow cytometry facilities within the Department. This is a fine example of the need for teamwork in the laboratory as it involved a number of individuals from two different departments within Pathology working together to realise a new assay with immediate clinical applications.

**E7 Work Performed in Conjunction with Transplant Immunology.** The cellular laboratory provides occasional support for patients pre or post renal transplantation. These are mostly patients for whom transplantation is proving difficult, due, for instance, to the presence of donor specific antibodies in the recipient or in patients post transplant who are undergoing some form of immuno-depletion to treat graft rejection. I have illustrated this activity by means of a table in appendix 2 (A5.8) which includes a brief summary on the collaborative work performed in the two laboratories as well as brief details as to how this has helped in my training. Also in appendix 2 (A5.9) is a letter from Dr XXXXXX XXXX (Consultant Clinical Scientist in Transplant Immunology) confirming the collaborations between the two laboratories. My roles in these studies are to provide helpful discussion with my colleagues in Transplant Immunology as well as offering practical advice as to the most appropriate immunological approaches to take. In addition, I was responsible for performing and analysing the practical work involved and informing the relevant colleagues in Transplant Immunology. This work was very educational at a

number of levels: As well as allowing an opportunity to learn more of a specialised area of immunology (transplantation), it also provided the chance to improve communication skills by needing to talk with professionals with interests in different patient groups. Also, there was an element of improvisation required to modify our assays to provide answers to the questions posed by these kinds of studies.

## **Section F: Other Responsibilities.**

**F1 Supervising/ Training.** In addition to supervision of junior staff whilst at XXXXX, I have been responsible for the supervision of a SpR performing his MSc laboratory project (D1, above) at XXXX. I am also at present co supervisor of a MPhil candidate who is working part time for a research degree. Additionally as noted earlier, I have helped in the BSc project from a student working in Haematology. In addition to this I have been actively involved in the training of BMS and Clinical Scientist staff in the Cellular Immunology laboratory particularly with respect to the cellular assays and the use of the flow cytometer. This has been very rewarding and it has helped my training in the respect that it has improved by communication and management skills.

**F2 Care of the Flow Cytometer.** I have shared responsibility for looking after the routine day to day maintenance of the flow cytometer (along with Mrs XXXX XXXX). This involves performing the daily calibrations and machine checks required under the terms of EFI accreditation, as well as performing the weekly cleaning schedule and trouble shooting in the event of other users encountering problems.

**F3 Radiation Protection Supervisor for XXXX Immunology Site.** I took on the role of departmental radiation protection supervisor for XXXX XXXX at XXXXX in January XXXX. At present the only isotope we use is  $^3\text{H}$  (in proliferation assays). Our practices are informed by the local rules which in conjunction with the Medical Physics department (Dr. XXXXXXXX XXXXXXXX) have been recently updated (following an audit of our isotope practices) and all work is outlined in relevant SOPs which have been recently updated (May XXXX). A copy of the first page of the Local Rules is included in Appendix 2 (A6.1). My responsibilities for isotopes are to ensure that adequate stocks of the isotope are available for use, keep up to date records for isotope stocks (including use and disposal), ensure that liquid, solid and scintillant waste are correctly disposed of, and to ensure that the isotope areas are regularly cleaned and kept free from contamination. I am also responsible for the training of other members of staff into safe practices when using isotopes and deal with any questions regarding the use of isotopes within the department.

**F4 Attendance at Senior Staff Meetings.** The senior staff in the XXXX. of XXXXXXXXXXXX and XXXXXXXXXXX XXXXXXXXXXXX at XXXX meet monthly and I regularly attend these meetings. They are an important forum in which important issues facing our site can be discussed (including quality issue, NEQAS results from all laboratories etc).

**F5 Quality Issues:** I have attended meetings regarding the quality system in place at XXXXX including a half day course organised at XXXXX (a copy of my certificate of attendance is included in appendix 2, (A6.2)) as well as participating in the immune monitoring NEQAS scheme (Leukocyte immunophenotyping). I am an active participant within the NEQAS testing both in terms of sample testing and reporting the results and

assessment of our performance. A summary of our performance in this scheme from the last six samples is included in Appendix 2 (A6.3). Since there are no formal quality schemes for lymphocyte and neutrophil functional assays, continual laboratory assessment of these assays is vital to ensure that consistent and reliable results are obtained over time.

**F6. Preparation for and Participation in CPA Accreditation.** In the summer of XXXX, the department had its periodic CPA assessment. I fully participated in the preparation for this visit. All SOPs used in our laboratory were revised and updated as required. Additionally a small number had to be written. I prepared and updated a number of SOPs relevant to the Cellular Immunology section as well as reviewing and modifying a number of laboratory policies to ensure that all CPA standards were met. A list of the current SOPs used within Cellular Immunology, as well as the front sheet of a SOP revised by me, are included in Appendix 2 (A6.4, A6.5). In particular it was important to ensure that all SOPs, policies and procedures were up to date and available for inspection. I also fully cooperated with the CPA inspector during his visit to the Laboratory in July XXXX. This was a very valuable experience and in particular required a high level of team work. The experience of writing and checking SOPs in addition to checking to ensure that CPA standards were being met was incredibly useful as was the experience gained on the day of the visit. We were inspected by two inspectors as part of the XXXXXX XXXXXXXXXX visit and a further one inspector as part of the XXXXXXXXXX XXXXXXXXXX inspection. In both cases, there were minimal non compliances and the lab was awarded conditional accreditation. Work has since been performed to address all non compliances and a document outlining the details of this is now being prepared by XXXXX.

**F7. Problem Solving.** Much of the day to day work in the laboratory involves an element of problem solving. This can be simply locating a sample that has gone missing to more difficult requests such as evaluating new assays to answer a particular clinical question. Two relevant examples of recent problem in the XXXXXXXXXX lab are outlined below. Other examples of this have already been referred to (please see paragraphs E2-E7) along with the evidence included to substantiate these examples).

**F8. Problem Solving Case Study.** This was a case involving a sample sent from a 4 month old girl where there was a clinical suspicion of primary immunodeficiency. A brief summary of this case is included in appendix 2 (A6.6)

**F9. T cell antigen re-stimulation Assays.** We routinely get asked to perform T cell re-stimulation assays using a number of antigen preparations against HSV, VZV, Candida and PPD. These assays are relatively simple to set up, although there are a number of problems that lead to difficulty in interpreting them. These are outlined in a short report on the subject (A6.7 in appendix 2). This work is on-going.

## **Section G: Meetings & Presentations.**

As well as attending general monthly lab meetings and senior staff meetings at the XX XXXXXXXXXX XXXXXXXXXX site, and the weekly Transplant Immunology Seminar series and regular Clinical Immunology training meeting at XXX, I also attended the following meetings:

1. Multiplex Assay Meeting. University of Newcastle. 13th July, 2004

2. Autoantibody analysis Course Keele University. 16-17th Feb 2005
3. RMS Flow Cytometry Course. York University 14-16 September 2005
4. Clinical Immunology Training meeting St George's Hospital, London, October 20th, 2005
5. MRCpath Training Days in Transplantation. Leeds April 2006.
6. Strategies and Advances in Stem cell Transplantation. Fountains Abbey, Ripon. May 25th 2006
7. BD Biosciences Flow Cytometry Day, Manchester June 28th 2006
8. 16th European Congress of Immunology, Paris 6-9th September.
9. Quality Management in Pathology training day Leeds 25th September 2006.
10. Service Improvement Training Day. Leeds. 19th December 2006
11. Midland Immunology Clinical Scientists training network meeting. Nottingham 24.01.07
12. BSI Congress, Glasgow 20-23 February 2007

## **Presentations**

1. 'T cells'- Transplantation Seminar 29.06.04
2. 'Cellular immunology-an update'. Infectious diseases and Immunology meeting. 05.11.04
3. 'The Th-1/Th-2 paradigm'. Transplantation Seminar, SJUH. 05.07.05
4. 'Mitogen and Markers'. Clinical Immunology Training meeting. September 05.
5. 'Neutrophil Function Tests-Going with the Flow'. BD Users day Manchester. 28.06.06
6. 'Neutrophil Function Tests'. Clinical Immunology Training meeting, LGI. 4.11.06
7. 'B cell Phenotype analysis in CVID patients'. Transplant Seminar, SJUH. 31.11.06
8. 'BMT Immune Reconstitution Studies'. BSI Congress. 23.02.07.
9. 'BMT Immune Reconstitution Studies.' Transplant Seminar, SJUH. 13.03.07

The numerous internal presentations given at NIBSC and in my academic career are not included in this list.

## **Poster Presentations (Since 2003)**

1. **B cell Analysis in Patients with Common Variable Immunodeficiency.** X.XXXXXX, X.XXXXXX, X XXXX. Presented at 16th European Congress of Immunology, Paris 6-9th September 2006.
2. **Natural Killer cell Receptor Expression in Patients with recurrent HSV-1 Infections.** X.XXXXXX, X. XXXXX, XX XXXX and X.XXXX. Presented at 16th European Congress of Immunology, Paris 6-9th September 2006.
3. **Investigations into the Modulation of cell-Surface Molecules by Dietary Supplements.** XXXXX XXXXXX, XXXXX XXXXXXXX Presented at the British Society for Histocompatibility and Immunity Conference. Sheffield. September 2006.
4. **Natural Killer Cell Functions in Individuals with Decreased Natural Killer Receptor Expression.** X XXXXXXX, X.XXXXX, X.XXXX. Presented at the BSI Congress, Glasgow. February 2007.
5. **The effects of pertussis whole cell and acellular vaccines on pulmonary immunology in an aerosol challenge model.** XXXXX XXXXXX, XXXXXXXX XXXX, XXXXX XXXXXXXXX, XXXXX XXXX. Modern Vaccine Adjuvant and Delivery Meeting. Dublin. June 4<sup>th</sup> -6<sup>th</sup> 2003.
6. **High dose IL-12 exacerbates B pertussis infection and is associated with suppression of cell mediated immunity in a murine aerosol challenge model.** XXXXX XXXXXX, XXXXXXXX XXXX, XXXXX XXXXXXXXX, XXXXX XXXXXXXXXXXXXXXX, XXXXXXXX XXXX. Modern Vaccine Adjuvant and Delivery Meeting. Dublin. June 4<sup>th</sup> -6<sup>th</sup> 2003.
7. **The role of glycosylation in G-CSF protection against serum inactivation.** XXXXX XXXXXXX and XXXXX XXXXXXX. XXXX XXXXX
8. **Studies on T cell responses in the lungs of vaccinated animals challenged with B.pertussis.** XXXX NXXXX
9. **The *in-vivo* effects of IL-12 DNA vaccination: Effects on lung function.** XXXXX XXXXXX, XXXXX XXXXXXXXX, XXXXXXXX XXXX, XXXXX XXXXXXX, and XXXXX XXXXXXX. XXXX XXXXX.

### **The Future.....**

1. To continue the improvement and development of the service provided by the Cellular Immunology Section of the department. To become more familiar with the clinical aspects my role. To help with reporting of results from this lab (post state registration).
2. To spend more time at the XXX labs especially to develop skills in protein, autoantibody and allergy results authorisation at that site. To generally improve communication between the two sites.
3. To continue to develop the R&D functions of the laboratory. It is hoped to continue with research collaborations with Transplant Immunology and with others from outside our department including the breast cancer group and the Bone marrow transplant Unit. To aid this part of the work, it is essential that extra funding (and possible research personnel) is generated. To continue to present results and appropriate meetings and to publish papers where possible.
4. To prepare for MRCpath examinations. A key part of this will be to attend MRCpath study days.

5. To continue with supervisory duties as appropriate and in line with expectations of others in the department. To expand management role as required.
6. To continue with my appreciation of the importance of continued learning and the need for continued professional development.