

## Spindles give cancer clues

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(PhysOrg.com) -- Cancer scientists working at the University of Dundee have discovered a form of stem cell activity that may help lead to early identification of the disease.

Early diagnosis and treatment of many cancers can be key in limiting the effects of the disease. This new research, published in the scientific journal *Cell Stem Cell*, reveals differences in the way [stem cells](#) behave in normal tissue compared with their activity in tissue that is pre-cancerous.

The research team led by Professor Inke Näthke, and funded by Cancer Research UK, examined the behaviour of mitotic spindles - structures that separate genetic material during the key process of cell division.

Using state-of-the-art imaging techniques, they were able to generate three-dimensional pictures of mitotic spindles in intestinal tissue. They found that they behaved differently in tissue with a single mutation associated with bowel (colorectal) cancer than they did in normal, healthy tissue.

Stem cells are crucial for the normal maintenance of many tissues. They are also involved in the re-generation of damaged tissues. Their role in cancer, and also their enormous potential in treating diseases, makes understanding their biology crucial.

'The process we were investigating is called asymmetric cell division,' said Professor Näthke, a Principal Investigator in the Dundee Cancer Centre. 'The importance of asymmetric divisions for stem cell function

and maintenance is well established in the developing nervous system and the skin. However, its role in gut tissue and its role in helping to produce tumours are still debated.'

'We developed an imaging technique that permits the visualisation of three-dimensional aspects of tissue architecture to identify differences in stem and non-stem cells in the intestinal tract. Using this technique, we found that this process of asymmetric division in stem cells is lost in tissue that gives rise to cancers in the gut, so these spindles behave differently in pre-cancerous tissue.'

'In the healthy tissue this process works well. In the precancerous tissue it seems to be compromised, which is an important sign, as this tissue otherwise appears normal.'

'This is important as it may have implications in developing techniques for identifying pre-cancerous [tissue](#) at an early stage, when it still appears normal, giving clinicians a chance to catch the disease in the early stages of development. It might also have implications for the types of treatment that should be considered.'

The work combined excellence across the College of Life Sciences and the School of Medicine at Dundee, together with other collaborators including researchers at the Beatson Institute for Cancer Research in Glasgow, and the Netherlands.

'This is a perfect example of the kind of cross-disciplinary work we expect to be doing under the auspices of the new Dundee Cancer Centre launched last week with [Cancer](#) Research UK,' said Professor N athke.

'We have combined expertise in imaging, pathology, surgery and cellular science to make these findings.'

Provided by University of Dundee

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