

A switch controls if our cells will make new ones

A new study has revealed the hidden properties of an 'on-off switch' that governs cell division.

Researchers at Duke University showed that if the switch is on, then a cell will divide, even if it's damaged or the signal to grow disappears.

Showing how the switch works may provide clues to novel drug targets for cancer and other diseases in which cell growth goes awry.

The switch is part of a critical pathway that controls cell division, the process by which the body makes new cells. Before a cell starts to divide, it goes through a checklist to make sure everything is in order, much like preparing for a long trip.

If a cell senses something is wrong early on, it can halt the process. But once a cell passes a milestone called the restriction point, there's no turning back, no matter the consequences. The switch controls this milestone and is key to cell growth.

Findings of the study have appeared in the latest issue of the journal Nature Cell Biology.

The cellular pathway that includes the switch is found in all multi-cellular life, from plants to people. A cell decides to trigger the pathway when it receives an external chemical signal to grow.

'The wiring diagram is fundamentally the same. It's very likely that different organisms have evolved a very conserved design principle to regulate their growth,' said Guang Yao, lead author of the study.

The decision whether it is time to proliferate is very tightly coupled to decisions of cell fate, he said.

'There's a decision as to whether the proliferation process is normal, and if the answer is no, then the result is that the cell dies. We don't know critical dynamics of that process.'

During the project, the researchers also discovered the switch has an unexpected property: it is bistable. Once turned on by an external signal, the switch can maintain its on state, even if the signal disappears.

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