Study results: Adult stem cells from bone marrow

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Researchers from the University of Maryland School of Maryland report promising results from using adult stem cells from bone marrow in mice to help create tissue cells of other organs, such as the heart, brain and pancreas - a scientific step they hope may lead to potential new ways to replace cells lost in diseases such as diabetes, Parkinson's or Alzheimer's. The research in collaboration with the University of Paris Descartes is published online in the July 2, 2012 edition of *Comptes Rendus Biologies*, a publication of the French Academy of Sciences.

"Finding stem cells capable of restoring function to different damaged organs would be the Holy Grail of tissue engineering," says lead author David Trisler, PhD, assistant professor of neurology at the University of Maryland School of Medicine.

He adds, "This research takes us another step in that process by identifying the potential of these adult bone marrow cells, or a subset of them known as CD34+ bone marrow cells, to be 'multipotent,' meaning they could transform and function as the normal cells in several different organs."

University of Maryland researchers previously developed a special culturing system to collect a select sample of these adult stem cells in bone marrow, which normally makes red and white blood cells and immune cells. In this project, the team followed a widely recognized study model, used to prove the multipotency of embryonic stem cells, to prove that these bone marrow stem cells could make more than just

blood cells. The investigators also found that the CD34+ cells had a limited lifespan and did not produce teratomas, tumors that sometimes form with the use of embryonic stem cells and adult stem cells cultivated from other methods that require some genetic manipulation.

"When taken at an early stage, we found that the CD34+ cells exhibited similar multipotent capabilities as embryonic stem cells, which have been shown to be the most flexible and versatile. Because these CD34+ cells already exist in normal bone marrow, they offer a vast source for potential cell replacement therapy, particularly because they come from a person's own body, eliminating the need to suppress the immune system, which is sometimes required when using adults stem cells derived from other sources," explains Paul Fishman, MD, PhD, professor of neurology at the University of Maryland School of Medicine.

The researchers say that proving the potential of these adult bone marrow stem cells opens new possibilities for scientific exploration, but that more research will be needed to see how this science can be translated to humans.

"The results of this international collaboration show the important role that University of Maryland School of Medicine researchers play in advancing scientific understanding, investigating new avenues for the development of potentially life-changing treatments," says E. Albert Reece, M.D., Ph.D., M.B.A., vice president for medical affairs at the University of Maryland and the John Z. and Akiko K. Bowers Distinguished Professor and dean of the University of Maryland School of Medicine.

This project builds on three decades of collaboration between the American and French researchers, particularly Dr. Bernard Pessac of the University of Paris Descartes and Dr. Trisler at the University of

Maryland. Researchers from the Multiple Sclerosis Center of Excellence at the Baltimore Veterans Administration Medical Center also contributed to the study.

More information: dx.doi.org/10.1016/j.crvi.2012.05.005