Medical Xpress

Extending the effective lifetime of stents

October 6 2011

Implanted stents can reopen obstructed arteries, but regrowth of cells into the vessel wall can entail restenosis. Research at LMU now shows that an antimicrobial peptide inhibits restenosis and promotes vascular healing. Thus, coating stents with this peptide could increase their clinical efficacy.

Atherosclerosis is a major contributor to worldwide mortality and is characterized by narrowing of the arteries due to a thickening of the vessel wall. This restricts blood supply to the tissues and can lead to heart attack or stroke. In many cases, implantation of a stent can successfully be used for revascularization of the obstructed or stenosed arteries to improve blood flow. However, when a regrowth of cells occurs in the inner vessel wall (the intima) or healing of the endothelial cell lining in the vessel lumen is incomplete, the result can be a restenosis, i.e. recurrent arterial obstruction and restriction of blood flow.

A research team led by LMU's Professor Christian Weber has now shown that a specific cell type called neutrophils, and molecules that they secrete, inhibit this life-threatening complication – which is observed in up to one-third of all stent implantations.

One of the products secreted by neutrophils, a short peptide named cathelicidin, promotes the healing of damaged blood vessels and patency of the stents by improving endothelial cell recovery, and prevents the formation of so-called neointima, which consists of cells of the inner vessel wall that contribute to restenosis at the site of stent implantation. Indeed, experiments in mice demonstrated that the incidence of

restenosis was significantly reduced when miniaturized stents were coated with the peptide.

"Most modern stents release compounds aiming to block cell growth and inhibit inflammation – nevertheless restenoses and other serious complications, such as thromboses, can still occur ," says Weber, Director of the Institute for Cardiovascular Prevention at Munich University Medical Center. "We hope that cathelicidin-coated stents have the expected effect in human subjects. Moreover, we plan to use our model systems to test the effects of other products secreted by neutrophils, as well as other peptides with similar functions to cathelicidin."

More information: *Science Translational Medicine*, online, 5. October 2011.

Provided by Ludwig-Maximilians-Universitat Munchen