Abstract # 2127

**Lipids Involved in Pro And Anti-Inflammatory Responses Are Altered In Follicular Fluid And Plasma Of Cows Administered A Low Dose FSH Treatment And May Be Used As Markers Of Ovulation In Beef Cows.** Alexandria P. Snider, University of Nebraska-Lincoln, USA

Superovulation procedures using Follicle Stimulating Hormone (FSH) in cattle promote development of a larger cohort of follicles to increase number of oocytes collected for assisted reproductive technologies. These procedures are used if there are problems associated with ovulation since anovulation is a major factor affecting female fertility. Ovulation has been demonstrated to be an inflammatory process. Thus, our hypothesis was that treatment of cows with a low-dose-FSH protocol (35 IU FSH every 12 hours for 3.5 days plus prostaglandin at last and 12 hours after last FSH; FSHLow) would increase follicular fluid (FF) pro-inflammatory lipid markers compared to unstimulated controls; and blood plasma lipid markers compared to early or late luteal phase unstimulated controls. Follicular fluid from unstimulated samples was collected prior to and 24 hours after FSHLow. Blood plasma was collected from the same unstimulated cows (n=11) at D7-early luteal control, D15-late luteal control and 24 hours after FSHLow. Lipid compounds (863) were identified via UPLC-MS Analysis (CSH PhenylHexyl method) with 124 lipid compounds annotated utilizing XCMS software package in R. Analysis of variance (AOV) function was used for each lipid compound and p-values were adjusted using the Bonferroni-Hochberg method (p.adjust function) to determine differences in FF and plasma samples in non-stimulated controls and FSHLow-stimulated cows. There were 29 annotated lipid compounds different (p<0.05) in FF. Seventeen are involved in anti-inflammatory responses with ten of them decreased (p<0.05; e.g. HODE cholesteryl ester, C18−02:0 PC) FSHLow compared to control cows. Twelve of the 29 lipids are associated with pro-inflammatory responses with six of them increased (p<0.05) in FSHLow compared to Controls. Of these six lipids, LysoPC(20:4) and Glycerophosphocholine are involved in cytokine signaling; PE(P−36:2) and SM(d18:1/16:0) stimulate macrophage recruitment; Docosahexaenoyl PAF C−16 stimulates leukocyte localization; and Sodium Glycochenodeoxycholate increases signaling through the NFκB pathway (p<0.05). In blood plasma, 16 lipid markers associated with anti-inflammatory and 16 associated with pro-inflammatory responses were altered in cows after FSHLow compared to Day 7 and 15 controls. A greater number of lipid markers associated with anti-inflammatory response were decreased (13; p<0.05; e.g. Oleamide, CE(15:2)) than increased (7; p<0.05; e.g. PC(38:2), PC(38:1)) in FSHLow compared to D15 controls indicating a shift from anti- to pro-
inflammatory processes. Seven lipids associated with pro-inflammatory response were increased (p<0.05) in plasma after FSHLow compared to D15 controls. These pro-inflammatory lipids are involved with cytokine signaling (LysoPC(18:3) and TGs) and TLR2 receptor function (diacylglycerols). Overall, lipid markers decreased or elevated in FF were found to have a similar profile in blood plasma suggesting that collection of either would be reflective of lipid content in the ovarian follicle or circulating blood plasma. Taken together, these results indicate that FSHLow stimulation increases pro-inflammatory lipids in FF and blood plasma over that of controls and these lipids amplify different aspects of the inflammatory process. Furthermore, these lipid markers could be utilized to better understand females with anovulation or other problems with the ovulatory process resulting in female infertility.