

Lab characterizes niche control of stem cell function

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The Stowers Institute's Xie Lab has published findings that begin to characterize the poorly understood interaction among stem cells within their cellular microenvironment, called a niche.

The findings appear in today's issue of *Cell Stem Cell*.

The Xie Lab demonstrated that differentiation-defective *Drosophila* ovarian germline stem cells (GSCs), behaving like human cancer stem cells, can out-compete normal stem cells for a position in the niche. They do so by invading the niche space of neighboring GSCs and gradually pushing them out of the niche by increasing the cellular response to the adhesion molecule E-cadherin.

Furthermore, the team found that mutant GSC competition requires both E-cadherin and normal GSC division, and that different levels of E-cadherin expression can stimulate GSC competition.

"We believe that this stem cell competition mechanism may explain why differentiated stem cells are displaced from the niche," said Zhigang Jin, Ph.D., Postdoctoral Research Associate and co-equal first author on the paper. "We observed that stem cell competition serves as a quality control mechanism to ensure that only undifferentiated stem cells remain in the niche."

"These findings offer important insights into the tight control of stem cell quality by the niche and how cancer stem cells might invade new

niches for self-proliferation,” said Ting Xie, Ph.D., Associate Investigator and senior author on the paper. “Additionally, these findings point to a promising strategy for delivering stem cells to targeted niches for their long-term maintenance and generation of functional cells through augmented stem cell competition.”

Source: Stowers Institute for Medical Research

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