

Healthy blood vessels may prevent fat growth

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The cells lining blood vessels are known to be important for maintaining health, but researchers at the Indiana University School of Medicine believe these cells may perform an unsuspected task – controlling the development of fat cells. Their findings are reported in the September issue of the journal *Stem Cells*.

The researchers found that precursor or stem cells have a markedly reduced tendency to develop into fat cells when placed in direct contact with healthy endothelial cells, which are the cells that line blood vessels.

"The key to this discovery was our recent observation that these cells, also known as adipose stromal cells, in fat tissue are in very close contact with endothelial cells in small blood vessels and capillaries," said Keith L. March, M.D., Ph.D., co-principal investigator of the study and director of the Indiana Center for Vascular Biology and Medicine (ICVBM).

"Once we had recognized this link between endothelial and stromal cells, it was a logical step to ask how these cells can influence each other," said Dr. March, who also is a professor of medicine, physiology and biomedical engineering at the IU School of Medicine and Krannert Institute of Cardiology.

Dr. March and his colleagues are researching uses for one of nature's building blocks, adipose stem cells, which they harvest from fat tissues. Their research looks at ways to treat vascular disease, including the use of adipose stem cells to grow new vessels as a treatment for peripheral

artery disease.

When the adipose stem cells were mixed with endothelial cells, they were less likely to develop into fat cells, said Gangaraju Rajashekhar, Ph.D., lead author of the journal article and a research associate at the Indiana Center for Vascular Biology and Medicine.

What we discovered was that endothelial cells released proteins – including Wnt proteins to be precise – that play a significant role in blocking fat cell development. Wnt proteins regulate development and differentiation in many tissues and may even play a role in aging," said Dr. Rajashekhar.

The researchers cautioned that more studies are needed to determine whether repair of unhealthy endothelial cells also can help to control fat growth.

"We know now that endothelial cells in blood vessels cells help tell adipose stem cells what to do," said Matthias Clauss, Ph.D., an ICVBM co-principal investigator of the study and an associate professor for cellular and integrative physiology at the IU School of Medicine.

"What we don't know yet is how the formation of fat cells influences the blood vessel lining cells. Our current hypothesis is that endothelial dysfunction promotes fat cell development, accompanied by new blood vessel growth. We hope to soon be able to interrupt this cycle," said Dr. Clauss.

This research may result in new options for treatment of cardiovascular diseases and also could provide physicians with another weapon in the war on obesity.

Source: Indiana University

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