New research findings may enable earlier diagnosis of uterine cancer

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Cancer of the uterus (womb) is the commonest gynaecological malignancy in the West. Research carried out at the University of Gothenburg, Sweden, has now identified a gene that may simplify future diagnosis.

Cancer is a genetic disease. It occurs when changes take place in the genes that regulate cell division, cell growth, cell death, cell signalling and blood vessel formation - either due to mutations caused by external factors such as smoking or radiation - or due to inherited changes. This interaction between defective genes and environmental factors means that cancer is an extremely complex disease. Cancer of the uterus, or endometrial carcinoma, is no exception.

Cancer of the uterus is the commonest gynaecological malignancy in the West and accounts for between five and six per cent of all cancers in Swedish women. However, the symptoms are often vague, and we know little about the genetic factors that lead to the appearance and development of this form of cancer. It is therefore vital that these genes are identified, as this could enable doctors to make the diagnosis much more quickly and easily, allowing the development of more effective cancer treatment.

In her study, Sandra Karlsson, a researcher at the Department of Cell and Molecular Biology, has used inbred rats to locate the defective genes that cause uterine cancer. Like monozygotic (identical) twins, these inbred rats are genetically almost identical, which makes it much easier to study

the influence of the environment in which they live.

“More than 90 per cent of the female rats in the study spontaneously developed uterine cancer. By using advanced techniques to analyse gene expression in the tumours, we succeeded in identifying a gene signature that could be used as a future diagnostic test for human uterine cancer,” says Sandra Karlsson.

The signature is made up of three genes. One of them protects the cell against oxygen free radicals. These free radicals are naturally and continuously produced in the cell, but excess amounts, which can damage the cell and the body’s DNA, are associated with over 200 diseases, from arteriosclerosis and dementia to rheumatism, cerebral haemorrhage and cancer. The studies carried out by Sandra Karlsson on human malignant tumours have confirmed that changes in this gene are present in early as well as late stage cancer.

“This shows that the identified gene has an important role in the origin and development of uterine cancer,” says Sandra Karlsson.

The thesis Gene Expression Patterns in a Rat Model of Human Endometrial Adenocarcinoma was publicly defended on the December 19th. Supervisor - Professor Karin Klinga Levan.

Provided by University of Gothenburg