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Transient swelling behavior and drug delivery from a dissolving film deploying anti-HIV microbicide[1] SAVAS TASOGLU, UC, Berkeley, DAVID F. KATZ, Duke University, ANDREW J. SZERI, UC, Berkeley — Despite more than two decades of HIV vaccine research, there is still no efficacious HIV vaccine. Very recently, a research group has shown that a microbicide gel formulation of antiretroviral drug Tenofovir, significantly inhibits HIV transmission to women [1]. However, there is a widespread agreement that more effective and diverse drug delivery vehicles must be developed. In this setting, there is now great interest in developing different delivery vehicles such as vaginal rings, gels, and films. Here, we develop a model for transient fluid uptake and swelling behavior, and subsequent dissolution and drug deployment from a film containing anti-HIV microbicide. In the model, the polymer structural relaxation via water uptake is assumed to follow first order kinetics. In the case of a film loaded with an osmotically active solute, the kinetic equation is modified to account for the osmotic effect. The transport rate of solvent and solute within the matrix is characterized by a diffusion equation. After the matrix is relaxed to a specified concentration of solvent, lubrication theory and convective-diffusive transport are employed for flow of the liquefied matrix and drug dispersion respectively. [1] Karim, et al., Science, 2010.

[1]NIH U19 AI 077289

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