Can Anti-Müllerian Hormone Concentration be Used as a Fertility Marker in Dairy Cows?

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The Anti-Müllerian Hormone (AMH) is produced by the growing follicles in the ovary of mammals. New research has shown associations between AMH and antral follicle count (AFC) as well as with fertility in dairy cows. Therefore, AMH could possibly be used as a novel fertility trait. The objectives of this preliminary study were: (1) to characterize variations in concentrations of AMH in a population of dairy cows and (2) to determine associations between categories of AMH, traditional fertility measures, and AFC. Fourteen days after calving, AFC (by ovarian ultrasonography) and AMH (in blood samples) were measured in100 lactating Holstein cows. Cows were ranked in a descending order based on AMH concentrations (from highest to lowest), and those in the top 25, middle 50, and bottom 25 percentile were classified into HIGH, MEDIUM and LOW AMH categories. All cows were subjected to fixed timed AI at ~75 d postpartum following an Ovsynch protocol. The association between AMH categories and the continuous variables of Days Open and AFC were evaluated using MIXED procedure of SAS. The association between AMH categories and 1st service conception rate (1st SCR) was evaluated using GLIMMIX procedure of SAS and the correlation between AMH and AFC was determined using CORR procedure of SAS. The average concentrations of AMH were 371±12, 162±8 and 60±12 pg/mL for cows categorized as HIGH, MEDIUM and LOW AMH groups, respectively. The 1st SCR tended (P=0.08) to be higher for cows in the MEDIUM (n=22/50; 44%) AMH group compared to cows in LOW (n=6/25; 24%) or HIGH (n=6/25; 24%) AMH groups. Similarly, cows in the MEDIUM AMH group tended (P=0.08) to have fewer days open (92±4 d) compared to cows in the LOW (101±4 d) or HIGH (101±5 d) AMH groups. As reported in literature, the AFC was higher for cows in the HIGH (28±2) AMH group than cows in the MEDIUM (24±1) or LOW (14±2) AMH group. The correlation between AMH concentration and AFC determined 14 d after calving was moderate (r = 0.54) yet significant (P<0.001).

Take Home Message: In the present study, cows with MEDIUM AMH concentrations tended to be more fertile than cows with either LOW or HIGH concentrations of AMH. However, these results must be validated in a larger population before considering it for use as a fertility trait in the future.