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# Research suggests promise of cell therapy for bowel disease

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New research shows that a special population of stem cells found in cord blood has the innate ability to migrate to the intestine and contribute to the cell population there, suggesting the cells' potential to treat inflammatory bowel disease (IBD).

"These cells are involved in the formation of blood vessels and may prove to be a tool for improving the vessel abnormalities found in IBD," said lead author Graca Almeida-Porada, M.D., Ph.D., a professor at Wake Forest Baptist Medical Center's Institute for Regenerative Medicine. The research is published in the current print issue of the journal *Hepatology*.

Up to 1 million Americans have IBD, which is characterized by frequent diarrhea and abdominal pain. IBD actually refers to two conditions – ulcerative colitis and Crohn's disease – in which the intestines become red and swollen and develop ulcers. With IBD, blood vessels in the intestine leak and contribute to inflammation.

While there is currently no cure for IBD, there are drug therapies aimed at reducing inflammation and preventing the immune response. However, these therapies aren't always effective. The long-term aim of the research is to develop an injectable cell therapy to induce tissue recovery.

The work, performed while Almeida-Porada was at the University of Nevada, also involved colleagues from Indiana University School of

Medicine. The researchers studied a special population of cells, known as endothelial colony-forming cells, found in cord blood, bone marrow and circulating blood. The finding in 1997 that the cells can contribute to blood vessel formation in adults, not just embryos, initiated the notion of using them for therapy. Studies in humans have validated the ability of these cells to improve reduced blood flow to the limbs and to treat heart diseases.

However, there have been few studies to explore the inherent biologic ability of these cells to home to different organs and contribute to tissue-specific cell populations. Evaluating their potential to migrate to the intestine was an obvious choice, said Almeida-Porada, because dysfunctional blood vessels are a hallmark of IBD. Not only are circulating levels of vessel-forming cells reduced in patients with IBD, but a key factor in IBD progression is the development of abnormal or immature blood vessels, which leads to chronic inflammation.

The cells were injected into fetal sheep at 59 to 65 days gestation. About 11 weeks later, intestinal tissue was analyzed to detect the presence of the human cells. The researchers found that the human cells had migrated to the intestine and contributed significantly to the cell population there.

"This study shows that the cells can migrate to and survive in a healthy intestine and have the potential to support vascular health," said Almeida-Porada. "Our next step will be to determine whether the cells can survive in the 'war' environment of an inflamed intestine."

The researchers also evaluated the ability of the cells to home to the liver. Smaller numbers of cells reached the liver than the intestine, suggesting that new strategies would be needed to enhance the therapeutic potential for this organ.