



CANCER
RESEARCH
UK

GENES AND INHERITED CANCERS

Our work on inherited cancers (also known as familial cancers) isn't just helping people with a strong family history – it's setting the stage for new treatments and better ways to prevent or detect the disease for everyone.

GENES AND CANCER

Our genes give our cells the information they need to work properly. Cancer can develop when certain genes are damaged and become faulty. This damage usually occurs by chance or through exposure to harmful substances such as tobacco smoke.

WHAT IS INHERITED CANCER RISK?

A person's risk of cancer increases if they inherit faults in their genes (mutations) from their parents. While most faults that cause cancer are not passed from parent to child, some mutations can run in families and being born with one makes it easier to reach the number of mutations needed for a tumour to form. So these inherited faults put the people carrying them – known as carriers – at a higher risk of cancer.

WHICH FAMILIES ARE AT HIGH RISK?

Having lots of cases of cancer in a family doesn't necessarily point to an inherited fault – it's more likely due to chance or shared lifestyle factors (such as smoking). But having several family members diagnosed at a relatively young age with the same cancer type (or certain sets of cancer such as breast and ovarian cancers) can suggest that a faulty gene is being passed from generation to generation. People who are worried about a strong family history of cancer should always talk to their GP.

We're
leading the
way in tracking
down cancer
genes

DID YOU KNOW?



Not everyone carrying a faulty cancer gene will develop the disease – lifestyle and other factors are still important.



Inherited cancers are very rare – accounting for around two to three per cent of all cancer cases.



Not all inherited cancers are explained by single genetic faults. Some are down to the combined effects of many common genetic variations – each causing a small increase in risk.

Have you got questions about cancer?

Visit cruk.org/about-cancer or call our specialist cancer nurses on 0808 800 4040



OUR SCIENCE CHANGES LIVES

We discovered the BRCA2 gene, which puts women at high risk of breast and ovarian cancers when faulty. Today, women can take a test to see if they carry a BRCA2 fault and those that do can be guided through a range of options designed to lower their risk.

MICHELLE FROM LONDON KNOWS THE IMPORTANCE OF RESEARCH

“ Finding out that I had a faulty BRCA2 gene was devastating, but it gave me the chance to take back control. I decided to have my breasts and ovaries removed and although it was one of the hardest choices I've ever faced, I'm grateful that I've been able to take action for my future. ”

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Registered charity in England and Wales (1089464), Scotland (SC041666) and the Isle of Man (1103).

For information on genes, inherited cancers and screening, go to cruk.org



PROFESSOR SIR BRUCE PONDER IN CAMBRIDGE TELLS US HIS STORY

“I’ve dedicated my career to finding genes at the heart of inherited cancers. It’s such an exciting time for this type of research – technology is letting us do things that were once considered impossible so I really think we’re on the cusp of something quite extraordinary. It’s wonderful to know that our work has already helped so many families but I think we’ll be able to help countless more in the future.”

We receive no government funding for our research

MAKING A DIFFERENCE

We have an unrivalled history of uncovering the genes driving inherited cancers. Thanks to our research, people who are affected can work with their doctors to manage their risk and keep an eye out for early signs of the disease.

INNOVATION

We discovered a gene called APC, which can dramatically increase bowel cancer risk when faulty. Today, affected families are offered regular bowel screening and preventive surgery.

HELPING FAMILIES

We played a starring role in the discovery of BRCA1 and BRCA2, faulty genes involved in several types of cancer. Affected families now have the chance to make important decisions about their health.

SUPPORT

We found that faults in the RET gene increase the risk of thyroid and adrenal gland cancers. RET testing is now done routinely in high-risk families to work out who might benefit from surgery.

DISCOVERY

We proved that people with a form of hereditary bowel disease called Lynch syndrome can drastically reduce their risk of developing bowel cancer by taking aspirin.

OUR PROGRESS IS YOUR PROGRESS

Our scientists are combining their expertise with cutting-edge technology – answering crucial questions about how cancer develops and how to beat it.

Cambridge: Professors Doug Easton and Paul Pharoah are world leaders in pinpointing genetic variations behind inherited breast and ovarian cancers.



Cambridge: Dr Antonis Antoniou is using computer programmes to understand how lifestyle factors and genetic risk combine in women carrying BRCA1 or BRCA2 faults, opening up new opportunities for screening and prevention.

Oxford: Professor Ian Tomlinson’s goal is to find the mutations that make certain families extremely vulnerable to bowel cancer. Finding the mutations could help doctors design ways to prevent the disease, or spot it early.



Newcastle: Professor Ruth Plummer wants better treatment options for patients with inherited breast and ovarian cancers. So she’s developing drugs designed to kill tumours with BRCA1 or BRCA2 faults.



Edinburgh: Professor Malcolm Dunlop is uncovering the genes that put people at high risk of bowel cancer. His work could lay the foundations for new tests and treatments.

London: Professor Ros Eeles is identifying the role genes play in prostate cancer, information that could lead to future screening programmes to spot cancer earlier. This research may also give us clues that could lead to new treatments.



Find out more: download other research leaflets in this series at cruk.org/researchleaflets