Stem cells and cancer: cancer pathways that also control the adult stem cell population

April 10 2008

Speaking today (10 April) at the UK National Stem Cell Network Annual Science Meeting in Edinburgh, Professor Alan Clarke from Cardiff University describes his work to investigate a mechanism that normally drives adult stem cells to repair the intestine.

Together with his colleague Owen Sansom from the University of Glasgow, he has found that if things go wrong and a crucial gene called Apc is lost or damaged, then this normal function of controlling the adult stem cell population breaks down and ultimately leads to a tumour. This research is funded by the UK Biotechnology and Biological Sciences Research Council (BBSRC) and Cancer Research UK.

Professor Clarke, Cardiff School of Biosciences said: “If we are to use adult stem cells for therapy then we must understand how they behave normally and what sometimes triggers them to go wrong and potentially cause cancer. Otherwise we may never be able to fully exploit their potential, or do so safely. That is why we have chosen to research intestinal repair as an example of how adult stem cells work and what happens when the pathways that control them go wrong.”

The team from Cardiff University has used genetic technology to manipulate intestinal stem cells and mimic the process by which a part of the intestine called the crypts is regenerated following high levels of DNA damage or injury. By doing this, they have found that a mechanism called Wnt signalling drives this process and is necessary to send stem cells down the route to become replacement cells in the

damaged part of the intestine. Under normal circumstances Wnt signalling is turned down once the stem cells have done their job. If this does not happen, then more and more cells are added to the crypt and ultimately a tumour forms.

Professor Clarke added: “It has been known for some time that loss of or damage to Apc within the intestinal crypt cells can lead to cancer, but what hasn’t been clear is what it actually does. Our work shows that Apc has a role in switching off Wnt signalling, controlling the adult stem cell population and preventing the formation of tumours.”

Source: Biotechnology and Biological Sciences Research Council