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Interaction between endothelial cells and albumin encapsulated droplets in Poiseuille flow[1] ROBINSON SEDA[2], J. BRIAN FOWLKES[3], JOSEPH BULL[4], University of Michigan - Ann Arbor — Acoustic droplet vaporization (ADV) of DDFP encapsulated microdroplets has the ability to transform these emulsions into larger gas emboli capable of occluding blood vessels for therapy. An albumin shell is able to stabilize the droplet's superheated core, but can also interact with endothelial cells (EC) at the vessel wall if in close proximity. Radial migration of these microdroplets could bring them close enough to make this interaction possible leading to bioeffects that include cell detachment and death if an ADV event occurs. The purpose of this study is to investigate the hydrodynamic conditions (i.e. shear stresses) that make possible this EC-droplet interaction. A flow chamber coated with a monolayer of EC and connected to a syringe pump is used to flow a DDFP droplet solution at physiological shear stresses (1-50 dyne/cm^2) and inspected for droplet attachment. Droplets have been observed to interact and reversibly attach to EC in a static environment, thus it is expected that at low shear stress values interaction and further attachment will be possible. Knowing the flow conditions at which this interaction is likely to occur will aid in preventative measures to avoid significant bioeffects associated with ADV near the vessel wall.

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