Cell insights shed light on everyday process of renewal and repair

March 8 2016

Scientists have gained insights into the fundamental process of cell division, by identifying key steps that ensure cells divide correctly as they undergo repair and growth.

The findings show how cells make sure that identical copies of DNA are given to the two daughter cells formed when a cell splits.

Their findings could provide valuable insight into what happens when this basic function misfires, which in people can make the body more susceptible to cancer and other conditions.

Researchers have pinpointed a set of proteins which, during the division process, connect the cell's genetic material to other proteins that physically divide it into identical pairs.

This dividing machinery is associated with cancer, and the DNA's connection to it must be firm and accurate to ensure equal distribution of DNA to the new cells, without loss or damage.

A team from the University of Edinburgh used yeast cells to study the molecular machines involved in cell division. They used chemical agents to spot proteins that interact, and then used molecular analysis to identify the proteins involved.

They found that two proteins - named Dam1 and Duo1 in yeast - help cell structures correctly attach to parcels of genetic material. These

packages are drawn towards opposite ends of a dividing cell before splitting in two. While the yeast proteins are not identical in humans, cell division is common to many species, and the results aid understanding of the process in people.

Two other proteins - known as Ask1 and Spc34 - were found to help build these structures to enable the cell to divide correctly.

Dr Julie Welburn, of the University of Edinburgh's School of Biological Sciences, who led the study, said: "This discovery helps clarify some of the detail involved in this very complex - yet fundamentally important - process of cell division, and resolves a longstanding puzzle."

The study is published in *Open Biology*.

More information: Molecular architecture of the Dam1 complex-microtubule interaction, *Open Biology*, rsob.royalsocietypublishing.or … /10.1098/rsob.150237

Provided by University of Edinburgh