Plants, pathologists and disease

You may have heard of pathology before in the medical and veterinary sciences... but did you ever think that pathologists might be interested in plants too? Well, they are...

Plants are essential for our health and well-being.

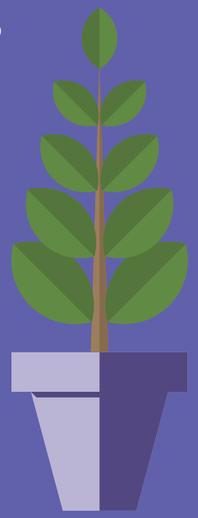
Plants provide:

- a valuable source of nutrition
- a source of drugs to treat disease
- a vehicle for producing new innovative disease treatments

Have a look at our exhibit and find out more about the different plants and their amazing roles in treating or preventing disease.

Plants included in this exhibit are:

Tobacco plants
Nicotiana tabacum is used to prepare monoclonal antibodies to prevent *HIV infection.*

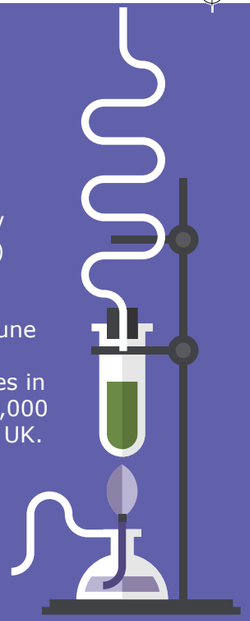


White willow
Salix alba is the original source of aspirin. As well as being a great painkiller, aspirin can be used to prevent miscarriage.

Vegetables
(such as kale, tomatoes, peas, chard and spinach) in our diets can prevent *scurvy.*

Yew
Taxus is used to prepare Paclitaxel treatment for treating *ovarian cancer.*

There's another side to tobacco...



Tobacco plants aren't all bad. They can be used to prevent HIV (human immunodeficiency virus) infection.

HIV causes AIDS (acquired immune deficiency syndrome), which originated in non-human primates in Sub-Saharan Africa. Around 100,000 people are living with HIV in the UK.

Although antibodies are naturally made by our white blood cells to protect us against infection, by making antibodies outside the body, doctors can treat diseases such as HIV on a larger scale.

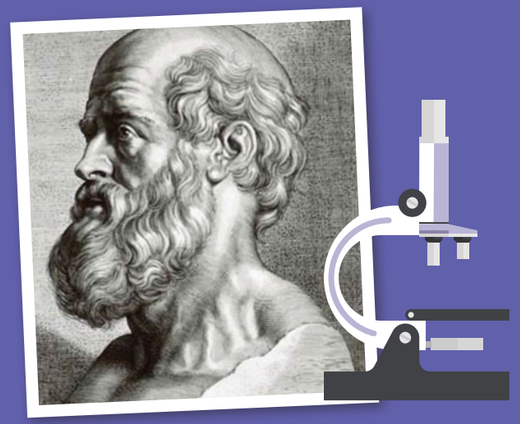
Tobacco plants *(Nicotiana tabacum)* are grown in specialist greenhouses under controlled conditions. The genes for the anti-HIV antibodies are incorporated into the DNA of tobacco plants, resulting in tobacco plants producing the antibodies in their leaves.

The juice is extracted from the young leaves and is filtered and purified. This can then be made into a vaginally applied anti-HIV cream or gel, which can help women who need protection from HIV transmission during unprotected sex.

Willow... it's not just about cricket bats!

Aspirin, derived from white willow, has been used for centuries to relieve pain. A less well known use is the prevention of miscarriage.

In the 5th Century BC, the Greek physician Hippocrates took the bitter powder from the bark of willow trees and used it to reduce fever and ease aches and pains. Aspirin is a synthetic drug based on this bitter powder.



Miscarriage affects up to one in four pregnancies and is defined as the unintended loss of a pregnancy before 24 weeks. Most miscarriages occur between the 6th and 12th week of pregnancy and the cause is usually not known.

One possible cause is the production, by the mother, of autoantibodies that make her blood more likely to clot. If blood clots in the placenta it may cause a miscarriage. A low dose of aspirin may be used to thin the blood, preventing clotting and reducing the likelihood of miscarriage.

The Royal College of Pathologists is a professional membership organisation committed to setting and maintaining professional standards and to promoting excellence in the teaching and practice of pathology. It is a registered charity and has over 10,000 members working in hospital laboratories, universities and industry worldwide.

Today pathology consists of 19 different specialties, including cellular pathology, haematology, clinical biochemistry and medical microbiology. It is the science at the heart of modern medicine and pathologists are vital to the diagnosis and clinical management of disease. Pathologists explain why and how people fall ill and help determine the best treatment for the patient.

Forensic pathology is often represented on TV shows such as *CSI* and *Silent Witness*, but this specialty only accounts for about 1% of pathologists. 99% of pathologists work around the clock for the benefit of the living. If you've ever had a blood test, biopsy or cervical smear the sample will have been analysed by a pathologist. To highlight the importance of pathology in everyone's health care the College runs a public engagement programme which includes the very successful National Pathology Week.

www.ilovepathology.org
www.rcpath.org
@rcpath

We hope you enjoyed the exhibit. Please tell us what you thought by tweeting **@rcpath #RCPathCFS**

This garden is sponsored by Roche Diagnostics UK and Ireland.

Roche Diagnostics plays a key role in people's health by producing tests that help people to understand their risk of developing a disease, diagnose disease, to predict how the disease may progress and enable treatment decisions to be made.

Roche

The Royal College of Pathologists
Pathology: the science behind the cure

Eat more veg!

We all know we need to eat plenty of fresh vegetables, especially the ones high in vitamin C. But why?

A lack of vitamin C (ascorbic acid) means the body can't make collagen. Collagen is a protein needed for healthy skin, blood vessels, bones and cartilage. Without collagen, the tissues break down leading to muscle and joint pain, tiredness, red spots on the skin and swelling and bleeding gums.

This disease is known as scurvy.

It is a rare disease in places where fresh fruit and vegetables are readily available, but even with so many vitamin C-containing foods around, some people just don't eat them.

Scurvy can be treated with vitamin C supplements and prevented by eating vegetables (kale, peas, chard and spinach) and fruit (oranges, melons, papaya, grapefruit, strawberries, kiwi and mango) high in vitamin C.

Check yew out!

In 1962, Paclitaxel from the bark of the Pacific yew, *Taxus brevifolia*, was discovered. It is used to treat a number of cancers, including ovarian cancer, which affects the small organs in the female reproductive system.

In the UK, every year over 7,000 women are diagnosed with ovarian cancer. It is often difficult to recognise, because the symptoms are non-specific and may include bloating, pain in the lower abdomen and finding it difficult to eat.

Paclitaxel works by stopping cells from dividing, which is how it prevents the cancer from growing and spreading.

At the moment, all Paclitaxel production uses plant cell fermentation technology. This is where specific yew cells are grown in large fermentation tanks and the Paclitaxel is then extracted directly and purified by chromatography.

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