

Unlocking Stem Cell Gates

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Prof. Tsvee Lapidot and Ph.D. student Isabelle Petit. Raising anchor

To obtain healthy stem cells for transplantation - either from a healthy donor or from the patient himself before or during chemotherapy - these cells must be encouraged to exit the marrow into the bloodstream (in other words, they must be "mobilized"). Looking for the mobilization signal, Prof. Tsvee Lapidot of the Institute's Immunology Department and Ph.D. student Isabelle Petit studied the cascade of events in the bone marrow leading to mobilization.

The scientists learned that stem cells in the marrow are freed into the bloodstream via a key protein called SDF-1. SDF-1 had previously been found by this and other research teams worldwide to anchor stem cells inside the marrow by activating adhesion molecules (molecules that serve as "glue"). Lapidot and Petit found that for stem cell

mobilization to take place, SDF-1 must be degraded, and they uncovered an underlying "anchors aweigh" mechanism.

The findings, published in *Nature Immunology*, may lead to the improved collection of stem cells for clinical transplantations. Key elements of the opposite process - the migration of cells into the marrow - were elucidated by Lapidot and his colleagues in an earlier study. The scientists managed to dramatically increase the proportion of stem cells capable of migrating to the marrow, a factor critical to the success of transplantation. Both studies were made possible by a unique experimental system developed by Lapidot's team.

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