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Surface deformation and shear flow in ligand mediated cell adhesion[1] SARTHOK SIRCAR, ANTHONY ROBERTS, University of Adelaide, SARTHOK SIRCAR / ANTHONY ROBERTS COLLABORATION — We present a unified, multiscale model to study the attachment/detachment dynamics of two deforming, near spherical cells, coated with binding ligands and subject to a slow, homogeneous shear flow in a viscous fluid medium. The binding ligands on the surface of the cells experience attractive and repulsive forces in an ionic medium and exhibit finite resistance to rotation via bond tilting. The microscale drag forces and couples describing the fluid flow inside the small separation gap between the cells, are calculated using a combination of methods in lubrication theory and previously published numerical results. For a select range of material and fluid parameters, a hysteretic transition of the sticking probability curves (i.e., the function g*) between the adhesion phase (when g*¿0.5) and the fragmentation phase (when g*¡0.5) is attributed to a nonlinear relation between the total nanoscale binding forces and the separation gap between the cells. We show that adhesion is favored in highly ionic fluids, increased deformability of the cells, elastic binders and a higher fluid shear rate (until a critical value). Continuation of the limit points (i.e., the turning points where the slope of the function g* changes sign within a select range of critical shear

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