

Navigation Links	
Biology News	
Medicine News	
Biology Products	
Medicine Products	
Biology Definition	
Medicine Definition	
Biology Technology	
Medicine Technology	
Biology Dictionary	
Medicine Dictionary	
Biology Navigation	
AIDS/HIV	
Bioinformatics	
Biotechnology	
Biochemistry	
Cancer	
Cell Biology	
Developmental Biology	
Ecology	
Environment	
Evolution	
Food Technology	
Gene	
Genetics	
Genomics	
Health/Medicine	
Medical Navigation	
Abortion	
Aches	
ADHD	
Addiction	
Alcohol	
Allergy	
Alternative Medicine	
Alzheimer's Dementia	
Anxiety/Stress	
Arthritis	
Autism	
Bacteria	
Blood	
Bird Flu/Avian Flu	
Bones	

HOME >> MEDICINE >> NEWS M

Tumor suppressor genes vital to regulating blood precursor cells in fruit flies

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Stem Cell Research at UCLA.

"We wondered how an organism knows how many blood cells to make and when to make them in the context of injury and repair to tissue. In particular, we wondered how the blood progenitor cells sense that change and know when it's time to make more blood cells," Martinez-Agosto said. "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."

The study appears Sept. 5, 2012 in the advance online issue of the peer-reviewed journal *Development*.

Michelle Dragojlovic-Munther, a graduate student in the Martinez-Agosto laboratory and first author of the study, found that cells with increased activity of TOR have a competitive advantage, allowing them to divide and make more of themselves so they can make blood. These progenitors, Dragojlovic-Munther found, 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. If they treated the flies with antioxidants, which reduce ROS levels, the c

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Page: [All](#) [1](#) [2](#)

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