contains polylactosamine repeats representing potential ligands for animal lectins called galectins, implicated in HIV pathogenesis.

Methods CPI-GC was isolated from *T. vaginalis* LPG by mild acid hydrolysis and C18-SepPak separation. Binding to galectin-1 and –3 (Gal-1 and –3) was determined by Biolayer Interferometry. Inflammation-related proteins and Gal-1 and 3 were measured by a multiplex immunoassay in supernatants from human cervical and vaginal epithelial cells infected with *T. vaginalis or* exposed to CPI-GC from different clinical isolates.

Results CPI-GC activated NF-κB and upregulated cFos, COX-2, IL-8, MIP-3α, IL-6, IL-1β and VEGF in a MEK1/2 dependent manner. In addition, IL-6, ICAM-1 and VEGF up-regulation was mediated by p38 while IL-8 and MIP-3α were ERK 1/2 mediated. CPI-GC from different clinical isolates varied in their ability to bind Gal-1 and Gal-3, which were constitutively expressed by vaginal and cervical epithelial cells and released at higher levels in the extracellular space during exposure to live trichomonas and CPI-GC. CPI-GC from all isolates invariably reduced levels of the natural microbicide SLPI. Mutant trichomonads that failed to bind Gal-1 and Gal-3 showed higher proinflammatory activity suggesting a role for the CPI-GC –galectin binding in suppressing innate immune responses.

Conclusion Interventions targeting CPI-GC or restoring the balance of natural immune defences represent a promising strategy for preventing adverse outcomes from *T. vaginalis* infection.

001.3 REGULATORY T CELLS IN PERIPHERAL BLOOD AND CEREBROSPINAL FLUID OF SYPHILIS PATIENTS WITH AND WITHOUT NEUROLOGICAL INVOLVEMENT: A COMPREHENSIVE AND COMPARATIVE STUDY

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Background Syphilis, a sexually transmitted disease caused by spirochetal bacterium Treponema pallidum, can progress to affect central nervous system, causing neurosyphilis. While many neurosyphilis patients may be asymptomatic, some patients can develop severe neurological and psychiatric symptoms. Accumulating evidence suggest that skin lesions and clinical symptoms of early syphilis patients result from host immune and inflammatory responses. However, very little is known about the immune components in neurosyphilis.

Methodology/Principal Findings In the present study, we perform a comprehensive and comparative analysis of regulatory T cells (Tregs) between 102 neurosyphilis patients and 431 syphilis patients without neurological involvement. We found secondary and serofast patients had increased Treg percentage, suppressive function and TGF-β levels in peripheral blood compared to healthy donors and serum Rapid Plasma Reagin (RPR) titers were positively correlated with Treg numbers in these patients. Neurosyphilis patients had higher Treg frequency in peripheral blood than those of syphilis patients without neurological involvement. Importantly, CD4+ T cells were increased and predominated in cerebrospinal fluid (CSF) of both asymptomatic and symptomatic neurosyphilis patients. Interestingly, a significant decrease in CSF CD4+ CD25 high Treg percentage was observed in symptomatic neurosyphilis patients compared to those of asymptomatic neurosyphilis patients, which may be associated with low CSF TGF-β levels.

Conclusions Our findings suggest that neurological progression in syphilis patients may be associated with an enhanced systemic Treg response and an increased local CD4+ T cell infiltration. A decrease in Treg frequency in CSF of symptomatic neurosyphilis patients indicates that immune-mediate tissue damage might be involved in the development of neurological symptoms.

001.4 BLOOD TRANSCRIPTIONAL PROFILING OF WOMEN WITH CHLAMYDIA TRACHOMATIS IDENTIFIES A PELVIC INFLAMMATORY DISEASE (PID) SIGNATURE

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Objective Most women with Chlamydia trachomatis (CT) infection are asymptomatic, while ~3% progress to pelvic inflammatory disease (PID) within two weeks of untreated infection. The identification of biomarkers that predict development of PID would aid in identification of women at risk for complications of infertility and ectopic pregnancy. The specific aim of this study was to identify a whole blood transcript signature for acute PID due to chlamydial infection.

Methods We performed gene expression microarrays using whole blood from 79 women who had a gynecologic exam, and cervical and endometrial microbiologic testing. Samples were divided into five groups: Group 1, women with acute PID who were CT+ at endometrium (PID+, CT+, and E+); Group 2, asymptomatic women who were CT+ at endometrium (PID-, CT+, E+); Group 3, asymptomatic women who were CT+ at cervix (PID-, CT+, E-); Group 4, asymptomatic women who were CT- at cervix and endometrium (PID-, CT-, E-); Group 5, women with symptoms of PID who were negative for CT or other sexually transmitted pathogens (PID+, STI-, E-).

Results We identified a transcript signature that discriminated women with chlamydial PID from all other groups. Pathway analysis revealed that the chlamydial PID signature contained genes from interferon response pathways. Gene transcription in a subset of women with chlamydial endometrial infection clustered with women with chlamydial PID.

Conclusions Our study raises the possibility that transcriptional biomarkers with potential as diagnostic and prognostic tools can be identified to combat chlamydial reproductive tract disease in women.

001.5 EFFICACY OF RG1-VLP VACCINATION AGAINST GENITAL AND CUTANEOUS HUMAN PAPILLOMAVIRUSES *IN VITRO* AND *IN VIVO*

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Licensed human papillomavirus (HPV) vaccines, based on virus-like particles (VLP) self-assembled from major capsid protein L1, afford type-restricted protection against types 16/18/6/11 (or 16/18 for the bivalent vaccine), which cause 70% of cervical carcinomas (Cxca) and 90% of genital warts. However, they do not protect against less prevalent high-risk types causing 30% of CxCa, or cutaneous HPV. The minor capsid protein L2 confers low-level immunity to type-common epitopes.

Chimeric RG1-VLP presenting HPV16L2 amino acids 17–36 (RG1 epitope) within the DE-surface loop of HPV16L1 induce cross-neutralisation *in vitro*. We hypothesised, that RG1-VLP vaccination protects against a large spectrum of mucosal and cutaneous HPV infections *in vivo*.

L2-specific antibody and CTL responses in RG1-VLP vaccinated rabbits were determined by ELISA and ELISPOT assays. Cross-neutralisation was analysed using native or pseudovirion (PsV) assays. Vaccine efficacy *in vivo* was determined in a mouse genital challenge model.

Immunization with RG1-VLP adjuvanted with human-applicable alum-MPL induced robust L2 antibodies (ELISA titers 2,500–12,500), which cross-neutralised mucosal high-risk HPV26/33/35/39/68/59/68/73/69/53/34, low-risk HPV6/11/32/40/44/70, and cutaneous HPV2/27/3/76 (titers 25–1,000), and a vigorous CTL response. *In vivo*, mice were efficiently protected against experimental vaginal challenge with mucosal high-risk PsV types HPV16/18/45/31/33/52/58/35/39/51/59/68/56/73/26/53/66/34 and low-risk HPV6/43/44. Enduring protection was demonstrated 1 year after vaccination.

RG1-VLP is a promising next-generation vaccine with broad efficacy against all relevant mucosal and also cutaneous HPV types.

001.6 PERSISTENT SIV-SERONEGATIVE MACAQUE MONKEYS GENERATE MULTI-CYTOKINE ANTI- SIV MUCOSAL IMMUNE RESPONSES FOLLOWING SERIAL LOW-DOSE SIV MUCOSAL CHALLENGE

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Background There are no systematic prospective human or simian studies on the effects of repeated sub-infectious doses of HIV/SIV on mucosal and systemic immunity. The capacity and mechanism of how these responses may impact acquisition and subsequent disease course are also unknown.

Methods To address this, we examined cynolmolgus macaques as part of a vaccine trial, for their ability to generate mucosal and systemic immune responses following repeated ultra low-dose mucosal SIVmac239 challenge. Animals were challenged intra-rectally weekly according to a 24-week dose-escalation. Blood was obtained weekly, and rectal biopsies were obtained 18 to 24w post SIV challenge and analysed by flow cytometry for anti-SIV T-cell responses. Intracellular cytokine responses (IFN-γ, IL-2, TNFα and CD107a) were measured.

Results Total CD4+ responses against two distinct antigenic targets correlated with apparent resistance to infection as measured by the number of challenges, total dose and infecting dose. Moreover, CD8+ responses were also predictive of susceptibility to infection. Both CD4 and CD8 T cell effectors were observed secreting IFN γ, TNF α, IL2 and CD107a in response to SIV gene products not present in the SIV vaccine that the animals received. Placebo-vaccinated animals did not have significantly fewer mucosal immune responses than vaccinees but they did have fewer blood responses suggesting that mucosal responses were generated by the SIV exposure while systemic responses were generated by the vaccine. Multiple sub-infectious SIV challenges did not induce humoral responses in the blood, as determined by western blot assay.

Conclusions Together, this data suggests that these mucosal immune responses are the predominantly the result of priming by repeated low dose SIV challenge. Such an effect alters subsequent susceptibility to infection which has implications for vaccine studies and for understanding the biology of transmission since it increases the resistance to infection of both vaccinees and placebo recipients unpredictably.

0.02 - Antimicrobial therapy for genital tract infections

002.1 A RANDOMISED, CONTROLLED STUDY TO ASSESS THE EFFICACY AND SAFETY OF NIFURATEL VAGINAL TABLETS ON BACTERIAL VAGINOSIS

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Background Bacterial vaginosis (BV) is a polymicrobial infection and the most common cause of vaginal discharge in women during their reproductive years. A randomised, evaluator-blinded, parallel group pivotal study was carried out to assess the efficacy and safety of the local treatment with nifuratel vaginal tablets in comparison with metronidazole vaginal suppositories in premenopausal, non-pregnant women suffering from BV.

Methods A total of 727 adult women in 38 German sites, with BV diagnosed by Amsel and Nugent criteria, were enrolled after providing their written informed consent. Patients received one course of vaginal treatment with metronidazole 100 mg once daily (o.d.) for six days or nifuratel 250 mg o.d. for ten days. The test of cure visit was performed on day 24 ± 3 after the beginning of the treatment. The efficacy was evaluated using the therapeutic cure rate defined as a combined endpoint including Amsel criteria, clinical signs and symptoms and Nugent score evaluated by a blinded central assessor. The non-inferiority of nifuratel compared to metronidazole at the pre-specified margin of Δ-15% was defined as the clinically acceptable difference between the two active treatments.

Results The therapeutic cure rate was achieved in the per protocol data set by the 53.7% of women: 54.5% in the nifuratel group and 52.9% in metronidazole treated patients (p = 0.0002). Concerning Nugent score (0–3), the two treatments had similar responder rates: 66.2% nifuratel vs. 66.8% metronidazole (p = 0.0006), same results were obtained in terms of Amsel criteria normalisation 78.9% nifuratel vs. 78.6% metronidazole (p = 0.0001). Nifuratel was slightly better to metronidazole curing vulvovaginal signs and symptoms: 81.2% vs. 78.6% (p < 0.0001).

Conclusion The study results suggest that nifuratel 250 mg vaginal tablet o.d. for 10 days may be recommended as first-line treatment in BV as well as the golden standard metronidazole since their efficacy is comparable.

002.2 SUSCEPTIBLITY OF BACTERIAL VAGINOSIS (BV)-ASSOCIATED BACTERIA AND LACTOBACILLI TO RIFAXIMIN, METRONIDAZOLE AND CLINDAMYCIN

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Objective Rifaximin is a semisynthetic rifamycin with poor oral bioavailability, used as an oral agent for the treatment of traveller's diarrhoea and hepatic encephalopathy. Rifaximin is in development as a topical agent for the treatment of bacterial vaginosis (BV). The objective of this study was to evaluate the antimicrobial susceptibility of vaginal isolates of facultative and anaerobic bacteria to rifaximin, clindamycin and metronidazole.

Methods A total of 411 unique BV-related bacteria and 100 isolates of lactobacilli recovered from the human vagina of US women during the years 2009–2012 were tested for antimicrobial susceptibility by the agar dilution CLSI reference method to calculate MICs.

Results Overall, 142 (35%) of the BV-associated vaginal isolates tested were resistant to metronidazole, 63 (15%) were resistant to clindamycin and 11 (2.6%) were resistant to rifaximin. Metronidazole resistance was observed most frequently among *Gardnerella vaginalis* (n = 100 isolates, 69% resistant), *Atopobium vaginae* (n = 62, 87% resistant) and *Mobiluncus* (n = 40, 42% resistant), whereas most were susceptible to both clindamycin (197/202; 98% susceptible) and rifaximin (191/202; 95% susceptible). Both rifaximin and metronidazole were effective against all strains of *Prevotella bivia*