

Blood vessel forming potential of stem cells from human placenta and umbilical cord blood

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A study comparing whether endothelial colony-forming cells (ECFCs) derived from human placenta or those derived from human umbilical cord blood are more proliferative and better for forming new blood vessels has found that ECFCs derived from human placenta are more vasculogenic.

The study, carried out by researchers at the Indiana School of Medicine, is published in a recent issue of *Cell Medicine* [2(3)] and is freely available [online](#).

"Circulating ECFCs isolated from [umbilical cord blood](#) and those isolated from [human placenta](#) are phenotypically identical and have equivalent proliferative potential," said study lead author Michael P. Murphy, MD of the Indiana University's Department of Surgery. "After transplantation, the circulating placenta-derived ECFCs formed significantly more blood vessels in vivo than the ECFCs derived from umbilical cord blood, indicating not only that there are inherent functional differences between resident and circulating ECFC populations, but that the placenta-derived cells are more vasculogenic."

Umbilical cord blood and the extra-embryonic membranes of placenta are ideal sources of [progenitor cells](#), said the researchers, because the tissues are discarded as medical waste and ethical concerns facing [embryonic stem cells](#) are avoided. The quantity of cells that can be derived from placenta, however, is much greater than the amount that can be derived from umbilical cord blood, making the placenta the more abundant source.

They concluded that the placenta represents an abundant source of ECFCs that could provide a therapeutic dose of cells.

"The potential volume of placenta-derived ECFCs that can be harvested from a single placenta would provide a sufficient dose of cells without the necessity of expansion," noted Murphy.

According to the researchers, the role of circulating ECFCs has yet to be determined, yet circulating mature [endothelial cells](#) are rarely found in normal, healthy individuals as they are markers of [vascular damage](#), remodeling and dysfunction.

"We envision that placenta-derived ECFCs may provide some benefit in neonatal cerebral ischemia or can be used for tissue banking for future and be useful in treating cardiovascular disease," said Murphy and his colleagues.

More information: Rapp, B. M.; Saadatzedeh, M. R.; Ofstein, R. H.; Bhavsar, J. R.; Tempel, Z. S.; Moreno, O.; Morone, P.; Booth, D. A.; Traktuev, D. O.; Dalsing, M. C.; Ingram, D. A.; Yoder, M. C.; March, K. L.; Murphy, M. P. Resident Endothelial Progenitor Cells From Human Placenta Have Greater Vasculogenic Potential Than Circulating Endothelial Progenitor Cells From Umbilical Cord Blood *Cell Med.* 2(3):85-96; 2011.

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