

**INFLAMMATORY CYTOKINE PROFILES DIFFER BETWEEN THE VAGINA AND ENDOMETRIUM.** C. Fay, H. I. Su, L. Martino, A. Shaunik, C. Schreiber, K. T. Barnhart. Reproductive Endocrinology and Infertility, University of Pennsylvania, Philadelphia, PA; Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania, Philadelphia, PA.

**OBJECTIVE:** Cytokines are potential biomarkers of immune response in the lower female genital tract. This study compares cytokines between the vagina and endometrium, two portals of entry for infectious organisms.

**DESIGN:** Randomized, assessor-blinded cross-over trial.

**MATERIALS AND METHODS:** Eighteen reproductive-aged women underwent follicular phase vaginal lavage (VL) and endometrial lavage (EL) as part of a clinical trial examining the impact of vaginal gels on the vagina and endometrium. Eight pro-inflammatory cytokines (IL-1 $\beta$ , IL-6, IL-8, MCP-1, MIP-1 $\alpha$ , MIP-1 $\beta$ , RANTES, and TNF- $\alpha$ ) and three anti-inflammatory cytokines (IL-1 $\alpha$ , IL-10, Slp-1) were assayed in baseline VL and EL specimens (RayBio Human Cytokines Array). Absolute cytokine levels were compared between VL and EL by signrank tests.

**RESULTS:** Multiple cytokines differed between the vagina and endometrium. Of pro-inflammatory cytokines, IL-1 $\beta$  ( $p=0.001$ ) was significantly higher, while RANTES ( $p<0.001$ ) was significantly lower in the vagina. Of anti-inflammatory markers, IL-1 $\alpha$  ( $p<0.001$ ) was higher, while IL-10 ( $p<0.001$ ) and Slp-1 ( $p<0.001$ ) were significantly lower in the vagina than in the endometrium.

**CONCLUSIONS:** This is the first study to compare immune response between the human vagina and endometrium using inflammatory cytokines. Our findings suggest that immune response varies by different sites of the lower reproductive tract. However, we see no common trend in regard to pro- and anti-inflammatory cytokines between these sites. It is unknown whether these differences reflect independent immune responses at the two sites, or, alternatively, vaginal immune responses are a product of mixed vaginal and endometrial immune response.

*Supported by:* Division of AIDS, US National Institute of Allergy and Infectious Disease.

## ENVIRONMENT AND REPRODUCTION SPECIAL INTEREST GROUP

**SPERM FATTY ACID COMPOSITION AND ITS RELATIONSHIP WITH SPERM CONCENTRATION AMONG MEN ATTENDING AN INFERTILITY CLINIC.** J. E. Chavarro, J. Furtado, T. L. Toth, J. Ford, H. Campos, R. Hauser. Channing Laboratory, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA; Department of Nutrition, Harvard School of Public Health, Boston, MA; Vincent Memorial Obstetrics and Gynecology Service, Massachusetts General Hospital and Harvard Medical School, Boston, MA; Department of Environmental Health, Harvard School of Public Health, Boston, MA.

**OBJECTIVE:** To examine the association of sperm fatty acid composition with sperm concentration.

**DESIGN:** Cross sectional study.

**MATERIALS AND METHODS:** We obtained 65 discard semen samples from 33 men undergoing fertility evaluation in an academic medical center. Semen was centrifuged to separate sperm cells from seminal plasma. Levels of specific fatty acids in sperm were measured with gas chromatography and expressed as percentage of total fatty acids. Spearman correlation coefficients between the median level for each man of specific sperm fatty acids and sperm concentration were calculated.

**RESULTS:** Sperm concentration ranged from  $0.01 \times 10^6/\text{mL}$  to  $400 \times 10^6/\text{mL}$  (median =  $14 \times 10^6/\text{mL}$ ). Peaks for all major fatty acids, including *trans fats*, could be clearly identified in all samples. The average fatty acid composition of sperm was 64% saturated, 10% mono-unsaturated, 7% omega-6, 18% omega-3 and 0.4% *trans* fatty acids. Sperm levels of total *trans* ( $r = -0.44$ ), total saturated ( $r = -0.42$ ) and total mono-unsaturated ( $r = -0.11$ ) fatty acids were inversely related to sperm concentration whereas sperm levels of total omega-3 ( $r = 0.75$ ) and total omega-6 ( $r = 0.45$ ) polyunsaturated fatty acids were positively related to sperm concentration. The median (25<sup>th</sup> – 75<sup>th</sup> percentile) sperm concentration for men in increasing quartiles of sperm *trans* fatty acid levels were 100.2 (50.4-141.0), 13.5 (3.2-18.0), 12.3 (3.0-49.2) and 2.7 (0.5-50.6)  $\times 10^6$  sperm/mL. The corresponding sperm concentra-

tions for men in increasing quartiles of sperm long chain omega-3 fatty acid levels were 0.2 (0.1-5.0), 6.0 (1.1-12.2), 49.2 (17.0-64.5), 89.4 (35.9-101.2).

**CONCLUSIONS:** Sperm fatty acid composition is related to sperm concentration. The associations of sperm *trans* fatty acid and sperm long chain omega-3 fatty acid levels with sperm concentration suggest a potential role of dietary fatty acid intake on spermatogenesis.

*Supported by:* Supported by National Institute of Environmental Health Sciences (NIEHS) grants ES09718 and ES00002 to RH and departmental Start-up Funds to JEC.

**IMPACT OF VAGINAL LUBRICANTS ON FECUNDABILITY.** C. K. Tanner, A. Z. Steiner. Obstetrics and Gynecology, University of North Carolina School of Medicine, Chapel Hill, NC.

**OBJECTIVE:** Vaginal lubricants appear to negatively impact sperm motility in vitro; however, it is unknown if this translates into lower fertility in women using lubricants while trying to conceive. The aim of this study was to determine if vaginal lubricant use results in lower fecundability (probability of pregnancy in a given menstrual cycle).

**DESIGN:** Prospective time-to-pregnancy cohort study

**MATERIALS AND METHODS:** Women aged 30 to 45, with no known history of infertility, who identified themselves as trying to conceive for 3 months or less were eligible. Participants completed a baseline questionnaire, including demographic information, medical and behavior history, and lubricant use (type and frequency). Women were followed without intervention until a positive pregnancy test or until censoring at 6 months of trying to conceive. Data were analyzed using cox proportional hazard modeling to determine fecundability and to calculate fecundability ratios.

**RESULTS:** 125 participants with a total of 423 cycles were analyzed. 25.6% of women reported using lubricants while trying to conceive. Of these, 50% used KY brand lubricant, 21.8% used Astroglide brand lubricant, 12.5% used Pre-Seed, 6% used Silk and 12.5% used other brands of lubricant. Lubricant user fecundability was 17.5% while non-lubricant user fecundability was 15.6%. Median time to pregnancy was 3.3 cycles in lubricant users and 4.2 cycles in non-lubricant users. Unadjusted analyses revealed that lubricant users were 1.15 times (95%CI 0.68-1.95) as likely as non-lubricant users to conceive in each menstrual cycle at risk. Adjusting for age, race, partner body mass index, cycle length, previous parity and frequency of intercourse did not significantly alter the fecundability ratio.

**CONCLUSIONS:** Approximately 25% of women aged 30-45 use vaginal lubrication while trying to conceive. Lubricant use does not appear to significantly impact natural fecundability for these women.

*Supported by:* Holderness Foundation, Carolina Medical Student Research Program, UNC WRHR.

**EFFECT OF AIR QUALITY ON ASSISTED HUMAN REPRODUCTION.** R. S. Legro, M. V. Sauer, G. L. Mottla, K. S. Richter, W. C. Dodson, D. Liao. Ob/Gyn and Public Health Sciences, Penn State College of Medicine, Hershey, PA; Ob/Gyn, Columbia University School of Physicians and Surgeons, New York, NY; Shady Grove Fertility, Rockville, MD.

**OBJECTIVE:** Air pollution has been associated with impaired reproduction. We hypothesized that reduced air quality during IVF would adversely affect outcomes.

**DESIGN:** Multicenter Cohort Study.

**MATERIALS AND METHODS:** Data from U.S. Environmental Protection Agency air quality monitors and an established national-scale, log-normal kriging method were used to spatially estimate daily mean concentrations of criteria pollutants at addresses of 7,403 females undergoing their first IVF cycle and at the their IVF labs from 2000-7. Particulate matter (PM), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and ozone (O<sub>3</sub>) were evaluated. Pollution exposure was correlated with pregnancy treatment outcomes by logistic regression analysis, adjusting for age and clinic.

**RESULTS:** Increases in NO<sub>2</sub> concentration both at the patient address & IVF lab were significantly associated with a lower chance of pregnancy and live birth during all phases of an IVF cycle from medication start to pregnancy test (most significantly after embryo transfer, OR 0.84, 95% CI 0.76-0.93,  $P = 0.001$  per 0.1 ppm increase). Increasing O<sub>3</sub> concentration at the patient address during ovulation induction was significantly associated