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*Review*

# Anti-Müllerian Hormone in Veterinary Science: A Prospective Biomarker for Fertility and Productivity: A Review

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**Abstract**

Anti-Müllerian Hormone (AMH) is a glycoprotein that belongs to the Transforming Growth Factor-β superfamily. It is produced in developing antral and pre-antral follicles in the mammalian ovary and serves as a reliable endocrine marker of ovarian reserve and for predicting response to a superovulation protocol. Multiple works have found that AMH expression in the follicles is dependent on the stage of follicular development. Plasma AMH concentrations are dynamic in the prepubertal age, the estrous cycle, and in the transition from gestation to the postpartum period. These shifts mean internal physiological changes in ovarian activities. Notably, levels of AMH are highly correlated with the ovulatory response, superovulation success, and reproductive longevity. It remains relatively stable throughout the reproductive cycle and is highly correlated with antral follicle count and embryo yield. It is also a useful diagnostic marker of reproductive disorders. Further use of AMH would be valuable for improving fertility diagnostics and reproductive planning in veterinary science. The aim of this review was to discuss the patterns of AMH expression, its role in reproductive development, and the factors that regulate its function concerning fertility and productivity.

**Keywords:** anti-mullerian hormone; ovarian reserve; follicular dynamics; fertility biomarker; reproductive physiology; AMH regulation

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## 1. An Overview of AMH Expression and Function in Reproductive Physiology

Anti-Müllerian hormone (AMH) is a glycoprotein that belongs to the transforming growth factor-beta (TGF-β) family (Cate et al., 1986). This is synthesized in Sertoli cells of the testes and granulosa cells of the ovaries, specifically, in the growing preantral and small antral follicles (La Marca& Volpe, 2006). AMH expression in the fetus varies depending on its sex during fetal development. It functions at an early stage in the testes and causes regression of the Müllerian ducts, but in the fetal ovary, AMH expression starts later during follicular development. By 120 days of gestation, AMH immunoreactivity became faintly detectable in the most advanced follicles (Bézard et al, 1987). Moreover, fetal testicular tissue shows much stronger AMH expression than ovarian tissue, even from an early stage (Vigier et al., 1983; Vigier et al., 1984), which reflects the sexual dimorphism in AMH regulation. However, AMH is a key regulator in folliculogenesis in the ovary; one way in which it prevents the initial requirement of primordial follicles from entering the growing follicle pool and by inhibiting the responsiveness of pre-antral follicles to the follicle-stimulating hormone (FSH) (Di Clemente et al., 1994a; Durlinger et al., 1999; Durlinger et al., 2001; Durlinger et al., 2002). Because of its high inter-individual variability, repeatability, and heritability (Monniaux et al., 2012; Ribeiro et al., 2014; Souza et al., 2015), AMH is now being regarded as a potential endocrine marker of ovarian follicular reserve and healthy follicular population in cows (Rico et al., 2009).

AMH and its specific receptor, AMHRII, are expressed in different organs and play an important role in gonadal development and follicular dynamics. Functionally, AMH binds to AMHRII, a type II transmembrane serine/threonine kinase. This binding leads to the recruitment and phosphorylation of a type I receptor, which triggers SMAD-mediated gene regulation (Cate, 2022). AMHRII has been cloned (Baarends et al., 1994; di Clemente et al., 1994b), and its mRNA is co-expressed with AMH in granulosa cells, indicating a local role in controlling follicular sensitivity to FSH and preventing premature recruitment.

## 2. AMH in Reproductive Organ Development and Freemartinism

Anti-Mullerian hormone plays a pivotal role in sexual differentiation in the embryo, i.e., in the regression of the Müllerian ducts (Jost, 1947). AMH secreted by the Sertoli cells in male embryos causes the removal of the paramesonephric (Mullerian) ducts, which allows the mesonephric (Wolffian) duct to persist and influence Leydig cell differentiation. AMH also helps in regression of the right Müllerian duct in female birds (Tran & Josso, 1977) (Teng et al., 1987a; Teng, 1987b). At embryonic day 12, the Mullerian ducts are completely regressed in male chicks, but in females, it is only the right pair of these ducts at embryonic day 14 (Romanoff & Romanoff, 1960).

A typical example of abnormal AMH activity during development is freemartinism; this occurs following a heterosexual pregnancy of twin fetuses. In this syndrome, the AMH of the male twin transfers the common placental circulation and it causes partial or complete regression of the Mullerian ducts of the female twin, resulting in underdeveloped reproductive tracts and sterility (Senger, 2012). Consequently, freemartin heifers have impaired or non-functional ovaries caused by altered embryonic differentiation (Alacam, 2015; Long, 1990; Sennerver and Nak, 2015; Cabrera and Fricke, 2021; Lopez-Gatius and Garcia-Ispierto, 2023). Koca et al. (2024b) have recently shown (**Table 1**) that levels of AMH are significantly higher in freemartin calves than in normal heifers, with a mean concentration of 367.3-380.8 pg/mL in freemartins and of 26.8-28.75 pg/mL in healthy controls.

**Table 1.** Descriptive statistics for AMH levels in freemartin and adult healthy heifers (Koca et al., 2024b).

| Group | | n | Mean ± SE | Minimum | Median | Maximum |
|---|---|---|---|---|---|---|
| G1 | AMH-1 (pg/mL) | 20 | 367.3 ± 25.5 | 227.0 | 353.5 | 677.0 |
| | AMH-2 (pg/mL) | 20 | 380.8 ± 24.4 | 234.0 | 360.0 | 645.0 |
| G2 | AMH-1 (pg/mL) | 16 | 26.8 ± 4.44 | 10.0 | 20.00 | 72.0 |
| | AMH-2 (pg/mL) | 16 | 28.75 ± 4.18 | 12.0 | 23.5 | 68.0 |

Furthermore, the age-related decrease of AMH gives insight into postnatal activity in the gonads. In freemartin calves, the anti-Mullerian hormone (AMH) decreases to typical female concentrations within five weeks. Conversely, when compared with normal male calves, a slower decline was observed, with comparable levels observed at age five months (Rota et al., 2002). These temporal trends indicate differential activity of the testis and the increasing impairment of Sertoli cell functions in non-functional gonads of freemartins.

## 3. Follicular Dynamics, Genetic Influences, and Environmental Factors Affecting AMH Levels

It is emphasized that the production and regulation of the anti-Mullerian hormone is closely connected with follicular dynamics, and small antral follicles, especially those with a diameter of 2-5 mm, act as the main source of this hormone in the ovary. Such follicles also respond best to superovulatory treatment; thus, AMH can serve as a good indicator of ovarian reserve and stimulation potential (Van Rooij et al., 2002). But the regulation in AMH is not only positive, it also exerts a negative influence, inhibiting high follicular activity. An excess in AMH could negatively affect follicular development by inhibiting CYP19A1 (aromatase) and luteinizing hormone/choriogonadotropin receptor (LHCGR), hence decreasing the synthesis of estradiol and follicular responsivity to the surge of LH (Grossman et al., 2008; Chang et al., 2013). In line with it, CYP19A1 mRNA expression is strongly elevated in large and healthy follicles and highly repressed in atretic follicles (Rico et al., 2009).

Follicular and hormonal dynamics during the estrus cycle are also very varied among animals. Cows within a high-AMH group (H group) maintained a greater number of 3-5 mm follicles and higher serum AMH concentrations during the cycle than cows within a low-AMH group (L group), with serum AMH concentrations decreasing in the mid-cycle and increasing to estrus. Such variations demonstrate the relationship between AMH and ovulation potential (Rico et al., 2011). Table 2 illustrates the exact data of the AMH and follicle count changes comparing the two estrus cycles in H and L groups.

**Table 2.** Variations in AMH concentrations in plasma during a natural estrous cycle in the H (high CL) group (n = 6) and the L (low CL) group (n = 5) of cows (Rico et al., 2011).

| | **H group** | | | **L group** | | |
|---|---|---|---|---|---|---|
| Parameter | Estrus 1 | Dmin*** | Estrus 2 | Estrus 1 | Dmin*** | Estrus 2 |
| AMH (pg/ml) | 102.3 ± 11.8[a] | 64.8 ± 6.0[a,*] | 130.1 ± 21.8[a] | 43.8 ± 16.1[b] | 27.4 ± 12.4[b] | 42.6 ± 14.8[b] |
| Normalized AMH** | 1.10 ± 0.09 | 0.69 ± 0.03* | 1.24 ± 0.17 | 1.03 ± 0.11 | 0.50 ± 0.12** | 1.20 ± 0.15 |
| No. of follicles 3–5 mm | 16.8 ± 1.6 | 15.4 ± 1.2[a] | 18.9 ± 2.8[a] | 11.8 ± 2.4 | 8.7 ± 1.5[b] | 10.0 ± 0.9[b] |

*** Day of the occurrence of minimal AMH concentrations for each cow. ** Ratio AMH:mean AMH. [a,b] At each time of the cycle, different superscript letters indicate significant differences between the two groups ($P < 0.05$). * Asterisks (** $P < 0.01$) indicate significant differences with AMH at estrus 1 and at estrus 2 within each group.

Some research further determined AMH concentration quartiles in dairy and beef cattle. Quartiles in dairy cows were between 6.2 pg/mL (Q1) and over 1000 pg/mL (Q4) (Akbarinejad et al., 2020; Jimenez-Krassel et al., 2015) and in beef cattle, they varied between 0.013 and 0.898 ng/mL in Q1 to Q4, respectively (Center et al., 2018), as shown in Table 3.

**Table 3.** Quartile categorization of AMH concentrations in dairy and beef cattle.

| | **N** | **Q1** | **Q2** | **Q3** | **Q4** | **References** |
|---|---|---|---|---|---|---|
| **AMH (pg/ml)** | Dairy (43) | 184 ± 8 | 311 ± 5 | 509 ± 14 | 1008 ± 46 | (Akbarinejad et al., 2020) |
| **AMH (pg/ml)** | Dairy (62;59;58;66) | (6.2–30) | (30.1–56) | (56.1–85) | (85.7–432) | (Jimenez-Krassel et al., 2015) |
| **AMH (ng/ml)** | Beef (79) | 0.013 - 0.168 | 0.169 - 0.263 | 0.264 - 0.363 | 0.364 - 0.898 | (Center et al., 2018) |

There is also emerging evidence about the role of genetics in the variability of AMH. According to a genome-wide study, there were marked correlations between individual single-nucleotide polymorphisms (SNPs) versus serum AMH levels, reproductive variables, and physiological responses. SNP rs876084180 was linked to the most significant contribution to the level of AMH in the circulation ($p < 0.0001$), and the favorable genotypes were seen to be present at the important loci linked to AMH (AA, GG, AA, and GG), IGFBP1, LGR5, and TLR4 (Contreras-Mendrez et al., 2024; Gobikrushanth, 2018). These data confirm that genetic control is the reason for inter-individual variability in ovarian reserve and fertility potential.

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Environmental factors, especially heat stress (HS), have been shown to play significant roles in inhibiting the secretion of AMH. Serum AMH concentrations of Holstein cows decreased from 417.26 ± 4.51 to 136.94 ± 4.03 pg/mL under severe HS, with strong positive correlations ($r = 0.71–0.75$, $p < 0.05$) observed between AMH and fertility traits during late spring and early summer. However, these associations weakened ($r < 0.30$) when the thermal load was high (Contreras-Mendez et al., 2024). Moreover, genetic factors that contribute to serum AMH levels under heat stress may help in selecting high-performing Holstein cows during summer. This would improve the performance of dairy herds in semiarid areas (Gobikrushanth, 2018; Rico, 2009).

Nutrition at an early age also profoundly impacts AMH levels. Mossa et al. (2015) found that female calves born by nutrient-constrained mothers have remarkably low ovarian reserves as shown by decreased levels of AMH between the ages of 4 months to 1.8 years and AFCs between the ages of 7 weeks to 1.6 years. Such calves also showed high FSH levels, which may represent impaired follicular development (Mossa et al., 2010a; Jimenez-Krassel et al., 2009).

Some researchers found that AMH is upregulated by bone morphogenetic protein 6 (BMP6) (Elvin et al., 2000; Shi et al., 2009), indicating that BMPs have potential functions in the control of AMH in developing follicles. Systematically, BMP6 increases the transcriptional activity of the AMH gene by enhancing the expression of two crucial transcription factors, SOX9 and GATA4 (Wang et al., 2023). However, Rico et al. (2011) found that FSH inhibited AMH mRNA and protein production in granulosa cells of 3-10 mm bovine follicles and also reversed the effects of BMP4 and BMP6 stimulation. So, it seems that FSH acts against the actions of BMPs during AMH production by granulosa cells (Rico et al., 2011).

## 4. AMH as a Predictor of Ovarian Reserve and Fertility

Female calves are born with all the follicles for their lifetime, and the number decreases gradually with age (Erickson, 1966). Ovarian reserve size, which can be determined through follicle recruitment and peripheral concentration of Anti-Müllerian Hormone (AMH) levels, is positively associated with fertility (Ireland et al., 2011; Mossa et al., 2017). In pluriparous dairy cows, high AMH is connected with shorter calving periods, reduced time to become pregnant after calving, and fewer open days, marking better reproductive efficiency (Schwarzmann et al., 2023; Mossa & Ireland, 2019). However, the values of AMH are usually not significantly influenced by postpartum diseases, and they are not closely related to antral follicle count (AFC) in this stage (Alward et al., 2021; Hubner et al., 2022). Remarkably, although there is a positive correlation between increasing AMH levels in multiparous cows and fertility, they are sometimes linked to lowered milk production, which implies a physiological balance between milk production and reproductive performance. Conversely, the level of AMH appears not to be influential in the reproductive parameters in primiparous cows (Jimenez-Krassel et al., 2015).

The predictive value of a single AMH measurement lies in its strong consistency within the animals. In beef heifers, a single AMH value had an excellent correlation ($r = 0.97$) with the average of multiple measurements made during different cycles (Ireland et al., 2011). Similarly, the AMH levels in dairy cows do not vary throughout the natural or hormone-synchronized cycle, which emphasizes its accuracy as a static biomarker (Rico et al., 2009; Pfeiffer et al., 2014; Souza et al., 2015).

The number of follicles and the ovarian response show high variability in cows, particularly those with a greater number of small to medium-sized follicles in the ovaries, generally respond better to superovulatory treatments. Also, animals with more of these follicles respond better to hormonal stimulation (Rico et al., 2009). Numerous studies showed strong positive correlations between AFC or AMH and the response of ovaries to various hormonal therapies. High AFC is generally associated with an increased number of large follicles, corpora lutea (CLs), embryos, and transferable embryos in Holstein and Japanese Black cows (Rico et al., 2012; Hirayama et al., 2012; Souza et al., 2015; Nabenishi et al., 2017). These relationships are summarized in Table 4, which describes the predictive value of AMH on ovarian reserve, numbers of CL, and oocyte/embryo production in cows stimulated with hormones.

**Table 4.** Evidence that the Anti-Müllerian Hormone (AMH) worked as a biomarker for fertility and the size of the ovarian reserve, number of CLs, and number of embryos/oocytes is positively associated with hormonal stimulation in cattle.

| Breed and Number | Positive Correlation with Response to Hormonal Stimulation | Ref. |
|---|---|---|
| Holstein cows (52) | Number of large follicles ($r$ = 0.46, P < 0.001), Number of CLs ($r$ = 0.43, P < 0.01) | (Rico et al., 2012) |
| Japanese black (12) | Number of total follicles ($r$ = 0.646, P < 0.001), Number of ova/embryos ($r$ = 0.734, P < 0.001) | (Hirayama et al., 2012) |
| Lactating Holstein cows (72) | Number of CLs ($r$ = 0.65, P < 0.01), Number of total structures collected ($r$ = 0.50, P < 0.01), Number of total transferable embryos ($r$ = 0.28, P < 0.02) | (Souza et al., 2015) |
| Japanese Black (6) | Number of embryos/oocytes (r = 0.637, P = 0.005), Number of transferable embryos (r = 0.640, P = 0.004) | (Nabenishi et al., 2017) |

Similar observations were noted in companion animals. AMH levels varied in different reproductive phases in queens, with higher AMH in the interestrus phase (9.44±2.01 ng/mL) compared to the follicular phase (5.92±0.57 ng/mL). In addition, a positive correlation was determined between age and AMH in the interestrus group (P<0.01, r = 0.696) (Piryağcı et al., 2024). Holst and Dreimanis (2015) found that serum anti-Müllerian hormone (AMH) levels serve as a reliable biomarker for the detection of Sertoli cell tumors (SCT) in canines. High concentrations of AMH are found in most cases of SCT, which can impair spermatogenesis and contribute to male infertility. Another area where AMH has played an important role is in the diagnosis of non-palpable Sertoli cell tumors (SCT), which contribute to male infertility (Giudice et al., 2014). Hollinshead et al. (2017) did not find a direct relationship between AMH and whelping rates, though they noted a decrease in AMH concentrations and lower fertility in older females. This is similar to human research, where age is a stronger indicator of pregnancy than AMH. Therefore, these indicate the need to look further into AMH and its predictive values in canine fertility.

## 5. Predictive Value of AMH and AFC in Superovulation

Anti-Mullerian hormone has been well known to be a valid endocrine marker of the ovarian reserve or rather, the healthy antral follicle pool and oocytes (Rico et al., 2009). AMH in plasma is positively linked to antral follicle population (AFP) in cows and a greater number of antral follicles in heifers also indicates higher AMH concentration (Ireland et al., 2010; Batista et al., 2014). However, plasma AMH is not always an indicator of follicular growth dynamics or wave synchronization as observed in both *Bos indicus* (Nelore) and *Bos taurus* (Holstein) heifers (Batista et al., 2014).

Despite these nuances, an AMH together with AFC can serve as a good indicator of the sensitivity of the ovaries to hormonal stimulation. The declining levels of AMH and AFC reflect reduced cases of ovarian responsiveness, usually with aging or a decrease in the quantity of follicle pools (Broekmans et al., 2006; De Wallly et al., 2014; Singh et al., 2014). This is reflected by Ireland et al. (2007) and Silva-Santos et al. (2014), who reported that cows that had lower AFC produce fewer and poorer quality oocytes after superovulation. Prepubertal AFC values, on the other hand, are capable of predicting future reproductive potentials; higher AFC values ahead of puberty were associated with more embryos and oocytes at 24 months of age in heifers (Silva-Santos et al., 2014; Ireland et al., 2007). Likewise, positive correlations between AFC and superovulation response have been observed in sheep, the strength of which reflects the AFC predictive value in superovulation across species (Mossa et al., 2007; Torres-Rovira et al., 2014). The concentrations of AMH in dairy cows have been defined as low (≤140 pg/mL), intermediate (>140 to ≤450 pg/mL), and high (more than 450 pg/mL); serum AMH levels of cows less than 400 pg/mL showed reduced follicular growth, ovulation rate, and lower embryo quality (Gobikrushanth et al., 2018; Torres-Simental et al., 2021). The higher levels of AMH also seem to give beneficial results in terms of fertility, as cows with high or intermediate AMH had a 1.42-1.51 times greater chance of becoming pregnant within 84 days of mating season, compared to cows with low AMH (Gobikrushanth et al., 2019).

Regarding the follicular steroidogenesis, high-AFC heifers have been found to have an increased estradiol (E2) concentration in the ovulatory follicles of an average diameter of ~15 mm than the low-AFC heifers (Mossa et al., 2010a). Granulosa cells of cows with a high AFC (>25 follicles) secreted much more estradiol (E2) and AMH than those of the cows with a low AFC (<15 follicles), and none of the differences changed with FSH supplementation (Scheetz et al., 2012). However, certain results oppose this tendency, as Ireland et al. (2009) noticed that AMH was not significantly different between heifers with high and low AFC, but with lower E2 in high-AFC heifers than in low-AFC ones. Besides, there are differences between AFC groups concerning ovarian dynamics. According to Sakaguchi et al. (2019), high AFC cows contained more small (<4 mm) and intermediate-sized (4 8 mm) follicles. In high AFC cows, the intermediate follicles were highest at 3 to 4 days after follicular ablation, followed by a subsequent decrease, which indicates that cows with higher follicular reserve experience an increased rate of follicle regression and development.

## 6. Modulation of AMH by Metabolic Status and Ovarian Pathologies

Although Anti-Müllerian hormone has a complicated biology in reproductive physiology and pathology, it is a potential biomarker to assess fertility and to diagnose a disease in the veterinary field. It has been shown that the concentrations of AMH decrease sharply in the course of antral follicle growth, a trend that is identical in both normal and cystic ovaries, implying that the process of follicular development has a significant effect on AMH levels as compared to pathological conditions such as cysts (Seifer et al., 1993; Fanchin et al., 2005; Andersen & Byskov, 2006). Intriguingly, despite a reduced concentration of AMH in the ovarian cysts, especially those in the luteinization process, AMH is not a direct indicator of the cyst development in cattle (Monniaux et al., 2008). Besides, the variations in the expression of AMH caused by early folliculogenesis can cause the recurrence of cystic ovarian disease (Diaz et al., 2018).

Postpartum inflammatory stress has been found to decrease the production of AMH which may compromise future fertility among dairy cows. Conversely, high levels of AMH at this stage are associated with improved magnesium status, which is crucial to consider as a health indicator (Okawa et al., 2021). Although the role of AMH in fertility, superovulation, and reproductive disease is yet to be fully determined, its ability to serve as a diagnostic factor has been realized in different species. (Umer et al., 2019).

Serum AMH in granulosa cell tumors (GCTs) of mares is highly elevated and has the advantage of being more sensitive than traditional markers such as inhibin and testosterone, with the benefit that it is cycle independent (Ball et al., 2013). In bovines, the plasma AMH was found to be the most sensitive in the detection of granulosa-theca cell tumors (GTCTs) in comparison with ovarian steroids and inhibins (Ali et al., 2013). Blood AMH is a highly specific and sensitive indicator among the GTCTs, as there is intense expression of immunoreactive AMH in the neoplastic granulosa cells (Kitahara et al., 2012). AMH has also proven to be a potential marker of Sertoli cell tumors in the canine medicine field (Holst & Dreimanis, 2015).

Metabolic and nutritional status affect the secretion of AMH. The administration of high-fat diets in rodents significantly lowered the expression of the AMH gene, interfered with the estrous cycle, and decreased the number of follicles. In contrast, coenzyme $Q_{10}$ ($CoQ_{10}$) supplementation in obese rats caused further changes in AMH levels and follicular atresia (Sarrible et al., 2025). However, high body condition scores (BCS), even at obese levels, do not appear to have any effect on serum AMH level or its predictability toward ovarian reserve and superovulatory performance (Koca et al., 2024a). On the other hand, the weight of the body in small ruminants is inversely correlated with the serum AMH, implying that obesity could impair the ovarian reserve in species like sheep and goat (Ozturan et al., 2025). In humans, weight loss in **Polycystic Ovary Syndrome (PCOS)** enhances fertility parameters without changing the AMH levels, which means that fertility may be enhanced without interference in AMH concentrations (Casadei et al., 2023).

## 7. AMH as a Predictor of Longevity and Embryo Production

The anti-Mullerian Hormone (AMH) has become an interesting biomarker not only for fertility and ovarian reserve but also to predict a productive lifespan and embryo yield in cattle. Herd longevity is highly reduced among heifers with low AMH concentrations as compared to those with higher AMH concentrations, with an average of 196 days. Additionally, they are of reduced survival following their first calving, and this demonstrates that AMH can predict survivability and lifetime productivity (Jimenez-Krassel et al., 2015). Interestingly, the level of AMH does not seem to be related to milk production characteristics. Research has also found that there is no significant relationship between the level of AMH and the percentage of milk fat, percentage of proteins, and the fat-to-protein ratio (Mobedi et al., 2024). Similarly, AMH concentrations and milk production levels are not correlated (Jimenez-Krassel et al., 2015).

There is a substantial amount of evidence that AMH can be used to predict the ability of the embryo to produce. A positive correlation was observed between plasma AMH and the number and quality of embryos following superovulatory procedures. Cows with saturated AMH (e.g., 100- 200 pg/mL and above 400 pg/mL) produced more embryos than cows with low levels (<100 pg/mL), with a correlation coefficient of $r = 0.49$ and $r = 0.58$ (Monniaux et al., 2010). Other positive correlations were observed in in vitro embryo production. For example, plasma AMH level was correlated with the number of in vitro embryos in Holstein ($r = 0.36$, $P<0.001$) and Nelore ($r = 0.50$, $P = 0.003$) donors. Donors with high AMH demonstrated a greater number of aspirated follicles and cumulus-oocyte complexes (Guerreiro et al., 2014). In addition, AMH has also been a stable and reliable hormonal marker in the rate of ovulation and restoration of embryos in both superovulation and ovum pick-up (OPU) procedures. Mossa et al. (2019) showed that the level of AMH is predictive of the total ovulatory response and oocyte production, thus making it an important factor in embryo transfer and in vitro fertilization programs (Monniaux et al., 2010; Fushimi et al., 2019).

Although Center et al. (2018) and Ireland et al. (2011) noted a close correlation between AMH levels, follicle counts, and the total number of collected embryos, both groups noticed that the relation has not been associated with the proportion of transferrable embryos. However, the research results found in Souza et al. (2015) and Monniaux et al. (2010) made an opposite conclusion that AMH can also affect embryo quality.

## 8. Conclusion

AMH is a reliable biomarker of AFP and reproductive potential in animals. Its expression varies significantly by hormonal signals, where FSH suppresses and the BMPs stimulate its synthesis in granulosa cells. AMH levels are associated with superovulatory response, embryo production, longevity and fertility characteristics of livestock. It is also used as a reproductive disorder diagnosis marker in pet animals. However, AMH is relatively well-studied in human medicine, whereas further research is needed in the veterinary species. Its increased application in herd health monitoring and assisted reproduction can bring considerable advancements in fertility management and breeding programs in veterinary practice.

**Conflict of Interests:** The authors declare no conflicts of interest.

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