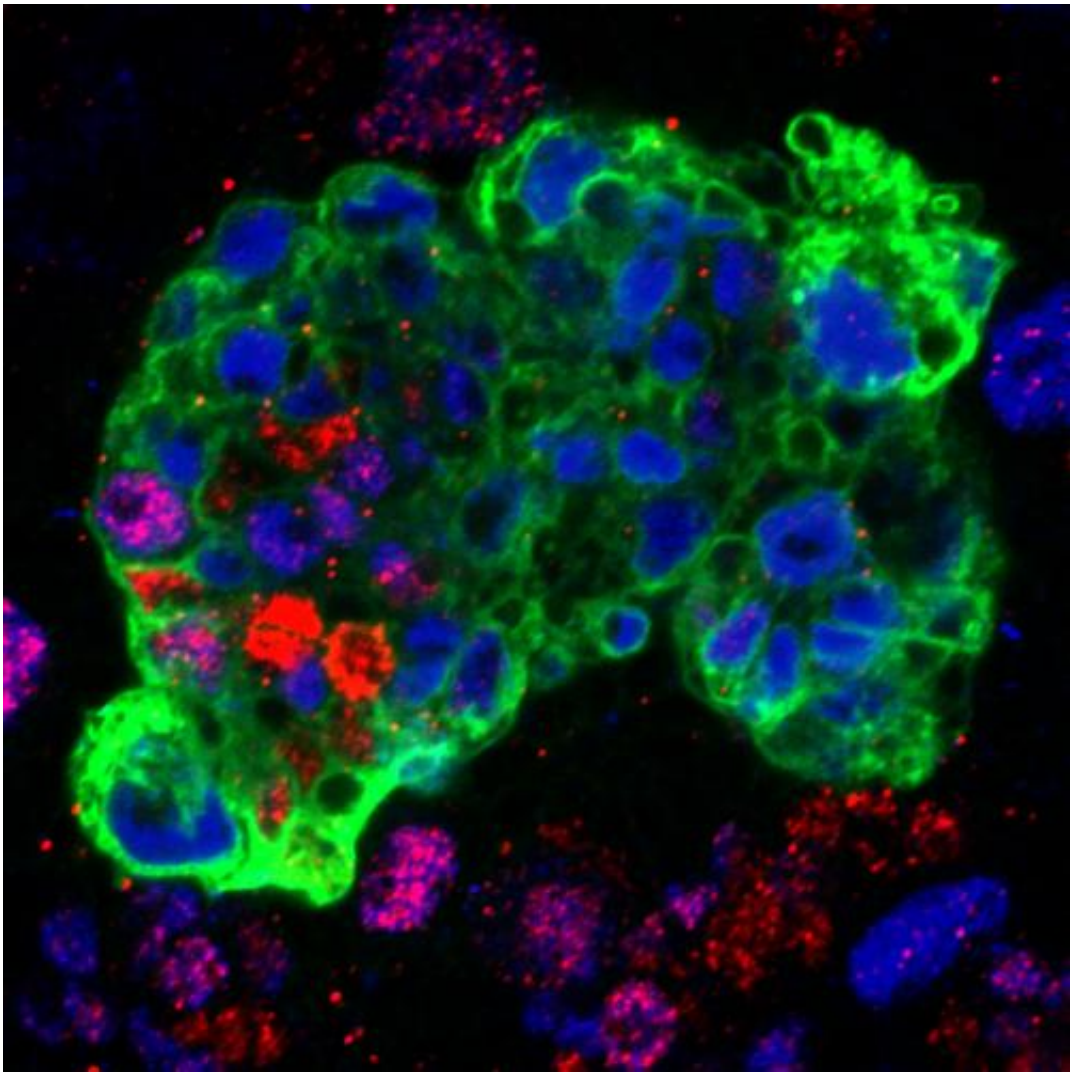
Fruit flies help uncover tumor-preventing protein complex

March 12 2014



Pictured here are ectopic neural stem cells formed from dedifferentiation of progenitor cells upon loss of both HDAC3 and Snr1 (a subunit of the Brahma complex). Credit: Chwee Tat Koe

A team of researchers from Duke-NUS Graduate Medical School have discovered a protein complex that disrupts the process known as dedifferentiation, known to promote tumor development.

Dedifferentiation (reversion) is a process that leads progenitor or mature cells to become 'ectopic neural stem cells' which causes tumors. By detecting this protein complex, Duke-NUS researchers have shed light on a process that inhibits tumor development and gives hope for the discovery of therapies and treatments that target tumor prevention through this pathway.

Researchers study neural stem cells (NSC) or 'neuroblasts' in the larval brains of fruit flies in order to better understand stem cell behavior in the lab. NSCs are multi-potent cells key to the function of the body's brain and nervous system. In the Neuroscience and Behavioral Disorders Program laboratory at Duke-NUS, 'type II' neuroblasts, found in fruit flies that are especially similar to human NSCs, are studied.

Type II neuroblasts, like stem cells, divide to generate another neuroblast and a second cell which are the progenitor cells. These cells can then undergo differentiation - the process they undergo to become specific types of cells. However, progenitor cells are prone to dedifferentiate into NSCs and become 'ectopic NSCs'. When this happens, 'ectopic NSCs' can undergo uncontrolled growth, leading to brain tumor development.

Asst Professor Hongyan Wang led her team, using the fruit fly (*Drosophila melanogaster*) model, to uncover how a protein complex, composed of Brahma, HDAC3 and Earmuff, plays an important role in preventing the progenitor cells from undergoing dedifferentiation. These findings have provided a critical and novel insight into a process that was previously poorly understood, and have implications for the overall understanding of NSCs and for the development of future cancer therapies.

The research is published online in *eLIFE* on March 11, 2014.

Provided by Duke-NUS Graduate Medical School Singapore