Mothers Harbor Fetal Stem Cells: A Boost for Stem Cell Research
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By Megan Rauscher

NEW YORK (Reuters Health) Jul 06 - Researchers have found that fetal cells that are most likely transferred to the mother during pregnancy persist in the maternal circulation and tissues and have multilineage potential. They are capable of differentiating into hepatocytes as well as epithelial cells in the thyroid, cervix, intestine, and gallbladder.

"The important [finding] of this study is that adult women may acquire and retain fetal stem cells naturally as a result of pregnancy, and that these cells may have therapeutic potential," Dr. Diana W. Bianchi from Tufts University School of Medicine in Boston told Reuters Health.

If these so-called pregnancy-associated progenitor cells (PAPCs), are shown to be "true stem cells, they possess the developmental advantages of being fetal in origin, but can be retrieved without the ethical controversy associated with obtaining fetal material," Dr. Bianchi said in a statement.

Many prior studies have documented the presence of fetal cells in maternal blood and tissues following pregnancy, the authors explain in the July 7th issue of the Journal of the American Medical Association. They conducted the current study to see if "fetal microchimeric cells express markers of epithelial, leukocyte, and hepatocyte differentiation within maternal organs."

Dr. Bianchi and colleagues studied archived paraffin-embedded tissue section specimens from 10 women who bore sons and were previously found to have high levels of microchimeric cells.

Almost all tissues contained XY+ cells bearing CD45, the common leukocyte antigen at varying frequencies. "These results are consistent with previous findings that suggest that fetal microchimeric cells are originally blood cells, including hematopoietic progenitor cells," they note.

Of note, in maternal epithelial tissues (thyroid, cervix, intestine, and gallbladder), up to 60% of XY+ cells expressed cytokeratin, a marker of epithelial cell differentiation, they report. Conversely, in hematopoietic tissues, such as lymph nodes and spleen, 90% of XY+ cells expressed CD45, a common leukocyte antigen.

Perhaps the most interesting finding, two editorialists write, is the finding of hepatocytes of fetal stem origin in liver tissues of one woman with liver injury and another woman following liver transplantation.

"The possibility that newly implanted or persistent fetal stem cells may promote tissue regeneration in maternal disease states is novel and exciting," Drs. Mary Lake Polan and Mylene W. M. Yao from Stanford in California write.

"Originally only viewed as possible culprits of maternal autoimmune disease, PAPCs have now emerged as fetal stem cells with potential therapeutic relevance not only for the mothers who harbor them, but possibly also for first-degree family members or even unrelated individuals," they add.

A related report in JAMA this week provides preliminary evidence that adult bone marrow cells are capable of differentiating into endometrial tissue. According to Dr. Hugh S. Taylor of Yale University in New Haven, Connecticut, donor-derived endometrial cells were detected in endometrial biopsy samples from 4 women who underwent single-HLA antigen mismatched bone marrow transplantation for leukemia.

This suggests that "bone marrow-derived cells can generate endometrium, which may have clinical implications for establishing and maintaining pregnancy, treating uterine disorders, and therapeutically augmenting stem cell transdifferentiation into endometrium," Dr. Taylor writes.

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