

Careers in pathology



The Royal College of **Pathologists**

Pathology: the science behind the cure

What is pathology?

Pathology is the study of disease. Pathologists work with doctors and nurses in hospitals and GPs' surgeries to diagnose, treat and prevent illness.

Isn't it all about dead bodies?

No, but you wouldn't be alone if you thought this. In a recent survey, over two thirds of people thought that pathologists worked only with the dead, as shown in television programmes like *CSI* and *Silent Witness*. In fact, although some pathologists do perform autopsies (also called 'post mortems'), this is only a small proportion of their work and the majority of pathologists work for the benefit of living patients. Every time someone has a blood test, cervical smear or a lump removed, it's a pathologist who looks at the specimen to work out if there's any disease present or not.

The reality

Pathologists don't all do the same job. There are 18 different specialties, with their own training programmes and exams. Pathologists work in laboratories, in clinics and on hospital wards. You might meet some of them face to face, but others work behind the scenes, providing the information that other doctors need to make a diagnosis and decide what treatment to offer.

The importance of pathology

Millions of pathology tests are carried out every year – over 14 tests for every man, woman and child in the country. Many major advances have been made by pathologists, for example in the treatment of cancer, ensuring safe blood transfusions, developing vaccines against infectious diseases and the treatment of inherited conditions.

Pathology specialties

The four main pathology specialties are **histopathology** (the study of disease in human tissue), **haematology** (the study of disorders of the blood), **clinical biochemistry** (the study of chemicals in the blood and other fluids) and **medical microbiology** (the study of infection). You can read more about these in this booklet. You can also find out about some of the other specialties, including immunology, genetics and toxicology.



Did you know?

Pathology is involved
in 70% of all diagnoses
made in the NHS

Histopathology

What is it?

Histopathology is the study of disease in human tissue.

What type of work?

Histopathologists look at tissues and cells removed from patients in the clinic or during an operation. They use a range of scientific methods to discover if a disease is present and what course of action needs to be taken. The tissue is first examined with the naked eye to look for any visible abnormalities and to select pieces to examine in more detail. These small pieces are treated with chemicals so that very thin slices can be cut. The slices are stained to show different parts of the cells and examined under a microscope. The histopathologist tells the patient's doctor what is wrong and often provides information about the correct treatment to give.

Histopathologists sometimes look at tissue while the patient is having an operation. The surgeon removes a small amount of tissue and waits for the histopathologist to make a diagnosis before deciding how to proceed. The patient is asleep while this is going on and knows nothing about it. Histopathologists are the people who diagnose cancer and other serious illnesses – but they also often have good news, for example discovering that a lump or mole is completely benign and nothing to worry about. Some histopathologists also carry out autopsies (post mortems) to find out why someone has died.

What skills are needed?

Histopathologists need **good attention to detail** for examining tissue and diagnosing disease. Many diseases look very similar, so being able to spot small differences is important.

They need to be able to **work under pressure** and make **critical decisions** every day, as their interpretation of what they see under the microscope will determine what treatment the patient is given.

Histopathologists must have a high level of **self-motivation** and be able to work both alone and as part of a team. **Good communications skills** are essential for discussing the relevance of microscopic findings with colleagues.

Exciting developments

Histopathologists are at the forefront of research into many common diseases such as cancer.



Did you know?

13 million slices of tissue are examined by histopathologists in England every year

Haematology



What is it?

Haematology is the study and treatment of disorders of the blood cells and bone marrow.

What type of work?

Haematologists investigate, diagnose and treat diseases such as anaemia, leukaemia and lymphoma. They also care for patients with blood-clotting abnormalities and are responsible for ensuring that blood transfusions are safe and available when they are needed. Haematologists work in laboratories as well as with patients in clinics and on the wards. They can be involved throughout the patient's journey, from the first hospital visit, through laboratory diagnosis to treatment. Hundreds of thousands of blood tests are done every day. Haematologists give advice to other doctors about any abnormalities that show up and may recommend further tests to get to the bottom of the problem.

What skills are needed?

Haematologists work with many groups of staff as well as with patients, so they need **good interpersonal** and **written communication skills**. They need to be able to discuss complex test results with scientists and doctors, and explain complicated diseases and treatments to patients and their relatives. Haematologists also need a very **broad understanding of medicine** as they treat patients who may have complicated medical problems. Haematologists are members of The Royal College of Physicians as well as The Royal College of Pathologists to reflect this wide role. They also take two sets of exams!

Exciting developments

There have been enormous advances in our understanding of blood proteins and the management of many conditions has been transformed in the last 20 years. Exciting and sophisticated new drugs have been developed to treat previously fatal conditions such as leukaemia and lymphoma. The preparation of blood products has improved the safety of transfusions and the treatment of clotting disorders.

Did you know?

Over 130 million haematology tests are performed in England every year



Medical microbiology



What is it?

Medical microbiology is the study of infectious diseases.

What type of work?

Medical microbiology used to be a lab-based specialty but microbiologists now spend a lot of time on the wards, seeing patients and advising on the investigation and treatment of all types of infection.

Microbiologists give advice about the best sample to collect in order to diagnose an infection, e.g. a swab, blood test or urine test. They then work with scientists in the laboratory to discover what's causing the infection. It might be a virus (e.g. influenza), a bacterium (e.g. MRSA) or a fungus (e.g. thrush). Once the organism causing the infection has been identified, the microbiologist gives advice about how to treat it.

One of the most important roles of the microbiologist is to ensure that antibiotics are prescribed and used appropriately. If antibiotics are prescribed for the wrong infection or over-used, they might not work when they're really needed.

Another important role of microbiologists is infection control: stopping infections spreading from one patient to another.

What skills are needed?

Microbiologists need to be **good communicators** as they work with many different people. They also need to be **patient, inquisitive and persistent** as infections don't always respond immediately to treatment and a second or third treatment is sometimes necessary.

Exciting developments

Medical microbiologists are on the frontline in the battle against antibiotic resistance, whether it's developing and testing new drugs or monitoring the spread of resistance to an infection. Microbiologists have the difficult task of tackling 'superbugs' and are at the forefront of research into new and serious infectious diseases.

Did you know?

70% of species of bacteria are yet to be discovered

Clinical biochemistry

What is it?

Clinical biochemistry (also known as chemical pathology) is the study of the chemicals in body fluids such as blood or urine.

What type of work?

Knowing the contents of body fluids can help doctors make a diagnosis or indicate if an organ is not working properly. Fluids such as blood, urine, saliva and spinal fluid are tested in laboratories and the results are interpreted by pathologists and scientists. For example, the level of sodium or glucose in the blood helps doctors diagnose and treat diseases like kidney failure or diabetes. By looking at a range of chemicals, sometimes over several days, clinical biochemists provide information about how a patient's heart, liver, kidneys or pancreas are working.

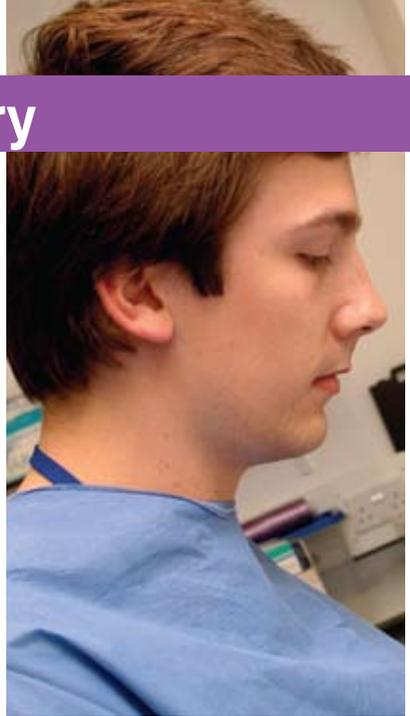
Pathologists in this specialty often hold clinics for patients with chemical disorders such as high cholesterol.

What skills are needed?

As in the other pathology specialties, those working in clinical biochemistry need a good general **medical knowledge** so that they can interpret test results for individual patients. They also need **good communications skills** so they can pass on their expertise to other doctors and to patients. **Leadership and organisational skills** are also essential when running a laboratory and interacting with the many other specialties that rely on the service.

Exciting developments

Many clinical biochemistry tests can now be performed at the patient's bedside or in their home. This is called 'point-of-care testing' and has the advantage that patients may not have to travel to the hospital or leave their bed to have their test. The results are usually available immediately so there's no waiting to find the answer. This exciting development is welcomed by those working in clinical biochemistry as it can improve the service that patients receive. However, not all tests are at the same high standard as those in the clinical biochemistry laboratory, so care must be taken to make sure that the tests are accurate. Pathologists are involved in important debates to make sure that the tests available outside the lab are safe and reliable.



Did you know?

The current test for diabetes involves a chemical test for glucose in the blood, but originally doctors tested the patient's urine by tasting it to see if it was sweet!

Other specialties

Some of the broader specialties include sub-specialties where pathologists have gone on to specialise in a particular area. Histopathology, for example, includes neuropathology (the study of diseases of the brain and nerves), dermatopathology (the study of diseases of the skin) and paediatric pathology (the study of disorders of babies and children).

Cytopathology

Cytopathology is an important sub-specialty within histopathology. It involves studying cells to diagnose disease, for example following a cervical smear.

Virology

Virology is a sub-specialty of medical microbiology. It is the diagnosis and treatment of infections such as HIV and hepatitis.

Immunology

Immunology is the study, investigation and treatment of disorders of the immune system such as immunodeficiencies, allergies and organ-transplant rejection.

Forensic pathology

Forensic pathology is the specialty that most people have heard of. It involves the investigation of suspicious deaths, for example following murder.

Genetics

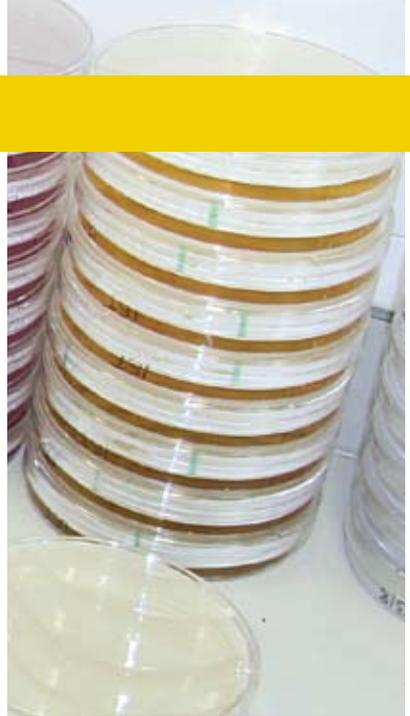
Genetics is the study of the underlying cause of disease, looking at the DNA in normal and abnormal cells to find out why a disease has developed and whether it might be passed on to the next generation.

Toxicology

Toxicology is the study of drugs in the body tissues and fluids, for example working out if someone has been poisoned or taken an overdose.

Veterinary pathology

Veterinary pathology is the study and treatment of diseases in animals. Vets specialise in pathology after their general training, just as pathologists do.



Did you know?

On average, every person in England has 14 tests per year, diagnosed by a pathologist

You don't have to be a doctor...

In addition to medically qualified pathologists, other types of experts are also needed within the various pathology specialties:

Clinical scientists are skilled science graduates who work in areas such as clinical biochemistry and clinical embryology. They may be responsible for all aspects of the work of a laboratory and work alongside medically qualified colleagues.

Biomedical scientists are also science graduates and work in specialties such as histopathology and haematology. Their expertise is in performing the millions of tests that are carried out in laboratories every year.

Medical technical officers provide technical support and work in specialised areas such as the mortuary.

Medical laboratory assistants provide technical assistance in laboratories and play an important role in the work of a pathology laboratory.

Cervical cytology screeners are the highly skilled people who examine cervical smears and other cytology specimens, helping to make the UK Cervical Cancer Screening Programme the best in the world.

Phlebotomists take blood from patients for testing and may be involved in point-of-care testing at patients' bedsides.

Administrative and clerical staff support the work of everyone in pathology departments, making sure that results are typed accurately and reach the person requesting the test promptly.

IT staff provide the computer infrastructure that is essential in a modern hospital and in the community, making sure that GPs and other doctors can look up pathology results wherever they are.



For further information

To find out more about a career in pathology, please visit The Royal College of Pathologists' website at www.rcpath.org. If you'd like to attend a pathology careers event or invite a pathologist to your school to discuss career opportunities, please contact Ruth Semple, our Outreach Project Manager, on ruth.semple@rcpath.org or **020 7451 6753**.

To order more copies of this leaflet or for more details about pathology training, please contact Jenny Maddocks on training@rcpath.org or **020 7451 6741**.