Medical Xpress

Newly discovered mechanism by which blood clots form

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Polyphosphate from blood platelets plays a key role in inflammation and the formation of blood clots, scientists from the Swedish medical university Karolinska Institutet have shown. The study, which is presented in the prestigious scientific journal *Cell*, describes how this mechanism can be used in treatment.

Blood clots are a common cause of myocardial infarction and stroke, and they arise when blood coagulates and clogs a blood vessel. Scientists have shown that the formation of a blood clot involves the aggregation of blood platelets and the formation of structures known as "fibrin threads", in combination with inflammation in the blood vessel. The molecular processes behind this, however, are only partially known.

A research group at Karolinska Institutet, in collaboration with American and European scientists, has discovered that an inorganic polymer, polyphosphate, plays a key role in both inflammation and the formation of blood clots. Experiments on mice and with patient plasma have shown that polyphosphate is released by blood platelets and activates Factor XII, a protein that scientists have previously shown to contribute to coagulation. Polyphosphate also activates inflammatory substances that contribute to leakage from the blood vessel, which is a characteristic feature of inflammation.

The scientists show also that certain enzymes, phosphatases, that break down polyphosphate can prevent both inflammation and the formation of blood clots in the blood vessels of mice. Thus the scientists believe

that phosphatases can become the focus for a new type of treatment for blood clots and inflammation.

More information: 'Platelet Polyphosphates Are Proinflammatory and Procoagulant Mediators In Vivo', Felicitas Müller, Nicola J. Mutch, Wolfdieter A. Schenk, Stephanie A. Smith, Lucie Esterl, Henri M. Spronk, Stefan Schmidbauer, William A. Gahl, James H. Morrissey, and Thomas Renné, *Cell*, online 10 December 2009.

Source: Karolinska Institutet (news : web)