

SMOKERS LEAVE A HISTORY OF THEIR ADDICTION IN DNA

SMOKERS are leaving a history of addiction in their DNA that may help to measure their risk of cancer, according to research presented at the NCRI Cancer Conference today (Tuesday).

Researchers at Imperial College London and the Human Genetics Foundation (HuGeF) in Italy have identified a number of sites in the DNA of blood that have been chemically tagged as a result of smoking. These tags are also detectable in lung tissue and could be used to measure the increased risk of certain cancers such as breast and bowel, as well as lung.

Smoking leaves a footprint on the surface of the DNA but the sequence of genetic code remains the same. This is known as an "epigenetic" modification. Once you give up smoking, these tags start to disappear although they never quite match the unmarked DNA of a non-smoker.

In this initial study, measuring DNA tagging in blood samples from smokers and non-smokers allowed the researchers to investigate the link between smoking and these tags. The study also looked at the risk of developing breast and bowel cancer in relation to these DNA tags, with plans to expand the work into other areas such as lung cancer*.

While smoking is associated with bowel cancer risk, a link between smoking and breast cancer has not been proven but the researchers believe that previous studies haven't had the same genetic or epigenetic measures of smoke exposure available. This research will make that information available to scientists so they can spot any DNA tags that might be attributable to any risk that might exist.

Dr James Flanagan, Breast Cancer Campaign scientific fellow at Imperial College London and co-author of the research, said: "This research may help to build a test that will be able to look at a person's epigenetic information at the molecular level and measure in great detail the added risk of cancer from exposures such as smoking.

"Previous research into smoking has often asked people to fill out questionnaires, which have their obvious drawbacks and inaccuracies. Using this approach, we will be able to read the fingerprint on a person's DNA to tell us a story of how their habit may have changed over the course of their life."

Professor Paolo Vineis, chair in environmental epidemiology at Imperial College London's School of Public Health and head of the HuGeF laboratory in Italy, said: "This research will help us to build a molecular profile of cancer risk, where we can screen people and quantify the exposure they've had to a number of risk factors over their lifetime, just by examining a blood sample.

"We hope that smoking is just the start – further work will look into other factors like alcohol and start to measure the risk an individual has built up over a lifetime of exposure to these contributors to cancer."

Dr Jane Cope, director of the NCRI, said: "This is a very interesting piece of research that applies basic biology to everyday life to reveal just how much

damage smoking can do to the fundamental biology of a person. If these early results hold true in more detailed studies, this finding could play an important role in understanding smokers' cancer risk in the future."

ENDS

For media enquiries please contact Greg Jones in the NCRI press office on 0151 239 6043 / 6044 / 6045 or, out-of-hours, the duty press officer on 07050 264 059.

Notes to Editors:

- *In this study, the researchers focused on the colon, which makes up the majority of the bowel. For more information visit <http://www.cancerresearchuk.org/cancer-info/cancerstats/types/bowel/incidence/#distribution>
- The authors acknowledge funding from Cancer Research UK, Breast Cancer Campaign, Medical Research Council UK, HuGeF Foundation (Italy), Imperial Biomedical Research Centre and the NIHR Respiratory Disease Biomedical Research Unit.
- View the conference abstract here: <http://www.ncri.org.uk/ncriconference/2012abstracts/abstracts/LB94.html>

About the NCRI Cancer Conference

The National Cancer Research Institute (NCRI) Cancer Conference is the UK's major forum for showcasing the best British and international cancer research. The Conference offers unique opportunities for networking and sharing knowledge by bringing together world-leading experts from all cancer research disciplines. The eighth annual NCRI Cancer Conference is taking place from 4-7 November 2012 at the BT Convention Centre in Liverpool. For more information visit www.ncri.org.uk/ncriconference

About the NCRI

The National Cancer Research Institute (NCRI) was established in April 2001. It is a UK-wide partnership between the government, charity and industry which promotes co-operation in cancer research among the 22 member organisations for the benefit of patients, the public and the scientific community. For more information visit www.ncri.org.uk

NCRI members are: the Association of the British Pharmaceutical Industry (ABPI); Association for International Cancer Research; Biotechnology and Biological Sciences Research Council; Breakthrough Breast Cancer; Breast Cancer Campaign; Cancer Research UK; CHILDREN with CANCER UK; Department of Health; Economic and Social Research Council;

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Leukaemia & Lymphoma Research; Ludwig Institute for Cancer Research; Macmillan Cancer Support; Marie Curie Cancer Care; Medical Research Council; Northern Ireland Health and Social Care (Research & Development Office); Prostate Cancer UK; Roy Castle Lung Cancer Foundation; Scottish Government Health Directorates (Chief Scientist Office); Tenovus; The Wellcome Trust; Welsh Government (National Institute for Social Care and Health Research); and Yorkshire Cancer Research.

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