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Microrheology and structural quantification of blood clots as a diagnosis of hypercoagulability

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Clotting is the process by which the flow of blood is stopped after an injury. This process may occur pathologically, in both arteries and veins. In the venous system, the severe forms are called Venous Thromboembolic Events which include Deep Vein Thrombosis and Pulmonary Embolism. Today, 50% of recurrent Venous Thromboembolic Events remain unexplained. Hypercoagulability is likely due to a modification of the conditions of polymerization of the fibrin, the main clot component. Using passive microrheology, we measured the mechanical properties of clots and correlated them under the same conditions with structural information obtained with confocal microscopy. We tested our approach with known alterations: an excess of fibrin monomer and of coagulation Factor VIII. We observed simultaneously a rigidification and densification of the fibrin network, showing the potential of microrheology for hypercoagulability diagnosis.

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