

Innovative, non-invasive treatment concept for atherosclerotic plaques / arteriosclerosis

Application area

The aftereffects of atherosclerosis, i.e. cardiovascular disease, are the leading cause of death in Western industrialized countries.

Atherosclerosis, a system disease of the arteries marked by the deposition of blood fats, thrombi, connective tissue and calcium hydroxyapatite into the walls of blood vessels ("vascular calcification"), increases with advancing age. However, nowadays younger people also suffer from this disease, which is mainly due to an unhealthy diet and lack of physical exercise. The deposits ("atherosclerotic plaques") cause a constriction and hardening of the arteries, with the result of a reduced or completely interrupted blood flow, culminating in a myocardial infarction or stroke.

Development of a non-invasive treatment concept that allows atherosclerotic plaques to be dissolved has been made possible, so that prevention as well as direct treatment of atherosclerosis might soon be a reality.

State of the art

At an early stage of atherosclerosis, the disease is treated conservatively with drugs that are meant to inhibit blood clotting and thus the emergence of thrombi. Drugs against fat metabolism disorders, so-called lipid or cholesterol-lowering drugs, might also be prescribed. In cases of advanced, i.e. life-threatening arteriosclerosis, generally only surgical interventions, such as performing a balloon angioplasty, the setting of a stent or laying a bypass promise good results.

Overall, the therapeutic possibilities are unsatisfactory, as they are either not very effective or invasive and have side effects. Prevention is best supported by life style changes.

Innovation

Scientists at the University of Konstanz have developed multi-functional block copolymers which include amino acid components. The latter self-assemble as micelles, i.e. they form polymeric nanoparticles. The block copolymers can remove cholesterol and calcium ions from the atherosclerotic plaques and thus dissolve them. Cholesterol and calcium ions migrate into the interior of the micelles and are excreted via urine. By changing their mixing ratio, block copolymers can also be adjusted to the plaque composition of the individual patient in order to optimize their effect.

Block copolymers could be used as a kind of blood filter ("rheopheresis") and ideally be taken as oral medication.

Your benefits at a glance

- ✓ Dissolving of atherosclerotic plaques
- ✓ Block copolymers are pharmacologically and toxicologically inert
- ✓ Block copolymers can be varied to optimize the → treatment of individual patients
- ✓ Block copolymers can be used via rheopheresis or taken orally as medicine
- ✓ For therapy and prevention

Technology transfer

Technologie-Lizenz-Büro GmbH is responsible for the exploitation of this technology and assists companies in obtaining licenses.

Patent portfolio

DE and PCT patent application pending.

Contact

Dr. Frank Schlotter

schlotter@tlb.de

Technologie-Lizenz-Büro (TLB)

der Baden-Württembergischen Hochschulen GmbH

Ettlinger Straße 25, D-76137 Karlsruhe, Germany

Phone +49 721 79004-0, Fax +49 721 79004-79

www.tlb.de

Reference number: 17/007TLB