

A Static and Dynamic Permeability Assay for Small Molecules Using a Planar Droplet Interface Bilayer

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Drug permeability across a cell membrane has been a crucial issue in drug discovery. Thus, various in vitro permeability assays have been developed such as Caco-2 assay and parallel artificial membrane permeability assay (PAMPA). However, due to the time and cost for culturing cells in Caco-2 assays and ambiguous membrane structures of PAMPA, a simpler yet more accurate method is still required. Hence, we developed a platform to measure the permeability of small molecules across a lipid bilayer. The lipid bilayer was made within a UV cell, and transport of molecules across the bilayer was recorded by UV absorbance over time. We computed the permeability of 5 drugs and our assay gave a higher permeability compared to the others, and this is related to the thickness of membranes. Also we measured the dynamic permeability upon the addition of a membrane disrupting surfactant suggesting that our assay has a capability to detect real-time changes in permeability across the lipid bilayer.