

# **Fibrin sealants in supporting surgical techniques: Strength in factor XIII.**

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## **Abstract:**

Factor XIII has a well-established role in natural coagulation and clot stabilization. It is often added back to fibrin sealants that are used in a wide range of surgical settings to achieve successful hemostasis, tissue adhesion and wound healing. Factor XIII is the final enzyme to be activated in the blood coagulation cascade. It plays an important role in maintaining the balance between coagulation and fibrinolysis. Factor XIII facilitates the formation of covalent cross-links within the fibrin network, forming a loose mesh after activation by thrombin. It adds significant resilience to fibrin clots, augmenting strength by as much as 5-fold. Both fibrin cross-linking and the factor XIII-catalyzed ligation of the fibrinolysis inhibitor  $\alpha_2$ -antiplasmin to the fibrin clot contribute to the increased proteolytic resistance of factor XIII-stabilized clots. Preclinical studies indicate that the inclusion of factor XIII in fibrin sealants used for vascular grafting significantly reduces suture-hole blood loss. This has important implications for the successful control of bleeding in comparable clinical situations. The advantages of factor XIII stabilized clots (increased strength, resistance to proteolysis, promotion of wound healing) suggest that the presence of factor XIII in fibrin sealants may optimize their performance in the clinical setting. The aim of this paper is to review preclinical data that provide evidence for a potentially positive role for factor XIII in fibrin sealants. © 2003 The International Society for Cardiovascular Surgery. Published by Elsevier Ltd. All rights reserved.