

Scientists discover how iron levels and a faulty gene cause bowel cancer

Posted on Thursday 9th August 2012

HIGH LEVELS of iron could raise the risk of bowel cancer by switching on a key pathway in people with faults in a critical anti-cancer gene, according to a study published in *Cell Reports** today (Thursday).

Cancer Research UK scientists, based at the University of Birmingham and the Beatson Institute for Cancer Research in Glasgow, found bowel cancers were two to three times more likely to develop in mice with a faulty APC gene that were fed high amounts of iron compared to mice who still had a working APC gene.

In contrast, mice with a faulty APC gene fed a diet low in iron did not develop bowel cancer at all.

Study author Professor Owen Sansom, deputy director of the Cancer Research UK Beatson Institute for Cancer Research in Glasgow, said: "We've made a huge step in understanding how bowel cancer develops. The APC gene is faulty in around eight out of 10 bowel cancers but until now we haven't known how this causes the disease.

"It's clear that iron is playing a critical role in controlling the development of bowel cancer in people with a faulty APC gene. And, intriguingly, our study shows that even very high levels of iron in the diet don't cause cancer by itself, but rely on the APC gene."

Co-author Dr Chris Tselepis, a Cancer Research UK scientist at the University of Birmingham, said: "Our results also suggest that iron could be raising the risk of bowel cancer by increasing the number of cells in the bowel with APC faults. The more of these cells in the bowel, the greater the chance that one of these will become a starting point for cancer.

"We're now planning to develop treatments that reduce the amount of iron in the bowel and so could lower the risk of developing bowel cancer. We hope to start using these in trials in the next few years in people who are at a greater risk."

The study could also explain why foods such as red meat, which have high levels of iron, are linked to an increased risk of bowel cancer.

When the APC gene is deleted, two proteins are switched on that cause iron to build up in bowel cells. When this happens, a key cancer signalling pathway called *wnt* is switched on, causing cells to grow out of control.

In mice fed a diet with no iron, cells with a faulty APC gene were killed and bowel cancers did not develop.

Mice with a fully functioning APC gene did not develop bowel cancers, even when fed a diet high in iron. In these bowel cells, the iron accumulation proteins are turned off and *wnt* signalling remains inactive.

Dr Julie Sharp, senior science information manager at Cancer Research UK, said: "Bowel cancer is the third most common cancer in the UK. These findings suggest a potentially effective way of reducing the chances of bowel cancer developing in people who are at high risk. Finding ways of 'mopping up' the iron that is in the bowel could have a real impact on the number of people who develop the disease.

"This research is a great example of scientists coming together and sharing their different expertise to find new ways of understanding and potentially preventing cancer."

ENDS

For media enquiries please contact Simon Shears in the Cancer Research UK press office on 020 3469 8054 or, out-of-hours, the duty press officer on 07050 264 059.

Notes to editors:

*Radulescu, S et al. Luminal iron levels govern intestinal tumourigenesis following *Apc* loss *in vivo* *Cell Reports* (2012)

The University of Birmingham

1. The University of Birmingham is a truly vibrant, global community and an internationally-renowned institution. Ranked amongst the world's top 100 institutions, its work brings people from across the world to Birmingham, including researchers and teachers and more than 4,000 international students from nearly 150 countries.

2. The University is home to nearly 30,000 students. With more than 7,500 postgraduate students from across the world, Birmingham is one of the most popular universities for postgraduate study in the UK.

3. The University plays an integral role in the economic, social and cultural growth of local and regional communities; working closely with businesses and organisations, employing approximately 6,000 staff and providing 10,000 graduates annually.

About the Beatson Institute for Cancer Research

The Beatson Institute for Cancer Research is core-funded by Cancer Research UK and provides a dynamic, supportive and well-resourced environment for its basic and translational scientists. Its mission is to:

- Understand how cancer cells grow, survive and spread
- Identify critical components of these pathways as targets for novel cancer treatments
- Help translate this knowledge for the benefit of cancer patients

At the beginning of 2008 the Beatson Institute moved into a new state-of-the-art building – further information can be found at www.beatson.gla.ac.uk (<http://www.beatson.gla.ac.uk/>)

About Cancer Research UK

- Cancer Research UK is the world's leading cancer charity dedicated to saving lives through research
 - The charity's groundbreaking work into the prevention, diagnosis and treatment of cancer has helped save millions of lives. This work is funded entirely by the public.
 - Cancer Research UK has been at the heart of the progress that has already seen survival rates in the UK double in the last forty years.

- Cancer Research UK supports research into all aspects of cancer through the work of over 4,000 scientists, doctors and nurses.
- Together with its partners and supporters, Cancer Research UK's vision is to beat cancer.

[Privacy](#) | [Legal](#) | [Cookies and cookie policy](#) | [Accessibility](#) | [Site map](#) | [Website feedback](#) | [Charitable information](#)

© University of Birmingham 2015

