Abstract: The surfaces of blood-contacting devices are procoagulant and activate blood into clots during their use. The clots either cause device failure, embolic complications or both. Anti-fouling coatings are therefore applied to the surfaces of these devices to prevent clot formation locally without systemic effects as seen with systemic anticoagulants (See **Fig. 1**) Unfortunately coated devices still fail from clot formation after about 2 weeks of use. We theorized that the coatings get washed out into flowing blood leading to device failure. The purpose of this study therefore was to develop a flow cell system to test for how long anti-fouling polycarboxybetaine methacrylate (pCBMA) coatings can last under shear stress. To do this, PDMS membranes coated with pCBMA were placed in acrylic flow cells and exposed to variable shear stresses.. Fibrinogen, a key clotting factor, adsorption on PDMS pre and post flows was measured using a standard enzyme-linked immunosorbent assay. Initial results indicate that pCBMA coating on PDMS is stable under the shear stresses tested.