REVIEW

Qualitative and Quantitative Intravaginal Targeting: Key to Anti-HIV-1 Microbicide Delivery from Test Tube to In Vivo Success

Published online in Wiley Online Library (wileyonlinelibrary.com). DOI 10.1002/jps.23098

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ABSTRACT: The past decade has seen several effective anti-HIV-1 agent discoveries, yet microbicides continue to disappoint clinically. Our review expounds the view that unsatisfactory microbicide failures may be a result of inefficient delivery systems employed. We hereby propose a thorough scientific qualitative and quantitative investigation of important aspects involved in HIV-1 transmission as a prerequisite for microbicide delivery. Intravaginal targeting of HIV-1 increases the chances of microbicide success, wherein vaginal microenvironmental factors including pH should be maintained at HIV-1 prohibitive acidic levels simultaneously to ward off other sexually transmitted diseases, which compromise vaginal epithelial barrier properties. Furthermore, choice of receptors to target both on HIV-1 and on target cells is vital in deterring transmission. Appropriate modeling of virus–target cell interactions as well as targeting early stages of the HIV-1 infection accompanied by computation and delivery of appropriate microbicide quantities could revolutionize microbicide research, ultimately delivering a female-controlled HIV-1 prevention modality appropriately.