this is that the mucosal environment of female reproductive tract – in the case of male-to-female transmission – is generally capable of repelling the virus. Several lines of evidence have linked HIV transmission co-factors with altered mucosal immune parameters. Mucosal inflammation, defined by elevated cytokine concentrations in cervicovaginal secretions, was associated with increased rates of HIV acquisition in the CAPRISA 004 study. While the causes of these remain unclear, we have also shown that mucosal cytokines are associated with an altered mucosal proteome including impaired barrier function, and increased frequencies of HIV target cells in the mucosa. A further proteomic analysis of HIV cases and controls demonstrated that HIV outcome could be predicted with 97% accuracy on the basis of 10 key proteins. Proteins overrepresented in cases included those associated with inflammation, while barrier-associated proteins were overrepresented in controls. Application of this model to younger women, who in the sub-Saharan African epidemic represent the group with the highest incidence rates, will be important to understanding HIV risk. In particular, the role of sex work-related exposures including rates of condom use, partner change, vaginal practices, microbiome, and other infections in driving immune changes remains poorly described. A better understanding of HIV transmission at a mucosal level may reveal novel HIV prevention options.

S14.3 IMMUNE ACTIVATION, GENE EXPRESSION AND HIV ACQUISITION RISK

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Background Sexual transmission of HIV is actually fairly inefficient and when it does occur usually a single virus is responsible for establishing the infection. Since activated HIV target cells (CD4+CCR5+) are known to be 1000x more susceptible to HIV infection than quiescent cells, one of the known risk factors for HIV acquisition is elevated baseline levels of immune activation. This study was designed to determine if oral administration of low doses of anti-inflammatory agents, acetylsalicylic acid (ASA) and hydroxychloroquine (HCQ), would reduce the number of HIV target cells in the female genital tract.

Methods 80 low-risk women from Nairobi, Kenya established baseline immune activation levels and then were randomized to 6 weeks oral administration of low doses of either ASA (81 mg/day) or HCQ (200 mg/day). Cellular activation (CD69, HLA-DR, CD95, CCR5) was assessed by flow cytometry of peripheral blood mononuclear cells (PBMC) and cervical mononuclear cells (CMC).

Results In PBMCs, a reduction in the percentage of CD4+CD69+ ($p = 0.01$) and CD4+CCR5+ ($p = 0.03$) T cells was observed in the ASA arm and a significant decrease of CD95 ($p < 0.0001$) and CCR5 ($p = 0.01$) expression on CD4+ T cells was observed following HCQ treatment. At the mucosal level, CMCs showed reduced levels of CD4+CCR5+ T cells following ASA treatment (p -0.02) and lower expression of the activation marker CD69 on CD4+ cells in the HCQ arm ($p = 0.05$).

Conclusions Reducing the number of HIV target cells in the female genital tract, represents a new approach to reducing HIV risk. This study showed that daily administration of low-dose anti-inflammatory drugs reduces the number of HIV target cells in the female genital tract. Further studies are required to determine if a similar reduction in mucosal HIV target cells can be observed in women at high-risk of acquiring HIV and if those reduction provide any protective benefit.

S15 - Multipurpose Technologies (MPTs): developing interventions to simultaneously prevent STIs, HIV and pregnancy

S15.2 GLOBAL MAPPING OF STI, HIV AND UNPLANNED PREGNANCY: WHERE DO THESE EPIDEMICS INTERSECT?

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Worldwide, women face sexual and reproductive health (SRH) risks including unintended pregnancy and sexually transmitted infections (STIs) including HIV. Multipurpose prevention technologies (MPTs) combine protection against two or more SRH risks into one product. Male and female condoms are the only currently available MPT products, but several other forms of MPTs are in development. We conducted a comprehensive analysis to examine the global distribution of selected SRH issues to determine where various risks have the greatest geographical overlap.

We examined four indicators relevant to MPTs in development: HIV prevalence, herpes simplex virus type 2 (HSV-2) prevalence, human papillomavirus (HPV) prevalence, and the proportion of women with unmet need for modern contraception. Using ArcGIS Desktop, we mapped these indicators individually and in combination on chloropleth and graduated symbol maps. We conducted a principal components analysis to reduce data and enable visual mapping of all four indicators on one graphic to identify overlap. Our findings document the greatest overlapping risks in sub-Saharan Africa, and we specify countries in greatest need by specific MPT indication. These results can inform strategic planning for MPT introduction, market segmentation, and demand generation, but data limitations also highlight the need for improved (non-HIV) STI surveillance globally.

S15.3 MAKING THE CASE FOR MPTS: PREVENTIONS OF INFERTILITY AND OTHER STI SEQUELAE

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In regions of sub-Saharan Africa where HIV is highly prevalent, HIV-affected couples require multipurpose prevention technologies (MPTs) to enhance their reproductive healthcare options beyond contraception and prevention of HIV and sexually transmitted infections (STIs). HIV-affected couples are living longer, healthier lives and are requesting options that will include assistance in becoming pregnant and establishing a family. These couples face unique challenges that require access to specialized information and reproductive services to prevent STIs or HIV transmission while attempting pregnancy. The male condom is the oldest and least expensive available MPT that effectively