How stem cells are regulated

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Researchers from Biotech Research & Innovation Centre (BRIC) at University of Copenhagen have identified a new group of proteins that regulate the function of stem cells. The results are published in the new issue of *Cell*.

All living organisms, including human beings, consist of a number of specialised cell types that all originate from the same type of primal cell; the embryonic stem cell. Stem cells can develop into any type of cell through a carefully regulated process referred to as cellular differentiation. During differentiation, specific genes are switched on while other genes are switched off. The genes that are activated during differentiation determine which type of cell the stem cell will become. The result is that cells in a particular organ, e.g. a liver, only express genes specific to that organ.

Director of BRIC, Professor Kristian Helin led the research team consisting of Jesper Christensen, Karl Agger and Paul Cloos. Last year, the same research group published an article in Nature on how a group of Jumonji proteins regulate the growth of cancer cells and are involved in the development of specific cancer types.

BRIC's new results show that a different subgroup of Jumonji proteins is essential for cellular differentiation. The Jumonji enzymes can turn off, or inactivate, particular genes that play an important part in embryogenesis. The conclusions are based on studies of the nematode (roundworm) C. elegans and studies of mouse embryonic stem cells. The C. elegans studies were carried out in collaboration with another of

BRIC's research groups, led by Associate Professor Lisa Salcini.

The BRIC researchers are currently developing inhibitors to the Jumonji proteins. Their aim is to use these inhibitors to treat cancer patients with increased levels of the Jumonji proteins.

Source: University of Copenhagen