Supplemental Material

Collating Recent Advances in Predicting Complex Behavior of Human Blood with Thixo-
represents maximum rouleaux formation at rest. The following structural evolution equation has three terms: 1. Shear induced rouleaux breakdown; 2. Shear rouleaux aggregation; and 3. Aggregation due to Brownian motion.

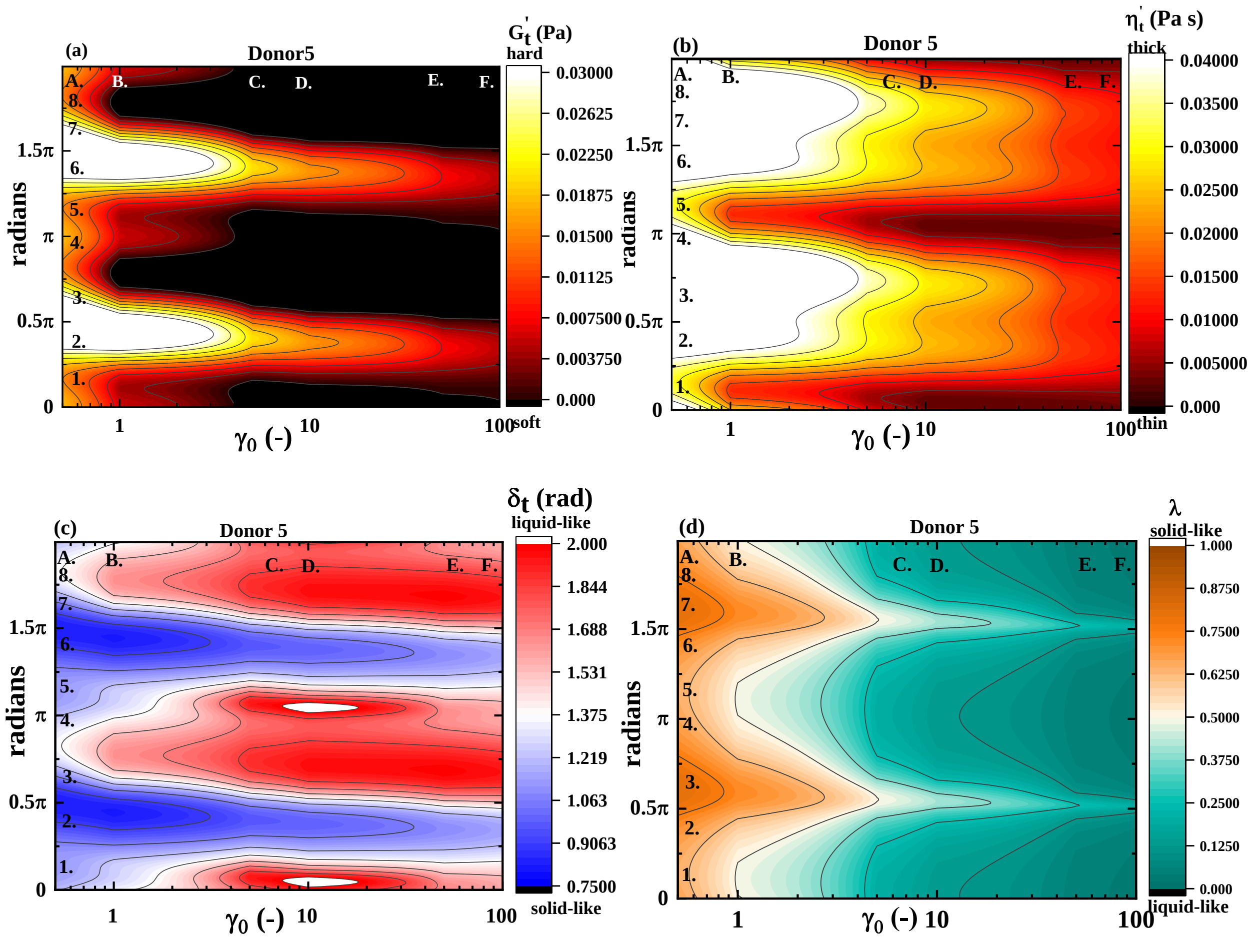

Fig. S1 Donor5 contour maps of human blood created with six set of LAOS at $\omega = 1$ (rad/s) and $\gamma_0 = 0.5,\ 1,\ 5,\ 10,\ 50$ and 100 (-) where the letters A-F corresponding to six sets of LAOS; while numerals 1.-8. correspond to same in Figs. 1-3 and 10 (1/8 cycle increments of a full cycle of oscillatory shear flow); (a) $G_t^{'}$ (Pa), hardness/softness *'solid-like'* metric; (b) $\eta_t^{'}$ thickness/thinness (Pa s), *'liquid-like'* metric; (c) δ_t (rad) transient phase angle; and (d) λ level of microstructure/rouleaux rate of phase angle change [59].

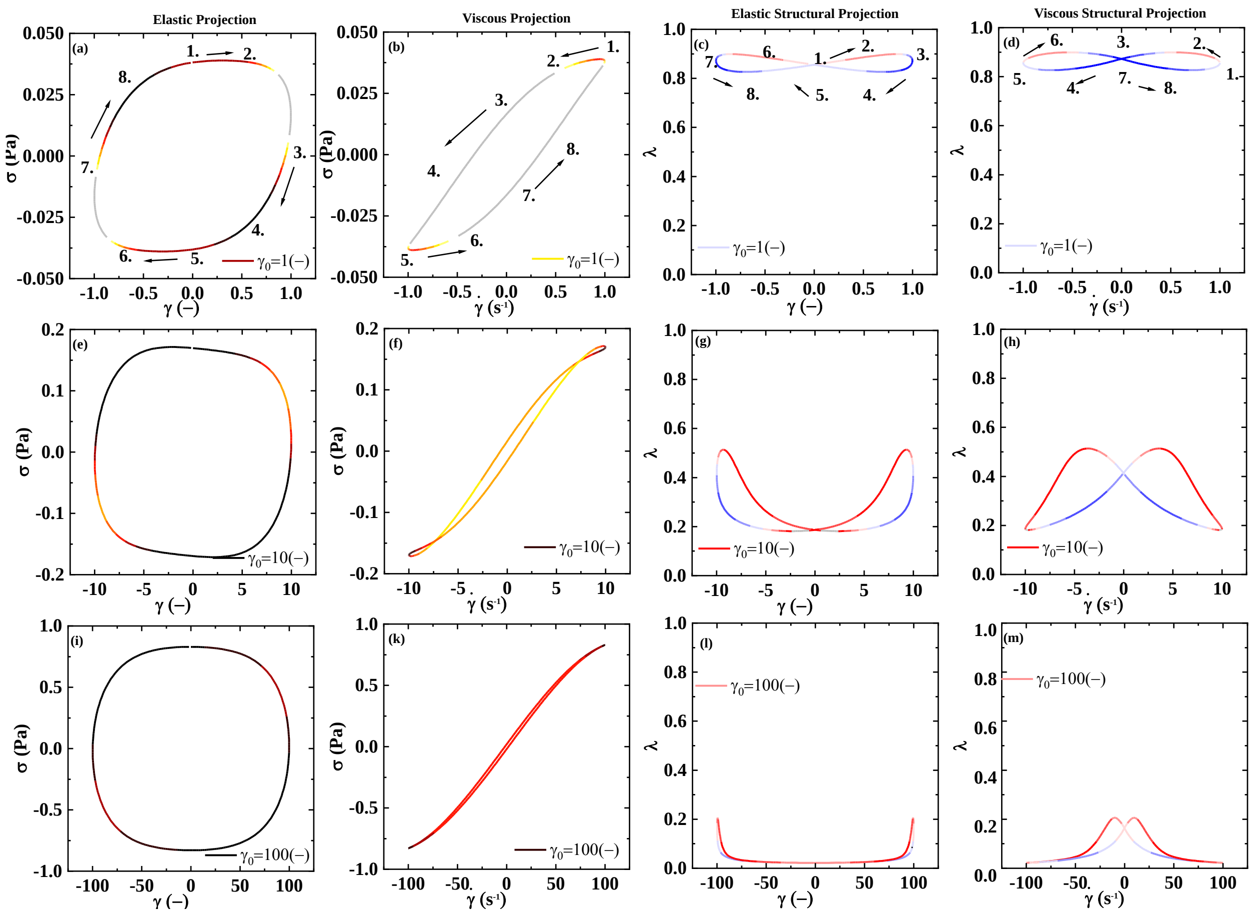

Fig. S2 Elastic and viscous projections, with structural elastic and viscous projections for: (a-d) $\gamma_0 = 1(-)$, ω=1 (rad/s); (e-h) $\gamma_0 = 10(-)$, ω=1 (rad/s); and (i-m) $\gamma_0 = 100(-)$, ω=1 (rad/s). Donor5. (a, e, i color mapping shows transient storage modulus, $G_t^{'}$ (hard/soft) elastic, *'solid-like'*, same color mapping shown in Fig. 9a; b, f, k color mappings shows transient viscous modulus, $\eta_t^{'}$ (thick/thin) *'liquid-like'*, same color mapping shown in Fig. 9b; c-d, g-h, l-m show δ_t transient phase angle, color mapping in Fig. 9c) (Donor5) [59].

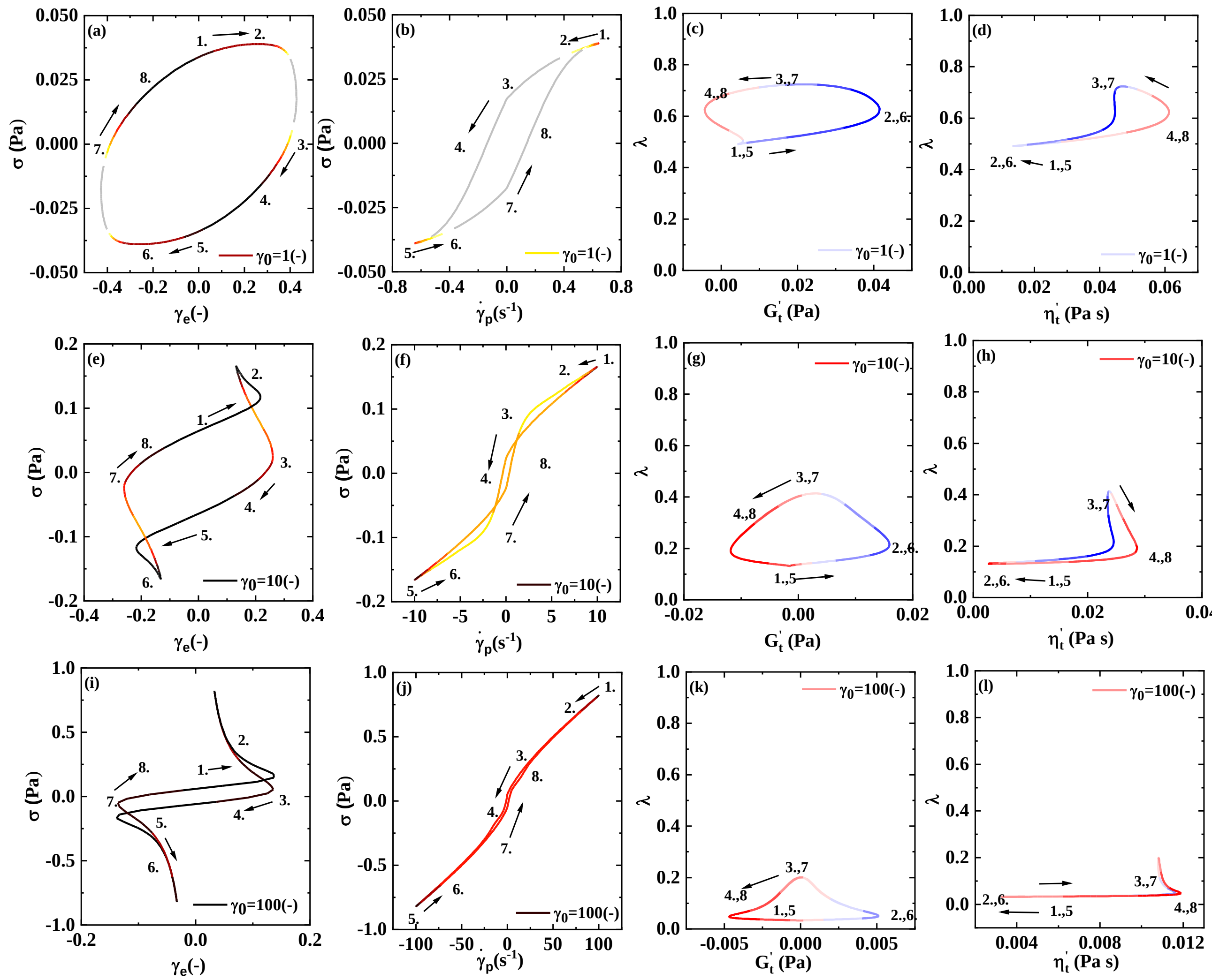

Fig. S3 (a, e, i) Stress vs. elastic strain, γ_e; (b, f, j) Stress vs. plastic shear rate, $\dot{\gamma}_p$; (c, g, k) Rouleaux/microstructure λ vs. transient storage modulus, $G_t^{'}$; and (d, h, l) Rouelaux/microstructure, λ vs. transient viscous modulus, $\eta_t^{'}$ for: (a-d) $\gamma_0 = 1(-)$, $\omega = 1\ (\text{rad/s})$; (e-h) $\gamma_0 = 10(-)$, $\omega = 1\ (\text{rad/s})$; and (i-m) $\gamma_0 = 100(-)$, $\omega = 1\ (\text{rad/s})$. (Donor5) (a, e, i color mapping shows transient storage modulus, $G_t^{'}$ (hard/soft) elastic, *'solid-like'*, same color mapping shown in Fig. 9a; b, f, k color mappings shows transient viscous modulus, $\eta_t^{'}$ (thick/thin) *'liquid-like'*, same color mapping shown in Fig. 9b; c-d, g-h, l-m show δ_t transient phase angle, color mapping in Fig. 9c) [59].

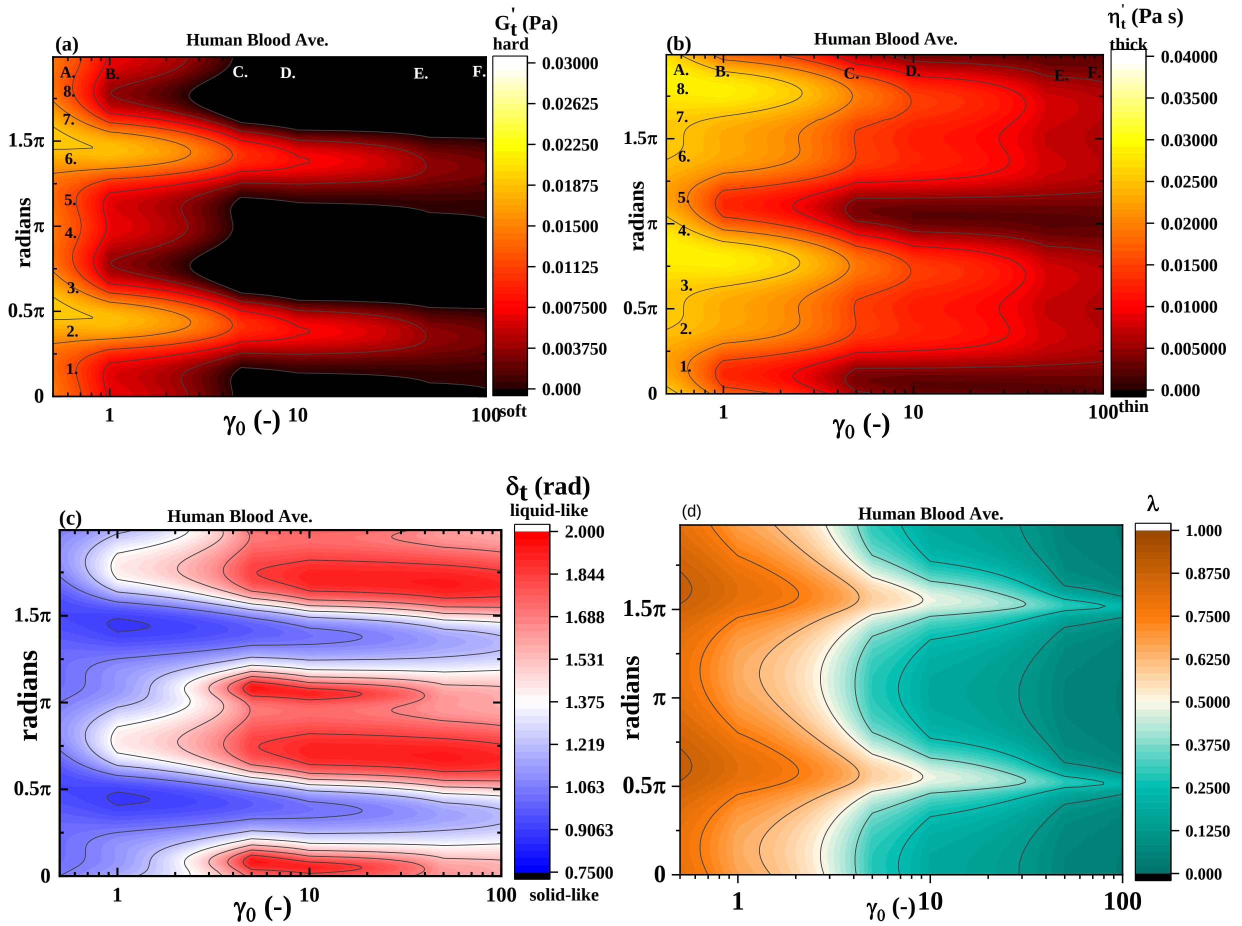

Fig. S4 Aggregated (Donors 1-12) contour maps of human blood created with six set of LAOS at ω=1(rad/s) and $\gamma_0 = 0.5,\ 1,\ 5,\ 10,\ 50$ and 100 (-) where the letters A-F corresponding to six sets of LAOS; while numerals 1.-8. correspond to same in Figs. 1-3 and 10 (1/8 cycle increments of a full cycle of oscillatory shear flow); (a) G_t'(Pa), hardness/softness *'solid-like'* metric; (b) η_t' thickness/thinness (Pa s), *'liquid-like'* metric; (c) δ_t(rad) transient phase angle; and (d) λ level of microstructure/rouleaux rate of phase angle change [46, 55-61, 62].

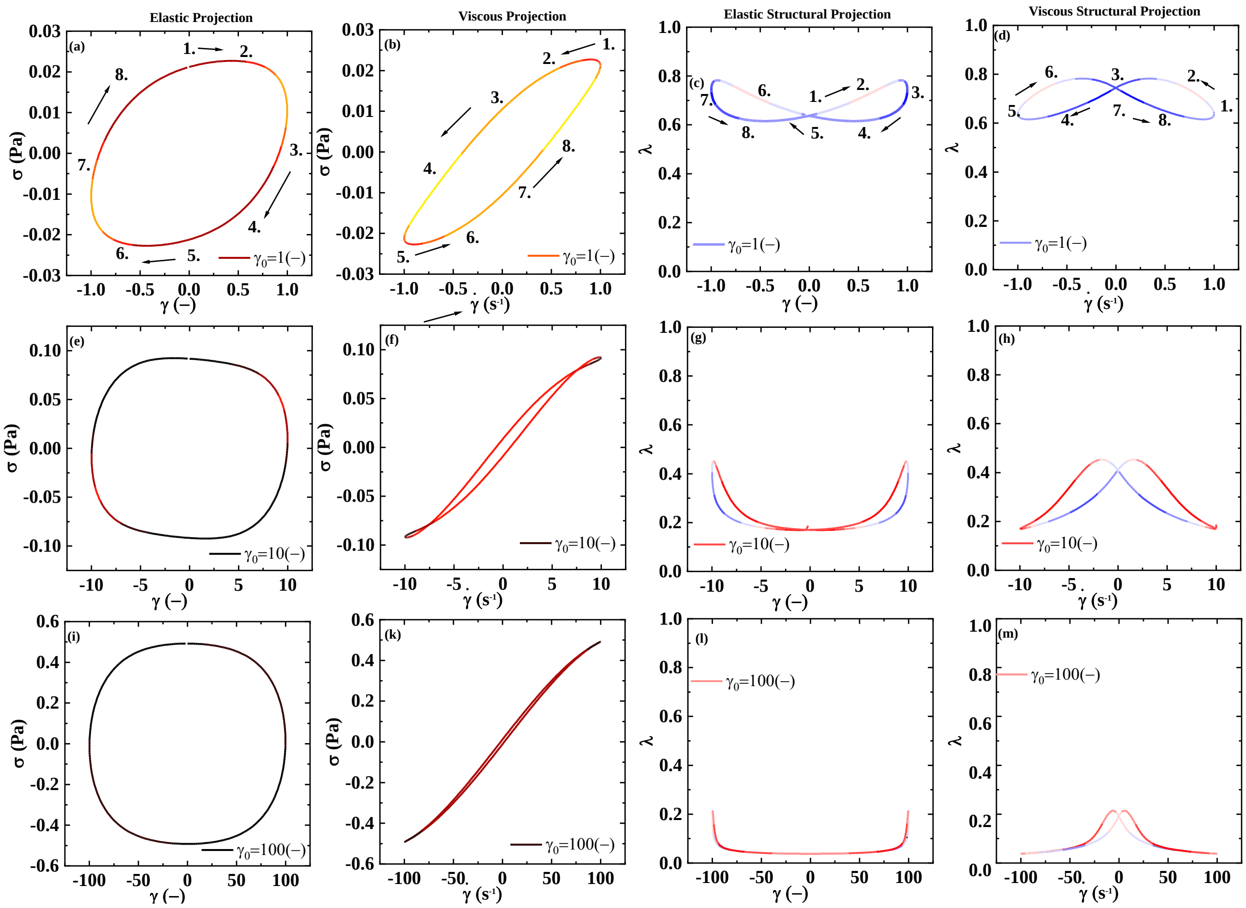

Fig. S5 Elastic and viscous, with structural elastic and viscous projections for: (a-d) $\gamma_0 = 1(-)$, ω=1 (rad/s); (e-h) $\gamma_0 = 10(-)$, ω=1 (rad/s); and (i-m) $\gamma_0 = 100(-)$, ω=1 (rad/s). Donor5. (a, e, i show transient storage modulus, $G_t^{'}$ (hard/soft) elastic, *'solid-like'*, same color mapping shown in Fig. 10a; b, f, k show transient loss modulus, $\eta_t^{'}$ (thick/thin) *'liquid-like'*, same color mapping shown in Fig. 10b; c-d, g-h, l-m show δ_t transient phase angle, color mapping in Fig. 9c and 11c) [62].

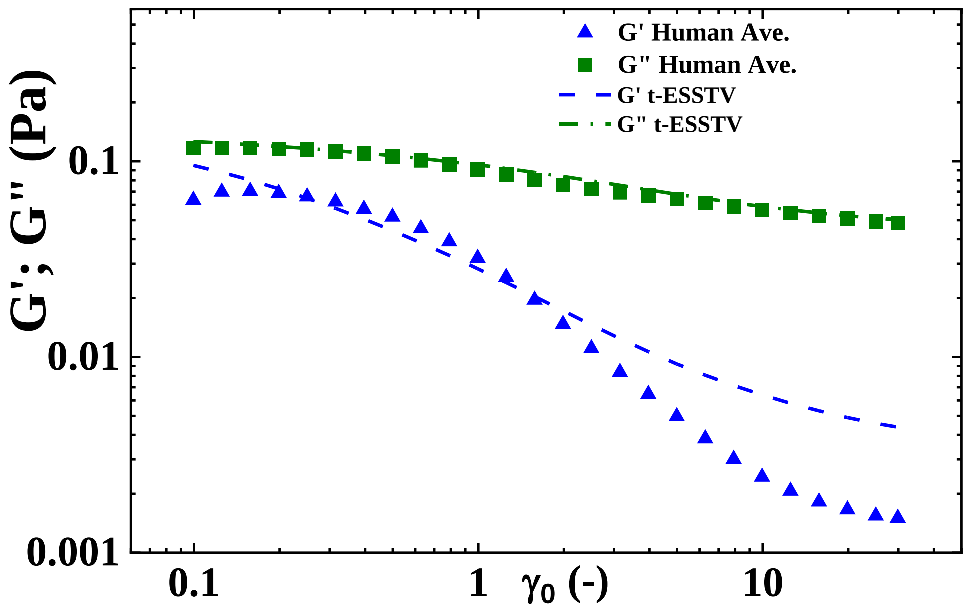

Fig. S6 Aggregated human blood small amplitude oscillatory shear sweep at ω=12.57(rad/s), using Donors 1-12, with t-ESSTV model predictions using the aggregated model parameters, and aggregated data [45, 55-61, 62].