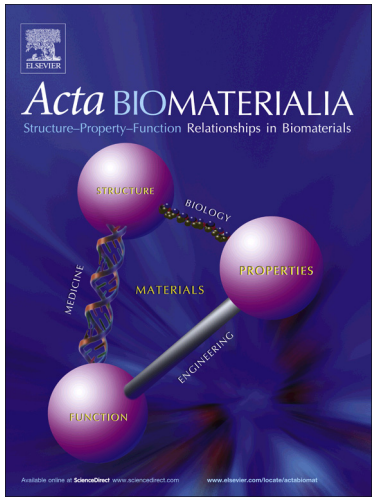

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Stretching Single Fibrin Fibers Hampers Their Lysis

Wei Li[1], Tomas Lucioni[1], Rongzhong Li[1,2], Keith Bonin[1], Samuel S. Cho[1,2], Martin Guthold[1]

[1] Department of Physics, Wake Forest University, Winston-Salem, NC, 27109

[2] Department of Computer Science, Wake Forest University, Winston-Salem, NC, 27109

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Abstract. Blood clots, whose main structural component is a mesh of microscopic fibrin fibers, experience mechanical strain from blood flow, clot retraction and interactions with platelets and other cells. We developed a transparent, striated and highly stretchable substrate made from fugitive glue (a styrenic block copolymer) to investigate how mechanical strain affects lysis of single, suspended fibrin fibers. In this suspended fiber assay, lysis manifested itself by fiber elongation, thickening (disassembly), fraying and collapse. Stretching single fibrin fibers significantly hampered their lysis. This effect was seen in uncrosslinked and crosslinked fibers. Crosslinking (without stretching) also hampered single fiber lysis.

Our data suggest that strain is a novel mechanosensitive factor that regulates blood clot dissolution (fibrinolysis) at the single fiber level. At the molecular level of single fibrin molecules, strain may distort, or hinder access to, plasmin cleavage sites and thereby hamper lysis.