

# Pathology: at the heart of your health

A journey through your life and how pathologists can help you



## Here, we show you the vital role of pathology during your life.

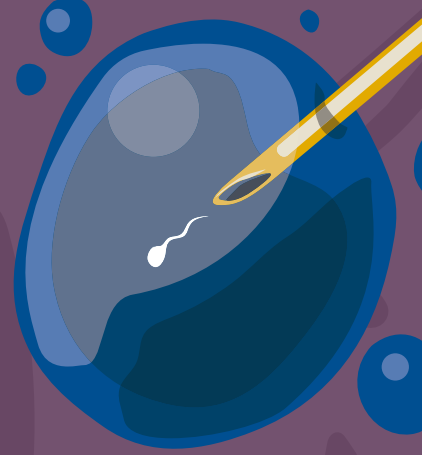
### What is pathology?

Pathology is the study of disease. **Pathologists, who could be doctors or healthcare scientists**, help all of us by diagnosing, treating and preventing illness. There are 17 specialty areas in pathology. Here's how the people who work in different specialties can help you through periods of both health and illness.

## Conceiving a baby

### IVF involving pathologists working in reproductive science

Consultant pathologists working in reproductive science are experts in diagnosing infertility. They also investigate and offer advice on treatment options, such as in vitro fertilisation.



## Newborns

### Newborn screening involving pathologists working in genetics

All newborn babies have a blood test known as the 'newborn heel prick test' to screen them for nine genetic health conditions, including cystic fibrosis and sickle cell disease. The results of these tests are analysed and reported by pathologists working in genetic medicine. As advances in technology have allowed us to study DNA in ever greater detail, genetics and genomic medicine have become an important weapon in the fight against disease. Doctors and scientists working in genetics diagnose inherited diseases and advise families on treatment.

## Babies

### Investigation of conditions affecting babies

Perinatal pathologists diagnose and investigate disease processes that affect unborn babies and infants, for example, blood disorders, childhood cancers and hormonal disorders. They also provide insight on treatment options and delivering treatment.



## Toddlers

### Allergy diagnosis and treatment involving immunology

Diagnosis and treatment of a food or other allergy in a toddler involves pathologists specialising in immunology. Immunologists deal with the study, diagnosis and management of people with immune deficiency or other immunological problems.

However, allergic disease can start before children become toddlers, and impact throughout all of life, both persisting and starting well into adulthood.

## Child under 12

### Diagnosis and treatment of bacterial infection involving medical microbiology

Ear, nose and throat infections are common in children because they are in regular close contact with other children. While many of these are viral infections that do not cause serious illness, occasionally a child can get a bacterial infection that needs to be diagnosed and treated with antibiotics. Pathologists advise on clinical and laboratory diagnosis of infection, identify the best treatment for infectious diseases and monitor patients following treatment.



## Teenagers

### Treatment of teenage cancer with a bone marrow (stem cell) transplant involving pathologists working in histocompatibility and immunogenetics (H&I)

Cancers in teenagers are thankfully rare but some types are more likely to occur than others – one in five cancer cases in those aged 15 to 24 are lymphoma. Treatment of teenage patients with this type of blood cancer often involves a bone marrow or stem cell transplant after chemotherapy. H&I scientists ensure that the donated stem or bone marrow cells are compatible with the recipient to lessen the chances of rejection.

Haematologists will be involved throughout the patient's journey from diagnosis to management including chemotherapy and bone marrow transplant, if needed, and also their long-term follow-up after treatment.

Molecular pathologists examine molecules, particularly DNA, within organs, tissues or bodily fluids to study and diagnose diseases using various diagnostics. Molecular tests check for specific changes in genes or chromosomes that can cause disease, such as cancer and infectious diseases. Molecular pathologists have an important role in personalised medicine, which identifies patients who can benefit from targeted therapies based on the specific characteristics of the tumour present.

## Young adults

### Cervical screening involving cellular pathology

Cervical screening looks to detect the very earliest sign of abnormality that, if left untreated, could lead to cervical cancer. This is done by first looking for the virus associated with cervical cancer using a molecular test. Samples that are virus positive are then looked at under the microscope to check for changes to the cells. Cytopathologists are a type of cellular pathologist that look at individual cells taken from any site in the body under the microscope, including the cervix. Cellular pathologists are doctors and scientists who diagnose and study diseases including cancer, such as cervical cancer, and inflammatory diseases, such as ulcerative colitis, in tissues and organs by looking at human tissue. This can be done using a microscope, but they can also use other diagnostic tests to help diagnose and guide treatment.



## University years

### Diagnosis of 'Freshers Flu' involving virology

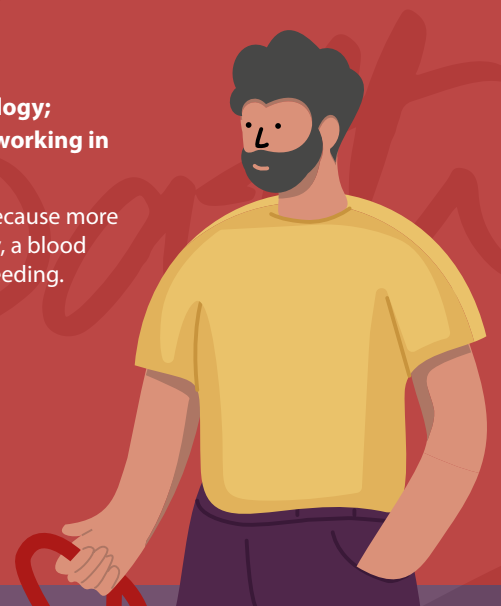
Virologists are pathologists who oversee the diagnosis, management and treatment of patients with viral infections, from common viruses like chickenpox and flu, to emerging infections like Ebola.

## Pregnancy

### Diagnosis and treatment of anaemia involving haematology; blood transfusion involving clinicians and pathologists working in transfusion medicine

Iron deficiency anaemia is very common during pregnancy because more iron is needed for the baby to grow and develop. Occasionally, a blood transfusion is required after giving birth due to very heavy bleeding.

Haematologists are involved in the diagnosis and treatment of anaemia and other conditions including clotting disorders and blood cancer in children and adults. Haematologists are experts in blood cells round the body and the blood cell factories of the bone marrow. They care directly for patients on hospital wards and in out-patient clinics, and carry out diagnostic work in laboratories.



## Family pets

### Diagnosis of a fungal infection in a cat involving veterinary microbiology

Veterinary pathologists investigate infectious diseases in pets and farm animals, as well as exotic species. For example, if your pet cat has a suspected bacterial, fungal or viral infection, a veterinary microbiologist will test a clinical sample for signs of one of these infectious agents.

A family take their itchy cat to the vet and samples are sent to a veterinary microbiologist who diagnoses ringworm (a fungal infection that can be transmitted to humans. This transmission is called zoonosis). The owner mentions that they also have a rash and the vet recommends the owner visits their GP to get it examined. The investigation of such infections in animals can involve clinical pathologists, microbiologists and anatomic pathologists in the diagnostic process.



### Diagnosis of a bone tumour involving anatomic veterinary pathology

Anatomic veterinary pathologists undertake post-mortem examinations and study cellular changes in tissues by examining them using a microscope. For example, if your pet dog has a suspected tumour, an anatomic pathologist will analyse a biopsy from the tumour to determine if it is benign (not cancerous) or malignant (cancerous). Veterinary pathologists work in animal disease surveillance, prevention, diagnosis and treatment. They play a key role in the development of safe and effective medicines and vaccines for animals and humans. They also contribute to animal conservation and protection, and public health.

## Mid-life

### Diagnosis and management of diabetes involving chemical and clinical pathology

Diabetes is a condition that causes a person's blood glucose level to become too high or too low. Nearly 5 million people in the UK have diabetes. Around 90% of them have type 2 diabetes and the risk of developing this condition increases with age. Chemical pathologists and clinical biochemists monitor bodily fluids like blood and urine to detect important changes in the body's chemistry. They investigate test results and meet patients in person to support their treatment.

### Diagnosis of brain tumour

Some types of brain tumours, such as glioblastomas, present more commonly in adults of this age range. Common symptoms at presentation include headaches or seizures. A neuropathologist diagnoses the type of tumour using a sample of tissue taken from the brain and uses information from molecular testing to decide on the best treatment.

## Retired years

### Skin cancer diagnosis and treatment involving histopathologists and dermatopathologists

Skin cancers such as melanomas are common cancers that are diagnosed by cellular pathologists, who are expert doctors responsible for diagnosing and studying disease in tissues and organs. Dermatopathologists are histopathologists with a special interest in skin disease. They can be involved in the diagnosis and treatment of skin cancer as well as other skin rashes and lumps. More than a quarter (29%) of all new melanoma skin cancer cases in the UK are diagnosed in people aged 75 and over.



## At the end of your life

### A post mortem can involve a range of specialties including psychopathology, toxicology and microbiology

A post mortem is the examination of a body after death. Coronial autopsies are performed by forensic pathologists as part of the legal process of investigating how someone died. However, most post mortems are not forensic (i.e. there is no suspicion that the death may be criminal) and are requested by doctors, to provide more information about an illness or the cause of death, or to further medical research. They can only go ahead with the consent of a close relative of the person who has died.

Histopathologists carry out post mortems in an examination room that looks similar to an operating theatre. They take small samples of organs and tissues to examine under microscopes. They may also send samples from the body for toxicology and medical microbiology tests to check for infectious agents. In hospitals, toxicologists analyse samples from patients who have, for example, taken recreational drugs or overdoses of prescription medicines. Neuropathologists are involved in examining the brain as part of the post-mortem investigation.

Forensic pathologists perform post-mortem examinations to determine the cause of death, including cases where a crime is suspected. They collect, examine, and interpret tissue specimens under the microscope, as well as documenting and interpreting injuries, including on living victims. They provide scientifically objective expert reports for the police, coroners, procurators fiscal and solicitors, and give expert evidence in crown, family and coroners' courts, among others. Their findings have an important role in improving public health.

If you want to find out more information, please visit **Discover Pathology at:** [www.rcpath.org/discover-pathology](http://www.rcpath.org/discover-pathology)