

# What are the alternatives to animal research?

At the start of the 21st Century, non-animal techniques have become the cutting edge of medical research. A range of alternative methods that frequently prove cheaper, quicker and more effective - as well as saving lives is replacing animal experiments.

## Cell Culture

It is possible to obtain human cells and tissues from biopsies, post-mortems, placentas, or as waste from surgery, and grow them in the laboratory. Cell cultures are used in many medical fields, and have contributed enormously to our understanding of the underlying mechanisms of cancer, Parkinson's disease, and AIDS. Cell cultures are routinely used in vaccine production, toxicity testing, drug development, and to diagnose disease.

It is important that human cells, rather than animal cells, are used for medical research, to avoid the problem of relating results from one species to another. To encourage the use of human tissue the Dr Hadwen Trust has helped establish the Human Tissue Bank at Leicester. The Trust has funded research using human cells and tissues to replace animal experiments, into Alzheimer's disease, cancer, rheumatism, cataracts, allergies, meningitis, and more.

## Molecular Methods

Technological advances are resulting in new and improved molecular methods for analysing and identifying new compounds and medicines. The Trust has provided analytical equipment to researchers selecting new anti-cancer and anti-malaria drugs, based on their molecular interaction with DNA, as an alternative to selecting drugs by animal tests.

Research at the molecular level is being used to understand the biochemistry and genetics underlying various illnesses, and leading to better treatments. A Trust researcher is using newly devised technology to rapidly analyse DNA from patients all over Europe and identify genes that predispose individuals to fibrosing lung disease. This approach is an alternative to modelling the illness in animals such as genetically modified mice.

## Micro organisms

Tests with simple microorganisms, such as bacteria and yeasts, are being used as early indicators of chemicals likely to be harmful, and are frequently faster, cheaper and more humane than animal tests. Bacteria can be genetically manipulated to manufacture useful products previously obtained from animals, such as human insulin and monoclonal antibodies.

The Trust's research into diabetes successfully used a microscopic organism called Hydra, as an alternative to diabetic animals. Whilst another Trust researcher has developed a test-tube method of growing the microbes responsible for causing sleeping sickness, a fatal tropical illness, replacing the mice normally used for research into this disease.

## Computer Models

Computers are increasingly being used to model the structure and actions of new drugs, and to predict their safety. Computer models of whole biological systems are now being developed on which experiments can be conducted, as alternatives to experiments on animals.

The Trust has funded research on various computer models including a model of the human placenta and foetus to study problems affecting unborn babies; and a model of the human jaw and teeth for dental research. These models are based on relevant human data and can be used to carry out simulated experiments, in place of experiments on animals. We have also supported work using mathematical modelling to improve cancer treatments, and to explore illnesses of ageing.

## Population Research

Studying the diseases in human populations, and the effects of lifestyle, diet and occupation, has already revealed a great deal about cancer, heart disease, osteoporosis, and birth defects. Such information is vital to improving human health and providing clues to the causes of illnesses. The Trust is funding part of a large population study into how foetal and infant growth influences the development of heart disease in later life, as an alternative to experiments on pregnant animals.

## Volunteer Studies

One of the best ways to conduct medical research is by studying the whole human being. New scanning and imaging techniques are making it increasingly possible to conduct safe and ethical studies of human volunteers, where previously animals had been used.

Trust projects use a variety of sophisticated imaging techniques to non-invasively investigate the intact human body. These include using a MEG scanner to study epileptic patients; investigating pain in patients with fMRI; and developing a novel technique, TMS, to study the function of the human brain in healthy volunteers.

### REFERENCE

The above extract is from the website of the Dr Hadwen Trust for Humane Research:  
<http://www.drhadwentrust.org.uk/>



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