Gene link to higher rates of bowel cancer in men

June 1 2012

(Medical Xpress) -- Scientists have shown for the first time that one of the sex chromosomes is involved in the development of a cancer that can afflict both genders, according to a Cancer Research UK-funded study in Nature Genetics. The finding may help explain why men have higher rates of bowel cancer than women.

The international collaboration - led by The Institute of Cancer Research (ICR), the University of Oxford and Edinburgh University – was

searching for changes to the DNA code that increase the risk of bowel cancer. For the first time, the scientists identified an alteration on the x-chromosome, one of two chromosomes that determine gender.

The 'faulty' region on the x-chromosome is linked to lower levels of a gene called SHROOM2 that controls how cells develop and take shape. Mutations in this gene have previously been linked to cancer.

The scientists have suggested that in women, the 'faulty' x-chromosome version is hidden by a normally-functioning version. But in men, who only have one copy of the x-chromosome, there is no normal version to mask this 'faulty' copy.

Co-lead researcher Professor Richard Houlston from The Institute of Cancer Research said: "To our knowledge, this is the first time that anyone has shown that one of the sex chromosomes is involved in the development of a cancer that can afflict both sexes. This may help explain why bowel cancer is slightly more common in men. Ultimately, it could also help us target screening to those who are more at risk of the disease."

The discovery of the x-chromosome link, along with a further two risk variants, brings the total number of regions on the genome found to increase the risk of bowel cancer to 20.

To identify these genetic alterations the researchers studied SNPs (single nucleotide polymorphisms) - pieces of DNA that vary between individuals – from five previous international studies, looking for SNPs that were more common in cancer cases than healthy individuals.

The second variant found in this study is within the CDKN1A gene on chromosome 6. CDK1NA codes for a protein that is a key controller of a number of tumour suppressor pathways in the cell. It also blocks the

creation of new strands of DNA which is needed in cancer cells as they grow and divide.

The third variant discovered is located on chromosome 11, within a gene called POLD3. This gene plays a key role in two pathways that repair DNA damage, and which are defective in some bowel cancers.

Bowel cancer is the third most common cancer in the UK - each year around 41,000 people are diagnosed with the disease, around 22,700 men and 18,400 women.

Dr. Lesley Walker, director of cancer information at Cancer Research UK, said: “Cancer Research UK funded scientists have led the world in discovering genes that increase the risk of bowel cancer. This research adds to this understanding and shows how a range of genes could be behaving in bowel cancer, potentially leading to new treatments for the disease.”

More information: Dunlop, M.G. et al Common variation near CDKN1A, POLD3 and SHROOM2 influences colorectal cancer risk *Nature Genetics* (2012)

Provided by Cancer Research UK