

'Good' cells can go 'bad' in a 'bad neighborhood'

March 22 2010, by B. D. COLEN



“It [the environment in which the cells develop] can make the system go askew,” David Scadden explained.

(PhysOrg.com) -- The general theory of cancer development holds that malignancies occur because of the presence of certain genetic elements within the affected cells.

But a new study by Harvard researchers at Massachusetts General Hospital (MGH) indicates that “good” cells can become cancerous because of exposure to a “bad” environment within the body — similarly to the way a “good boy” may turn to crime when exposed to the pressures of life in a crime-ridden neighborhood.

In their paper in today’s edition of the journal *Nature*, David T. Scadden and colleagues report that normal blood stem cells “are dependent upon

their environment. They get their cues from the surrounding ‘neighborhood’ of bone cells,” says Scadden, co-director of the Harvard Stem Cell Institute and director of the MGH Center for Regenerative Medicine. “It [the environment in which the cells develop] can make the system go askew,” Scadden explained.

Working with mice with normal blood stem cells, Scadden, who is also co-chair of Harvard’s inter-School Department of Stem Cell and Regenerative Biology (SCRB), and his team found that when they made a particular genetic alteration in the bone cells surrounding the [blood stem cells](#) of the mice, the mice developed a condition called myelodysplasia, a blood disease that is often a precursor of acute myelogenous leukemia (AML), a highly aggressive, usually fatal, form of cancer.

Scadden said it has long been known that a large fraction of patients who develop myelodysplasia “don’t have any known genetic abnormality in their bone marrow. But myelodysplasia is called pre-leukemia, so why don’t they? That suggests that it’s not their blood [stem cells](#) that are defective, but rather that there’s something wrong with the environment in which their blood cells reside.”

According to Marc H.G.P. Raaijmakers, a postdoctoral fellow in Scadden’s lab and the lead author of the *Nature* report, “our findings bring new insight into how cancer can emerge, indicating that nearby cells gone bad can facilitate a cell becoming malignant.

“In this case,” notes Raaijmakers, “the mice developed fatal AML and were shown to have rapidly developed new genetic injuries in [blood cells](#)” after exposure to the defective [bone cells](#) in their environment.

Scadden and Raaijamakers both said that the findings might suggest a new approach for developing cancer therapies — targeting interactions

between the cells that become malignant, and the “bad” [cells](#) in their neighborhoods.

Provided by Harvard University

Citation: 'Good' cells can go 'bad' in a 'bad neighborhood' (2010, March 22) retrieved 19 April 2024 from <https://medicalxpress.com/news/2010-03-good-cells-bad-neighborhood.html>

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