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Simple chemical procedure augments therapeutic potential of stem cells

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BOSTON, Mass. (Oct. 31, 2008) Adult stem cells resemble couch potatoes if they hang out and divide in a dish for too long. They get fat and lose key surface proteins, which interferes with their movement and reduces their therapeutic potential. Now, via a [simple chemical procedure](#), researchers have found a way to get these cells off the couch and over to their therapeutic target.

To do this, they simply added a molecule called SLeX to the surface of the cells. The [procedure](#) took just 45 minutes and restored an important biological function.

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"Delivery remains one of the biggest hurdles to stem cell therapy," explains senior author Jeffrey Karp, an instructor at the Harvard-MIT Division of Health Sciences and Technology. "The blood stream offers a natural delivery vehicle, but stem cells don't move through blood vessels normally after being expanded in culture. Our [procedure](#) promises to overcome this obstacle."

These findings will be published online in the journal *Bioconjugate Chemistry* on Oct. 31.

In order for cells injected into the blood stream to be therapeutically useful, they need to take initiative to reach target tissues. But instead, cultured stem cells go with the flow. They move through the body quickly, carried by the current, which means they seldom contact the sides of blood vessels. Thus, they have fewer opportunities to escape into the surrounding tissue by squeezing between cells of the vessel wall. Adult stem cells must escape before they can colonize surrounding tissue and rebuild damaged structures.

In February of 2008, HMS associate professor Robert Sackstein (at Brigham and Women's Hospital) and colleagues showed they could correct this problem by adding a particular molecule to the surface of adult stem cells. This moleculea cousin of SLeXformed temporary connections with proteins on the blood vessel wall, serving as a kind of weak tape. But Sackstein's method involved enzymes, which m

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