# Alkyl sulfates: a new family of broad spectrum microbicides.

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Background: Our laboratories have focused on development of alternative, topical microbicides which would be less toxic than nonoxynol-9 (N-9) and offer a broad spectrum of microbicidal activity against HIV and, especially against human papillomaviruses (HPVs), etiologic agents of cervical cancer. Efforts have concentrated on alkyl sulfates including sodium dodecyl sulfate (SDS), a molecule with both surfactant and chaotropic properties. SDS inactivates human immunodeficiency virus (HIV), herpes simplex virus type 2 (HSV), HPV and chlamydia and is spermicidal. Current goals include determination of microbicidal activity of compounds in the synthesis pathway of SDS and related alkyl sulfate family members. Methods: Inactivation of HSV-2, HIV and chlamydia were determined using standard virological and bacteriological assays. BPV-1 inactivation was measured in a C127 mouse cell focus assay. HPV inactivation was measured by assay of virus infection and transformation in an in vivo human xenograft model. Results: Compounds in the synthesis pathway of SDS including coconut water, lauryl alcohol and monocaprin (a derivative of coconut oil), demonstrate anti-viral, and specifically, anti-papillomavirus activity. Lithium dodecyl sulfate, lauric acid and ammonium dodecyl sulfate also demonstrate significant activity. Determinations of relative potencies, as well as the sensitivity of human vaginal epithelium to these agents are in progress. Conclusions: Multiple members of the alkyl sulfate chemical family, as well as parent compounds in the synthesis pathway of SDS, are broadly microbicidal and possess anti-papillomavirus activity. SDS is less toxic (8-20 fold) than N-9 in cell culture and is non-toxic in a rabbit vaginal irritation study. The alkyl sulfates represent promising candidates for development as human vaginal microbicides that will inactivate a broad range of STDs including HIV, HSV-2, chlamydia and papillomaviruses.

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