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On the march in the 'land of the ever young'

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WEDNESDAY, 26 AUGUST 2009

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The ability to use stem cell therapies in the fight against illnesses like diabetes, Parkinson's or Alzheimer's disease, took a small but significant step as Cambridge scientists uncovered a key process that makes them pluripotent – the remarkable ability to transform into any of the body's different cell types.

Though scientists are now able to transform adult skin or brain cells into embryonic-like stem cells in the lab, cells that just like natural embryonic stem cells can be reprogrammed to make other cell types, there is still only a very basic understanding of how they achieve pluripotency.

However, in a discovery published in the journal *Cell* that has important implications for efforts to harness the power of stem cells for medical applications, researchers from the Wellcome Trust Centre for Stem Cell Research at the University of Cambridge have pinpointed the final step in this complex process.

"Exactly how pluripotency comes about is a mystery," said Dr Jose Silva, who led the Cambridge research with his colleague Dr Jennifer Nichols.

"If we want to create efficient, safe and reliable ways of generating these cells for medical applications, we need to understand the process; our research provides additional clues as to how it occurs."

Funded by the Wellcome Trust, the Biotechnology and Biological Sciences Research Council and the EC Frame-work 7 project EuroSyStem, the researchers studied how the protein Nanog – curiously named after the Celtic phrase 'Tir Nan Og', or 'land of the ever young' – helps give cells pluripotency.

This protein was identified as a key player in pluripotency in 2003 but until now its exact biological role remained unclear.

Dr Silva said: "It was clear that Nanog was important, but we wanted to know how it works. "Our research shows that this unique protein flips the last switch in a multi-step process that gives cells the very powerful property of pluri-potency.

"The next challenge is to find out exactly how Nanog influences other important molecules," said Dr Silva.

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