

York scientists discover driving force behind prostate cancer

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Scientists at the University of York have discovered the driving force behind the development of prostate cancer.

Their research, published in *Nature Communications* today and funded by the charity Yorkshire Cancer Research, reveals the existence of a cancer inducing DNA re-alignment in stem cells taken from human prostate cancers.

This opens the way to the development of drugs that target the stem cells, leading to more effective therapies that work against the root cause of the disease.

Professor Norman Maitland, Director of the YCR Cancer Research Unit, and his team in the University's Department of Biology were the first to isolate [prostate cancer](#) stem cells in 2005. While other [cancer cells](#) can be killed by current therapies, stem cells are able to evade their effects, resulting in [cancer recurrence](#). The team has since been exploring the exact molecular properties that allow these cells to spread, survive and resist [aggressive treatments](#) such as radiation and chemotherapy.

Professor Maitland said: "This discovery marks a fundamental shift in our understanding of how solid cancers start. It is believed that 'root' cancer cells arise from healthy stem cells going wrong – for example certain controls can be turned off which allow the cells to keep growing and invade surrounding tissue.

"In [blood cancers](#) such as [leukaemia](#), DNA is rearranged during an event known as chromosomal translocation, which results in a [mutant protein](#) that drives [cancer progression](#). Although similar rearrangements have recently been discovered in solid cancers, until now, they have not been considered as stem cell functions. Our work has challenged this idea."

Professor Maitland's team has found these genetic accidents in prostate cancer stem cells and has shown that they result in a specific cancer-associated gene within the cells called ERG being inappropriately activated. It is believed that this activation triggers the stem cells to renew more often.

Professor Maitland continued: "The cells become selfish by surviving outside normal controls that exist in the prostate and thrive at the expense of their neighbours, ensuring that the genetic accident becomes permanent and passed from generation to generation. This process appears to be essential for the initiation of prostate cancer."

Yorkshire Cancer Research funded a £2.15m five year programme at the YCR Cancer Research Unit in August 2011 to allow scientists to continue their internationally-award winning research into prostate cancer.

Kathryn Scott, Head of Research Funding at the charity, said: "This exciting discovery is another step forward in our understanding of how prostate cancer begins. Professor Maitland has detected one of the earliest possible changes in the development of prostate cancer. The findings mean that new therapies can now be developed which specifically target the protein identified, killing the stem cells that remain after chemotherapy while leaving healthy cells untouched."

Provided by University of York

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