Treatment of heart attacks with APOSEC: further mechanism unravelled

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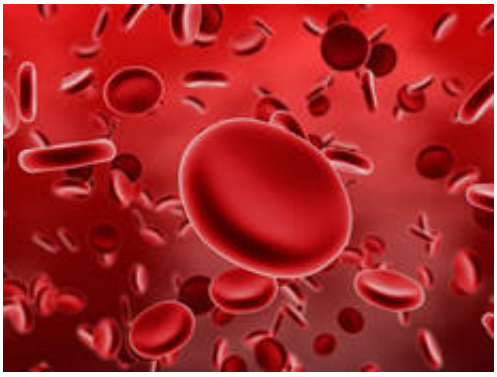

The protein concentrate APOSEC, obtained from white blood cells, when given intravenously 40 minutes after an acute myocardial infarction, largely prevents scarring of the cardiac muscle. These were the findings of Hendrik Jan Ankersmit, Head of the Christian Doppler Laboratory for Diagnosis and Regeneration in Cardiac and Thoracic Diseases at the MedUni Vienna, which were unveiled back in the autumn of 2011. A study by a team of researchers led by Ankersmit has now unravelled further mechanisms responsible for how APOSEC works.

A lack of oxygen, due to inflammation and "sticking" of the incoming blood supply caused by platelets in the blood can lead to microvascular obstruction (MVO) in the tissue of the affected organ. In ischaemic

conditions (such as myocardial infarctions, strokes, etc.), an additional drug treatment that combines the effects of vasodilation, platelet aggregation inhibition and immunomodulation would be ideal.

"Through fundamental research, we have demonstrated that APOSEC triggers several of these protective mechanisms at once. APOSEC contains, among others, nitrogen monoxide (NO), which is responsible for the vasodilating and platelet aggregation inhibiting effect after an acute myocardial infarction. In collaboration with the working groups led by Prof. Mariann Gyöngyösi (Cardiology, MedUni Vienna) and Prof. Ivo Volf (Medical Physiology, MedUni Vienna), we have been able to demonstrate in large animal experiments that ECG changes in animals treated with APOSEC resolved and the signs of MVO were prevented."

APOSEC is a product containing soluble proteins that are excreted by white blood cells after they are irradiated. The recovery of white blood cells as 'bio-reactors' is simple and can be compared in terms of effort to a regular blood donation. The product can be produced in advance and is easily available if the worst happens. A GMP facility is currently being set up in collaboration with the Red Cross's Blood Donation Centre in Linz (Dr. Christian Gabriel) to manufacture this "biological" under good manufacturing practice (GMP) conditions.

As part of his PhD thesis, Dr. Konrad Hoetzenecker from the Department of Thoracic Surgery was also able to demonstrate that APOSEC has an immunosuppressive effect in an experimental cardiac muscle inflammation model. Working with Prof. Urs Eriksson from the University of Zürich, it was possible to demonstrate that CD4-positive T cells are forced under the influence of Caspase-8 to undergo programmed cell death (apoptosis). This explains a further fundamental scientific aspect of the effect of APOSEC.

More information: "Secretome of apoptotic peripheral blood cells

(APOSEC) attenuates microvascluar obstruction in a porcine closed chest reperfused acute myocardial infarction model: role of platelet aggregation and vasodilation." K. Hoetzenecker, et al. *Basic Res Cardiol* (2012) 107:292; Article DOI: 10.1007/s00395-012-0292-2

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