Why Is the Mare Acting Like a Stallion?: Novel Test to Diagnose Granulosa Cell Tumor

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Granulosa cell tumor (GCT) in mares is a significant concern in veterinary medicine. These tumors primarily affect the ovaries and constitute about 85% of all tumors related to the reproductive tract, impacting the mare's behavior, reproductive function, and athletic ability. Early detection is crucial to mitigate the effects of GCT and keep mares fit for breeding and sports. The aim of this study was to develop an accurate, cost-effective alternative to the current invasive, expensive ultrasound, and biochemical analysis used to diagnose GCT from equine blood. A systematic approach was designed to study the expression of ovarian granulosa-theca cell hormones such as anti-mullerian hormone (AMH), inhibin A, inhibin B, activin A, activin B, and testosterone in eight GCT cyst fluids to identify which of these hormones leak into blood circulation. These hormones were measured using Enzyme-Linked Immunosorbent assays in 26 GCT-positive, 26 GCT-negative, and 181 random subjects for clinical differentiation. The results indicated hormones with elevated levels in cyst fluid corresponded to high levels in serum. Mean AMH concentrations in cyst fluid and serum were 2622.3ng/mL and 17.03ng/mL, respectively. AMH showed the best clinical differentiation (six-fold, p-value<0.0001) between GCT-positive and GCT-negative subjects. ROC analysis revealed an excellent AUC for AMH (0.993), followed by inhibin B (0.842). To implement the AMH test in the diagnostic setting, a cutoff point of 5.6ng/mL was established. The AMH test demonstrated diagnostic accuracy of 96.1% and was improved to 100% by adding inhibin B measurements. AMH measurements can now be established as a stand-alone test for equine GCT diagnosis. This AMH test ($10) will reduce the current testing cost ($300) by 30-fold.

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