

Stem Cell Research: Researches Find Suppressor Genes Vital to Regulating Stem Cell-Like Precursor Cells

Stem Cell Company Analysis

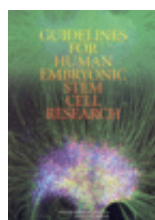
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Much research is being done on stem cell boundaries. How does an embryo know in advance what size the spleen, liver or ears should be. How do stem cells know when to stop? And in the adult body how do stem cells know when repair is necessary? Of how far to go in creating new cells?

"How does an organism know how many blood cells to make and when to make them in the context of injury and repair to tissue," said UCLA's Dr. Julian A. Martinez-Agosto, the senior author of the study. "In particular, we wondered how the blood progenitor cells sense that change and know when it's time to make more blood cells."

To answer this question, Martinez-Agosto, an assistant professor of human genetics and pediatrics and a researcher with the Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research at UCLA, and colleagues examined a signaling pathway called TOR that the cells use to gauge nutrition levels and stress.

"We found that the TOR pathway uses these two genes to regulate its function and, when activated, it expands or increases the number of blood progenitor cells in the fly's blood," Martinez-Agosto said.

The research found that increased TOR activity gives cells a competitive advantage, allowing them to divide and make more of themselves so that they can make blood. These progenitors also have high levels of reactive oxygen species (ROS) — ions or very small molecules that include free radicals — which are known to damage cells and can predispose humans to aging and heart disease. But in this case, the ROS proved

valuable.

The precursors, Martinez-Agosto said, were producing ROS all the time, and when TOR was activated, the levels increased dramatically. Too much ROS caused them to divide more than normal. The researchers found that if they treated the flies with antioxidants, which reduce ROS levels, the cells would develop normally.

Condensed and adapted from the UCLA announcement.

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