



The Physics of Soft and Biological Matter

P.24 A Label-Free Microfluidic Assay to quantitatively study antibiotic diffusion through lipid membranes

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The recent surge in numbers of antibiotic resistant bacteria has stimulated interest in the mechanisms of antibiotic transport across bacterial cell membranes. We present a label-free microfluidic assay that quantifies the permeability coefficient of a broad spectrum fluoroquinolone antibiotic, norfloxacin, as it diffuses across lipid membranes. We use giant unilamellar vesicles as a model system, tracking the diffusion of norfloxacin molecules into the vesicles using the UV autofluorescence of the drug. We directly obtain the permeability coefficient without requiring knowledge of the drug partition coefficient and validate theoretical predictions for the effect of pH on norfloxacin permeability. This technique can be further extended to quantify the effect of nanopores embedded in the membrane on drug diffusion.