The body's bacteria affect intestinal blood vessel formation

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Researchers at the Sahlgrenska Academy at the University of Gothenburg, Sweden, have discovered a previously unknown mechanism which helps intestinal bacteria to affect the formation of blood vessels. The results, which are presented in *Nature*, may provide future treatments of intestinal diseases and obesity.

There are ten times more bacteria in our intestines than cells in the human body. However, we know relatively little about how the normal gut microbiota functions and the resulting effects on our physiology.

Previously unknown mechanism

In a study of mice, researchers at the University of Gothenburg's Sahlgrenska Academy have discovered a previously unknown mechanism by which gut microbiota influences intestinal physiology and blood vasculature remodelling. The results, which are published in the online version of the highly respected scientific journal *Nature* on 11 March, open up future opportunities to control the intestine's absorption of nutrients, which in turn may be used to treat conditions such as intestinal diseases and obesity.

New blood vessels

The study focuses on villi, finger-like projections which are about one millimetre long, and which increase the surface area of the intestine and

maximise its ability to absorb nutrients. In the presence of bacteria, these villi become shorter and wider, which means that new blood vessels must be formed. However, the process involved has previously been unclear.

"Zip code" for protein signals

"Our study shows that signals from the normal gut microbiota that induces blood vessel formation in the small intestine" says researcher Fredrik Bäckhed, who led the study at the Sahlgrenska Academy. "In simplified terms, the intestinal bacteria promote the mucosal cells in the intestine to attach a sugar molecule to a specific protein. The sugar molecule acts like a zip code moving it to the cell surface where it induces signaling.

"It will take time before the results can be applied in a clinical context and converted into new therapies. But our discovery is exciting, and is a result of fundamental basic research which teaches us a great deal about how we live in cooperation with the normal gut microobiota."

More information: Tissue factor and PAR1 promote microbiota-induced intestinal vascular remodeling, published in *Nature* on 11 March.

Provided by University of Gothenburg