Relationship between circulating AMH and puberty, fertility and prolificacy of small ruminants

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are based on at least two of the following features: an irregular ovulatory function (oligomenorrhea or amenorrhea), the evidence of hyperandrogenism (biological or clinical) and the presence of a polycystic ovarian morphology. Both serum and follicular fluid AMH levels are also increased in PCOS women, and are correlated with the severity of the disease. We have shown that they are associated with increased levels of bioactive AMH and an enhancement of AMHR2 expression, supporting the hypothesis that AMH is likely involved in the follicular arrest observed in PCOS women. The rise of serum AMH concentration observed in these patients is due to the large number of small antral follicles, as well as to the enhancement of AMH production per granulosa cell (GC). We have shown that LH and androgens stimulate AMH expression and E2 has no effect in GCs from anovulatory PCOS patients. In contrast, LH and androgens have no effect and E2 down-regulates AMH mRNAs in GCs collected from control women. Moreover, AMHR2 mRNA levels are not modulated by LH and E2 in GCs from PCOS women whereas they are down-regulated by these hormones in GCs from control women. Accordingly, androgen receptor (AR) and estrogen receptor two (ESR2) are differentially expressed in GCs from control and PCOS women. Thus in GCs from PCOS women, the regulation of AMH and AMHR2 expression by LH, estradiol and androgens is altered in a way which promotes the overexpression of the AMH/AMHR2 system. Other hormones dysregulated in PCOS women might also be involved.

WS 9.3 | Relationship between circulating AMH and puberty, fertility and prolificacy of small ruminants

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In female mammals, AMH is exclusively produced by the granulosa cells and is the best endocrine marker of the population of small antral ovarian follicles. Thus, antral follicle count (AFC) and circulating AMH concentration have become prognostic tools to predict the female reproductive capacity in human, improving the success of assisted reproductive technology (ART). This has renewed the interest in AMH production in agricultural species for fertility management, particularly in cattle. In contrast, less is known about the relationship between AMH and reproductive characteristics in small ruminants. Thus, we have established the AMH endocrine profile in sheep and goat from birth to the first mating. On average, AMH concentrations rise from birth to 2–3 months of age, decrease from 3 to 5 months and remain stable thereafter. We have observed a great individual variability, but in absence of hormonal treatment we failed to clearly associate AMH level with the onset of puberty or the precocity of fertility. Nevertheless, this relationship is clearer when an early gonadotrophin stimulation treatment was applied to ewe lambs. In adult sheep and goats, AMH is positively correlated with AFC and is also predictive of response to superovulation treatment and embryo production as in cattle. Interestingly, circulating AMH is largely decreased in fertile sheep carrier of some natural mutations associated with hyperprolificacy. In conclusion, as in other mammal species, circulating AMH in small ruminants is a good marker of the dynamic reserve of antral growing follicles and thus a predictor of the success of ART targeting this reserve. However, establishing the relationship and the predictive ability of AMH and the reproductive capacity in small ruminants will need further work.

WORKSHOP 10 ENDOMETRITIS/ENDOMETRIOSIS IN THE MARE: APPLICATIONS OF STEM CELLS

WS 10.1 | Evidence-based treatment of persistent post-breeding endometritis in mares

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Post-breeding endometritis follows every mating and is an important part of the natural defense mechanisms of the uterus. Reproductively normal mares do not need any treatment after mating. Particularly in some Thoroughbred practices, all mares are routinely treated after mating, although only about 15% of mares need help. Persistent post-breeding endometritis is a condition where a mare continues to show intrauterine fluid and neutrophils > 24 h after mating, in which time normal mares have returned to the pre-breeding state. Mares should be examined by ultrasound around 24 h after breeding, and if ≥ 2 cm of fluid is detected, the mare should be treated. The aim of the treatment is to remove uterine contents. Oxytocin is the drug of choice: it increases uterine contractions and thereby facilitates drainage and shortens the duration of neutrophilia. Prostaglandin stimulates uterine contractions for a longer time than the short acting oxytocin but it should not be used after ovulation. Large volume uterine lavage is recommended for mares that persistently accumulate fluid or echogenic fluid or are non-responsive to oxytocin or do not relax the cervix or who have a history of endometritis. Bacteria are not involved in post-breeding endometritis, and therefore antibiotics should not be used. Mares susceptible to endometritis show different timing and types of cytokine release as compared to resistant mares. Corticosteroids modulate cytokines by decreasing pro-inflammatory and by increasing anti-inflammatory cytokines. Therefore mares that have a history of accumulating fluid repeatedly and persistently and fail to open the cervix, may benefit from pre-breeding intravenous administration of dexamethasone.