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Driven Microbead Rheology of Fibrin Gels R.C. SPERO, B. SMITH, J. CRIBB, T.E. O'BRIEN, S.T. LORD, R. SUPERFINE, University of North Carolina at Chapel Hill — The rheological properties of fibrin, the primary structural element in blood clots, have been widely studied at the macroscopic level, because its mechanical properties are critical to its physiological function. Microbead rheology (MBR) shows promise for advancing this field in various ways. First, MBR can be performed on small sample quantities (∼1 uL), which is useful for high-throughput experimentation; second, fibrin's complex structure has a range of length scales, such that large cells may not propagate while small viruses diffuse easily through the mesh. Microbeads from 10 um to under 500 nm can probe these length scales. These characteristics suggest MBR could be useful in screening drugs for disorders involving variant clot rigidity. We report on efforts to measure the rheology of fibrin gels over the course of its polymerization. A magnetic force microscope applies pulsed forces to microbeads suspended in fibrin gels. Beads are monitored on an inverted microscope and their positions tracked by software over the 30-minute course of the gelation. A single mode Jefferies model is used to extract viscosity and elasticity from the beads' creep-recovery.

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