Menstrual blood -- a valuable source of multipotential stem cells?

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Researchers seeking new and more abundant sources of stem cells for use in regenerative medicine have identified a potentially unlimited, noncontroversial, easily collectable, and inexpensive source – menstrual blood.

Stromal stem cells - cells that are present in connective tissues - have recently been identified in endometrial tissues of the uterus. When the fresh growth of tissue and blood vessels is shed during each menstrual cycle, some cells with regenerative capabilities are present and collectable. While collecting menstrual blood stromal cells (MenSCs) directly from tissue would be invasive, retrieving them during the menstrual cycle would not be.

“Stromal stem cells derived from menstrual blood exhibit stem cell properties, such as the capacity for self-renewal and multipotency,” said Amit N. Patel, MD, MS, Director of Cardiac Cell Therapy at the University of Pittsburgh’s McGowan Institute of Regenerative Medicine. “Uterine stromal cells have similar multipotent markers found in bone marrow stem cells and originate in part from bone marrow.”

Published in the most recent issue of *Cell Transplantation* (Volume 17, issue 3), the study examined to what degree MenSCs demonstrated an ability to differentiate into a variety of cell lineages.

Tests showed that MenSCs could differentiate into adipogenic, chondrogenic, osteogenic, ectodermal, mesodermal, cardiogenic, and

neural cell lineages. According to Patel, the sample MenSCs expanded rapidly and maintained greater than 50 percent of their telomerase activity when compared to human embryonic stem cells and better than bone marrow-derived stem cells. “Studies have demonstrated that MenSCs are easily expandable to clinical relevance and express multipotent markers at both the molecular and cellular level,” concluded Patel.

Researchers emphasized the importance of the abundance and plasticity of MenSCs. Based on the results of their studies, they noted the potential for MenSCs in regenerative transplantation therapies for many different organs and tissues. “The need for regenerative therapies using cells with the ability to engraft and differentiate is vast,” said Patel.

“The ideal cell would also have the ability to be used in an allogenic manner from donors for optimal immunogenic compatibility. Due to their ease of collection and isolation, MenSCs would be a great source of multipotent cells if they exhibit this property along with their ability to differentiate,” concluded Julie G. Allickson, Ph.D., Vice President of Laboratory Operations and Research & Development, Cryo-Cell International, Inc., the study-partner company that identified, extracted, and initially analyzed the cells. “The preliminary results are extremely encouraging and support the importance of further study of these cells in several different areas including heart disease, diabetes and neurodegenerative disease.”

Dwaine Emerich, Ph.D., a section editor for Cell Transplantation, believes that “These studies are a significant step forward in the development of transplantable stem cells for human diseases because they address major issues including routine and safe cell harvesting of renewable cells that maintain their differentiation capacity and can be scaled for widespread clinical use.”

Source: Cell Transplantation Center of Excellence for Aging and Brain Repair