

'Addicted' cells provide early cancer diagnosis

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Scientists at the Institute of Food Research have detected subtle changes that may make the bowel more vulnerable to the development of tumours.

With support from the Food Standards Agency and the Biotechnology and Biological Sciences Research Council they are investigating whether diet could control these changes and delay or reverse the onset of cancer.

"We looked at changes in 18 genes that play a role in the very earliest stages of colorectal cancer," says Professor Ian Johnson at the Institute of Food Research.

"We detected clear chemical differences in these genes in otherwise normal tissue in cancer patients.

"This represents a new way to identify defects that could eventually lead to cancer."

All cells carry a complete set of instructions for the whole organism in their nuclear DNA, but to define the specialised structure and functions of each particular cell type, genes must be switched on or firmly off, over the course of the cell's life-cycle.

One of the mechanisms controlling the activities of the genes in a cell is the "epigenetic code", a set of chemical tags attached to the DNA molecule, marking individual genes for expression, or for silence. It is



well known that the abnormal behaviour of cancer cells is partly due to mistakes in this epigenetic code, some of which switch on genes for growth, whilst others switch off genes that would otherwise cause abnormal cells to destroy themselves.

Scientists at IFR are exploring the possibility that such mistakes in the epigenetic code may begin to occur in apparently normal tissues, long before the appearance of a tumour.

In the current study published in the British Journal of Cancer they measured the numbers of methyl groups attached to DNA taken from the cells lining the large intestine of bowel cancer patients. They found subtle changes that may make the whole surface of the bowel more vulnerable to the eventual development of tumours by causing the 'addiction' of cells to abnormal gene expression.

Some of these changes seem to occur naturally with age, but, supported by the Food Standards Agency, IFR is investigating the possibility that factors in our lifestyle such as diet, obesity and exercise can accelerate or delay DNA methylation as we grow older, thus giving us some degree of control over this vital aspect of our long-term health.

Professor Nigel Brown, Director of Science and Technology at BBSRC said: "Basic research in the relatively young field of epigenetics is already contributing to our understanding of human health. Understanding how epigenetic processes work to maintain healthy cells and tissues is the key to long-term health because, as we see here, the breakdown of these normal processes may subsequently cause disease. BBSRC funds a range of research in the field of epigenetics and has been encouraging networking amongst members of the European epigenetics research community."

Source: Norwich BioScience Institutes



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