

Heparin a key role player in allergy and inflammatory reactions

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Heparin plays a key role in allergic and inflammatory reactions driven by mast cells, scientists from Karolinska Institutet in Sweden shows in an international collaboration involving colleagues from Germany and Switzerland. The study is published in the recent issue of *Immunity*, and sheds some new light on the biological function of heparin.

Heparin has a long history at Karolinska Institutet, since here the substance was originally purified and its [chemical structure](#) was characterized back in 1935 by Professor Erik Jorpes. Knowing about the therapeutic implications Jorpes was one of the pioneers treating patients that suffered from thrombosis with heparin infusions. Today, heparin is still one of the most commonly used anticoagulant drugs.

Professor Jorpes showed that heparin is produced in a specific blood-born [cell population](#), called mast cells. [Mast cells](#) have a central function in allergic and [inflammatory diseases](#) and contribute to increased vascular permeability, allergic and anaphylactic reactions. The current study identifies the underlying mechanism and its therapeutical implications.

The authors show that heparin initiates the production of a hormone - bradykinin - that contributes to swelling, anaphylactic and inflammatory symptoms, which are commonly known to be associated with aberrant mast cell activity. Notably, mast cell-released [heparin](#) generates the inflammatory mediator bradykinin via activation of factor XII (the so-called Hageman Factor) that belongs to the blood coagulation system.

The study thus provides an unexpected link between the clotting cascade and mast cell-driven pro-inflammatory reactions. Drugs that block bradykinin or factor XII activity protect from adverse mast cell-driven effects in patients and

genetically engineered mouse models and could be a new strategy to treat allergic diseases.

More information: Chris Oschatz, Coen Maas, Bernd Lecher, Thomas Jansen, Jenny Björkqvist, Thomas Tradler, Reinhard Sedlmeier, Peter Burfeind, Sven Cichon, Sven Hammerschmidt, Werner Müller-Esterl, Walter A. Wuillemin, Gunnar Nilsson & Thomas Renné, Mast cells increase vascular permeability by heparin-initiated bradykinin formation in vivo, *Immunity*, February 25, 2011, Volume 34, Issue 2.

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