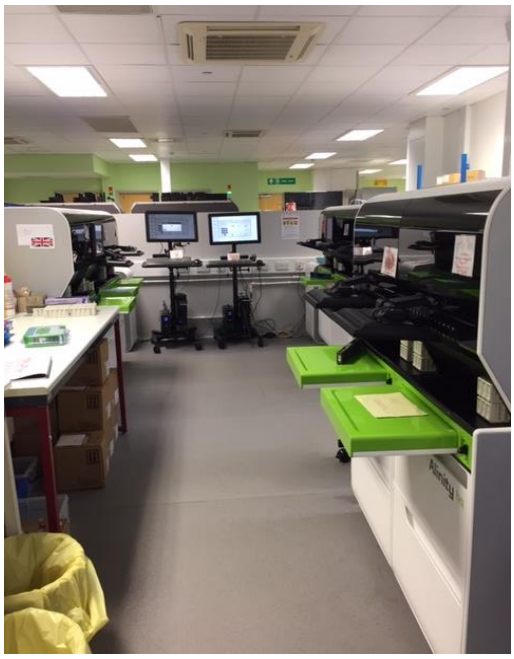
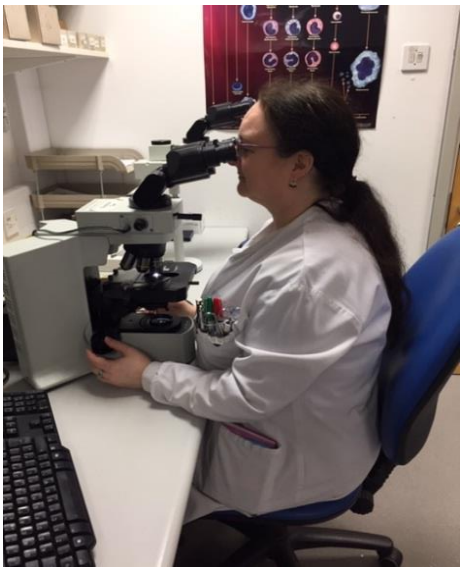
1.1 Haematology and Transfusion

The Haematology Department comprises haematology automation, morphology, coagulation and blood transfusion section

Automation deals with the analysis of Full Blood Count Samples (FBC) to diagnose conditions relating to red cells (anaemia), white cells (infection and leukaemia) and platelets (clotting issues). The analysis uses automated analysers that measure various cell population numbers and sizes. A Biomedical Scientist interprets these results to aid clinicians in the diagnosis of disease or treatment monitoring. This may involve other tests such as blood film morphology. The automation section analyses approximately 3000 samples per day.





Morphology is a subsection of haematology. If an abnormal result is detected in the automation section, a blood film of the sample is made and stained. This allows the Biomedical Scientist to look at the cells for changes in number, size and general characteristics. This can help to narrow down the diagnosis. Approximately 150 blood films are viewed each day.

Coagulation involves the analysis of samples to detect problems in the clotting mechanism that can lead to a patient either being at risk of excessive bleeding or excessive clotting (thrombosis). The samples are analysed on automated machines and the results are interpreted by a Biomedical Scientist. Any abnormal result will require specialist coagulation tests to identify the specific cause of the abnormality and enabling tailored treatment. 700-800 routine coagulation samples are analysed each day with approximately 10 specialised bleeding tests and 80 specialised thrombosis tests processed every fortnight.

Blood Transfusion deals with the identification of a patient's blood group (A, B, AB or O) and v other antibodies testing. Biomedical Scientists are responsible for ensuring donor red cells are compatible with the patient's blood (cross matching), and also for the safe issue of other blood components such as Fresh Frozen Plasma and Platelets. Red cells and other blood products may be required during certain surgical procedures or in emergency situations such as road traffic accidents where patients have lost a lot of blood. Most red cells are required for the treatment of anaemia, secondary to a number of medical conditions. The blood transfusion section processes roughly 300 blood groups tests each day while the numbers of crossmatches can vary. During 2018 over 14000 blood products were issued at the NNUH.

1.2 Clinical Chemistry

Automation is a section of clinical biochemistry looks at the various chemicals, enzymes, vitamins and hormones in the blood and urine to provide information on health and disease as well as monitoring the effectiveness of treatment. Tests are grouped to assess the function of various organs such as the liver, heart, kidney, thyroid and pancreas. Automation receives approximately 7000 samples each day.

Immunology helps diagnose diseases like leukaemia by looking at the proteins on the cell surface. They also provide allergy and autoimmune testing. Immunology receives about 500 samples a day.

Endocrinology specialises in testing proteins as well as various hormones. It also carries out Maternal Serum Screening investigations. The department works with the UEA to provide a specialised Metabolic Bone Service. Endocrinology receives about 500 samples a day.

Toxicology is a specialised area of clinical biochemistry that provides a drug monitoring service for both therapeutic drugs and substance abuse or drug overdose testing. Toxicology also provides a service to coroners and occasionally tests for other medico-legal purposes. Toxicology receives approximately 200 samples a day.

1.3 Cellular Pathology

Microtomy

Histopathology is the study of disease in tissue, with the aim of making a diagnosis on which clinicians can base treatment. The role of the Histology lab is to turn biopsies (small tissue samples) or samples from resections (larger tissue samples or whole organs) into microscope slides for consultant pathologists to examine under a microscope. The Histology lab receives approximately 250 cases each day and creates approximately 250,000 microscopy slides per year.

Description and dissection of specimens received in Histology has traditionally been done by consultant pathologists. Now, dissection of simple specimens is increasingly done by Specialist Biomedical Scientists. Similarly, some experienced Biomedical Scientists are training in more complex specimen dissection and even diagnosis.

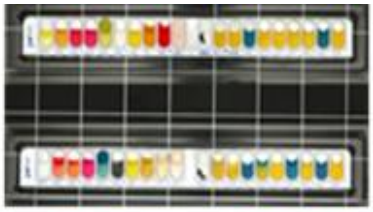
Tissue Dissection

Tissue Staining

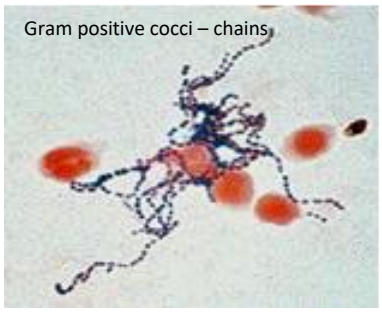
Diagnosis by examination of tissue sections on slides relies on chemical dyes used to stain the tissue to make it visible. This kind of staining remains a routine part of the work. However, pathologists are increasingly relying on immunohistochemistry (using antibodies to target specific proteins involved in disease) or molecular techniques (analysing DNA and RNA). These are techniques that will increasingly contribute to the future of personalised medicine.

1.4 Microbiology

Medical microbiology is the study of micro-organisms which cause infections. These include bacteria, viruses, fungi & parasites. The microbiology department undertakes diagnosis of infections to ensure accurate treatment and the prevention of their spread. Microbiology receives approximately 2000 sample requests each day.

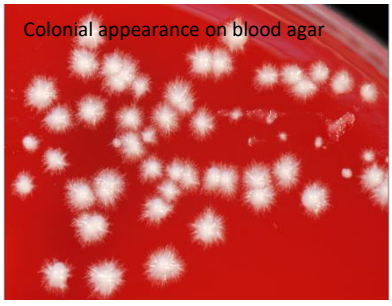


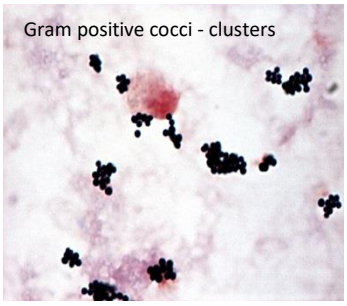

Antibiotic susceptibility testing


Gram positive cocci – chains

The microbiology department uses various techniques to establish evidence of infection. This includes the use of culture media to support the growth of micro-organisms, microscopy, biochemical tests and the detection of antibodies & genetic material.

The microbiology department specialises in testing specimens such as urine, faeces, blood, tissues & swabs for evidence of infection caused by micro-organisms.


Colonial appearance on blood agar


Gram positive cocci - clusters

2 Further Information

The following organisations and websites can provide useful guidance on careers and the profession.

Organisation	Address	Tel. No.	Email	Webpage
Institute of Biomedical Science (IBMS)	12 Coldbath Square London EC1R 5HL United Kingdom	+ 44 (0)20 7713 0214	mail@ibms.org	https://www.ibms.org/
Health Care and Professions Council (HCPC)	Health and Care Professions Council, Park House, 184 Kennington Park Road, London, SE11 4BU	+44 (0)845 300 6184 + 44 (0)845 300 4472	registration@hcpc-uk.org	http://www.hpc-uk.org/
Royal College of Pathologist (RcPath)	The Royal College of Pathologists 6 Alfie Street London E1 8QT	+44 (0) 20 7451 6700	info@rcpath.org	https://www.rcpath.org/
Association of Clinical Biochemists (ACB)	The Association for Clinical Biochemistry and Laboratory Medicine 130-132 Tooley Street London SE1 2TU	+44 (0) 20 7403 8001		http://www.acb.org.uk/

NHS Careers				http://www.nhscareers.nhs.uk/explore-by-career/healthcare-science/
NHS jobs				https://www.jobs.nhs.uk/
Norfolk and Norwich Hospital				http://www.nnuh.nhs.uk/
Apprenticeships - general				https://www.apprenticeships.gov.uk/ https://www.gov.uk/topic/further-education-skills/apprenticeships
Modernising Scientific Careers				Practitioner Training Programme (PTP) https://www.healthcareers.nhs.uk/explore-roles/healthcare-science/studying-healthcare-science Scientist Training Programme (STP) https://www.healthcareers.nhs.uk/career-planning/study-and-training/graduate-training-opportunities/nhs-scientist-training-programme
National School of Healthcare Science	National School of Healthcare Science St Chads Court 213 Hagley Road Birmingham B16 9RG	+ 44 (0) 121 695 2529	nshcs@hee.nhs.uk	http://www.nshcs.hee.nhs.uk/

The Academy of Healthcare Science (AHCS)	Academy for Healthcare Science 6 The Terrace, Rugby Road, Lutterworth, Leicestershire LE17 4BW	+44 (0) 1455 244640	information@ahcs.ac.uk	https://www.ahcs.ac.uk/
Manchester Academy for Healthcare Scientist Education(MAHSE)	Manchester Academy for Healthcare Scientist Education (MAHSE) Room 1.903, Stopford Building University of Manchester Oxford Road Manchester, M13 9PT	+44 (0) 161 3064552	admin@mahse.co.uk	https://mahse.co.uk/