

MICROBIOTA

Gut microbes might promote intestinal angiogenesis

More and more studies are helping to unravel the role of microbial products in regulating the immune response in health and disease. “However, little is known about how these products regulate the function of other cell types,” explains Claudio Fiocchi. “Our laboratory has previously reported the existence of a strong angiogenic response in IBD-involved mucosa; it seemed logical and important to us to ask the

question of whether microbial products could stimulate an angiogenic response in human intestinal microvascular endothelial cells (HIMECs).”

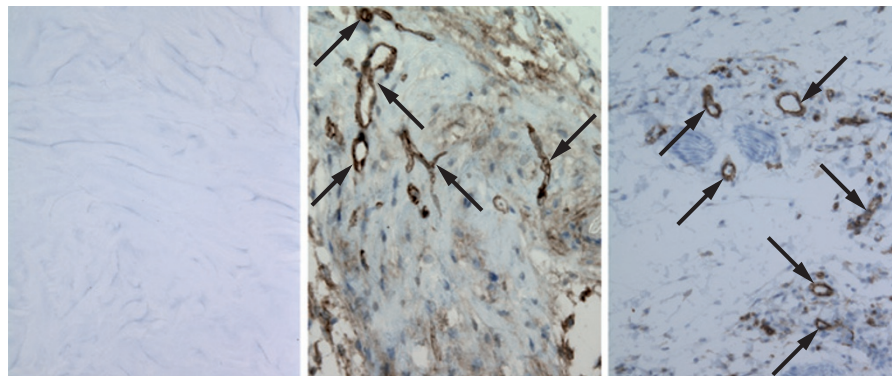
The researchers exposed HIMECs to bacterial ligands specific for certain Toll-like receptors (TLRs) and NOD-like receptors (NLRs). An *ex vivo* assay and *in vivo* assay (using collagen gel) were also performed. “We used this combination of assays to gain a comprehensive view

of the potential proangiogenic activity of a variety of microbial products under a number of different experimental conditions that mimic events in IBD mucosa,” says Fiocchi.

Bacterial ligands were found to induce proliferation, migration, tube formation and production of proangiogenic factors from HIMECs. Moreover, vessel sprouting and angiogenesis were observed in the *ex vivo* and *in vivo* assays, respectively. All bacterial ligands were able to induce an angiogenic response—although in a cell-dependent and ligand-dependent manner.

Fiocchi concludes that gut inflammation could potentially be improved by modulating the gut microbiota or blocking TLRs or NLRs to prevent proangiogenic activity.

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Collagen gels containing medium alone (left panel) and ligands for TLR4 (middle panel) and NOD1 (right panel) show vessel growth demonstrated by CD31-positive endothelial cells (arrows). Permission obtained from Elsevier © Schirbel, A. *et al.* *Gastroenterology* doi:10.1053/j.gastro.2012.11.005. Panels taken from Figure 3.

Original article Schirbel, A. *et al.* Activation of Toll-like and Nod-like Receptors promotes angiogenesis in intestinal mucosal endothelial cells. *Gastroenterology* doi:10.1053/j.gastro.2012.11.005