Junk DNA may prove invaluable in quest for gene therapies

September 21 2009

Scientists have identified how a protein enables sections of so-called junk DNA to be cut and pasted within genetic code - a finding which could speed development of gene therapies.

The study by researchers at the University of Edinburgh sheds light on the process, known as DNA transposition, in which shifted genes have a significant effect on the behaviour of neighbouring genes. In the human genome, rearrangement of antibody genes can enable the immune system to target infection more effectively.

The research identifies how the enzyme is able to cut out a section of DNA and reinsert it elsewhere in the genome. The study, published in the journal *Cell*, was funded by the Wellcome Trust and the Medical Research Council.

The cut-and-paste property of shifted DNA is now being used to develop tools for scientific research and medical applications. Learning more about transposition could help scientists understand how to control the process and speed the development of gene therapies - which introduce into cells genes with beneficial properties that, for example, can fight hereditary diseases or cancer.

Junk DNA, which accounts for almost half of the human genome, was originally believed to have no purpose. However, it is now emerging that movement of junk DNA, in a cut-and-paste mechanism, can lead to beneficial changes in cells.

Dr Julia Richardson of the University's School of Biological Sciences, who led the study, said: "By forming a picture of the enzyme that causes DNA to shift, and discovering how this works, we understand more about how these proteins could be adapted and controlled. This may one day enable genes to be pasted into cells exactly where they are needed - which could be of enormous benefit in developing gene therapies."

Source: University of Edinburgh