

ANIMAL RESEARCH IS HELPING TO BEAT CANCER SOONER



CANCER
RESEARCH
UK

WHAT WE DO

Our vision is to bring forward the day when all cancers are cured.

'Thousands of people are alive today thanks to research. Animal studies have played an important part in this progress.'

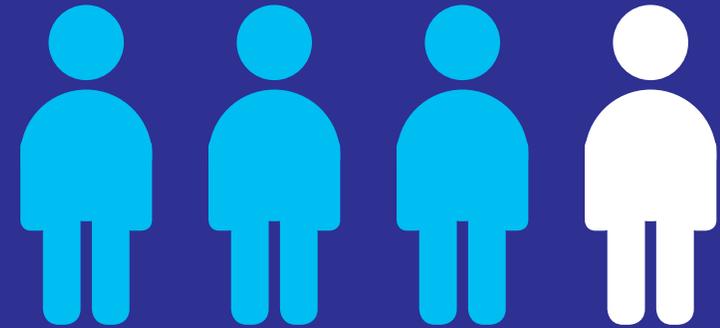
Professor Karen Vousden,
Chief Scientist,
Cancer Research UK

Thanks to our supporters, our scientists are making cutting-edge discoveries every day, finding better ways to prevent, diagnose and treat cancer.

Our world-class research – which includes studies involving animals – has helped double survival rates over the last 40 years.

But with cancer set to affect 1 in 2 of us in the future, there's still much more to do if we're going to beat it.

Today 2 in 4 patients in the UK survive cancer.



Our ambition is to accelerate progress and see 3 in 4 patients surviving cancer by 2034.

WHY DO WE NEED ANIMAL RESEARCH?

Research involving animals is essential for us to save lives. Most cancer treatments used today wouldn't exist without this type of work.

Studying animals helps us to understand more about cancer so we can find better ways to detect and treat it. This includes discovering the faulty genes that cause cancer, investigating how cancer grows and spreads, and exploring how our bodies can help fight tumours.

Animal research is also an important way to develop new drugs, radiotherapy and surgical techniques.

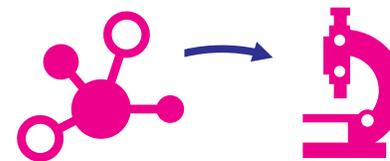
It's the law in the UK that all new drugs are tested in animals before they can be tested in people. This minimises the risk to cancer patients during the development of new cancer drugs.

Researchers who study animals must show that there is no alternative, they have involved the smallest number of animals possible, and every step has been taken to minimise distress.

HOW ANIMALS CAN BE INVOLVED IN DEVELOPING DRUGS

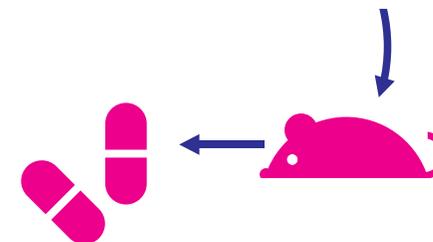
Much of the research we fund doesn't involve animals. Of the projects we support that do, more than 9 in 10 are studies of mice – others may involve fish or frogs. All animals involved in research are bred in licensed facilities to make sure the scientific findings are accurate and reproducible. One of the ways animals can be involved in cancer research is testing new drugs.

Researchers find a promising molecule to target in cancer cells.



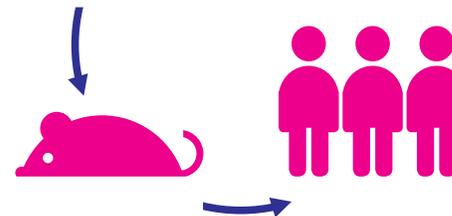
Scientists develop a chemical that blocks the molecule, and test it on cancer cells growing in the lab.

If the chemical is effective in mice, researchers go back to the lab and turn their idea into a drug.



If the chemical works well in the lab, the next step is testing it in mice to see if it works on tumours in the body.

The drug is tested again in animals to make sure it's safe, and to find out what dose works best and if there are any side effects.



Doctors can now apply for a licence to test the new drug in people with cancer.

ANIMAL RESEARCH IMPROVES CANCER TREATMENT

Animal research has made a real difference for people with cancer.

Science involving animals has been vital for discovering drugs like tamoxifen for breast cancer. And scientists first spotted the potential of Glivec – a drug that cures people with chronic myeloid leukaemia – in research involving mice.

Antibody treatments were also developed thanks to animal studies, leading to treatments like cetuximab for bowel cancer, and drugs that harness the body's immune system to fight cancer.

Animal research has been crucial for improving radiotherapy and surgery.

For example keyhole surgery was first tested in animals. And developing ways to prevent cancer, such as the cervical cancer vaccine, relies on animal research.

Understanding how faulty genes cause cancer couldn't be done without animal research, because researchers need to look at the whole body, rather than individual cells or tissues. Genetic engineering – something that can't legally be done in people – helped scientists prove in mice that faulty versions of genes like BRCA1 cause many cancers.

MORE MEN WITH PROSTATE CANCER LIVING LONGER

Prostate cancer is the most common cancer in UK men, claiming thousands of lives every year. Treatment often involves a combination of surgery, radiotherapy and chemotherapy. But, sadly, some men's cancer returns.

Thanks to our research, there is hope. In the 1980s scientists discovered that an anti-fungal drug could stop cells making testosterone – the hormone

that drives prostate cancer growth. But this drug had to be taken several times a day and it had serious side effects. Men needed a better alternative.

Our researchers went on to develop a new drug called abiraterone. Animal research was needed to find out if it would be more effective and have fewer side effects. Our scientists discovered that mice given abiraterone once a day for two weeks had virtually no testosterone in their blood.

This proved the drug stopped the hormone being produced. The mice also experienced fewer side effects.

Thanks to this vital research, doctors had sound evidence to take abiraterone into clinical trials. This drug is now available to men with advanced prostate cancer, giving them more time with their loved ones and a better quality of life while taking the drug.

HOW RESEARCH ANIMALS ARE CARED FOR

Animal research is crucial to beating cancer, so it's important our researchers take every step to protect animals' welfare.

Highly trained and qualified staff, including specialist vets, look after research animals. The work is governed by strict laws and must be carried out by licensed people at licensed premises, which have to meet standards of care.

Animals' environment must be carefully controlled according to what they need. This includes things like the right lighting and temperature, correctly sized cages to avoid overcrowding, and having bedding and toys. Animals are also checked daily for health problems.

Many procedures involving animals are mild, like being scanned or having a blood sample taken. When a more invasive procedure is done, animals are given pain relief and monitored closely for signs of distress. If an animal's life needs to be ended it's carried out humanely to give them a fast, pain-free death with minimum distress.

All animal research is approved by an ethics panel including members of the public. They must agree the work is necessary, the animals are being cared for correctly and the potential benefits are worthwhile.

REDUCING THE NUMBER OF MICE INVOLVED IN DRUG TESTING

We can't develop drugs without involving animals yet, but our researchers are helping to reduce the number needed. This example shows how our scientists have developed **microsampling**, a technique to reduce the number of mice involved in drug testing.

OLD TESTING METHOD

 2 untreated mice for comparison

NEW MICROSAMPLING METHOD

 1 untreated mouse for comparison

Mice are given a drug either by mouth or an injection, then researchers measure the amount of drug there is in the mice's blood at five points in time.

At each point in time 4 mice were humanely killed to collect enough blood to test.



Total mice needed: **22**

Thanks to modern, sensitive equipment, researchers only need a small blood sample, taken using a fine needle.



The same 4 mice are tested before treatment at each point in time.



Total mice needed: **5**

THE FUTURE

Animals are only part of the story. Researchers study cells grown in the lab, examine samples of human tumours, and use computers to model cancer cells virtually.

Our scientists are helping to improve animal research by developing ways to: **replace** animals; **reduce** the number of animals needed (see p. 9); and **refine** experiments to limit distress to them. Here are some examples.

Modern imaging techniques that track cancer in a single animal as it develops and spreads mean fewer animals are needed for each study.

Scientists are designing tests to predict side effects of new cancer treatments using small samples of human blood. This might mean fewer animals are needed to check a drug's safety.

Researchers are developing artificial tumours grown in the lab. This will help them uncover how tumour cells communicate with the healthy cells around them – a process key to the growth and spread of cancer. These artificial tumours could replace the use of animals to study these relationships.

Completely replacing all animals in research is not yet possible. For now we will continue funding the highest quality research – including research involving animals – to help beat cancer sooner.



RESEARCH IS BEATING CANCER SOONER

cruk.org

Download a copy of this leaflet at cruk.org/leaflets

For general enquiries call **0300 123 1022** or email supporter.services@cancer.org.uk

Photograph p. 7: LRI EM Unit

Cancer Research UK is a Registered Charity in England and Wales (1089464), Scotland (SC041666) and the Isle of Man (1103).

ARL001: January 2017

