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Anti-müllerian hormone and new analytes – Clinical use in small animal reproduction
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Anti-Müllerian hormone (AMH), also called Müllerian inhibiting substance (MIS), is produced solely in the gonads. In males it is produced by the Sertoli cells of testes. High concentrations are produced by the fetal Sertoli cells, and the resulting regression of the Müllerian ducts in male fetuses has given the hormone its name. In females, AMH is produced by granulosa cells of the ovary. Due to the specific production in the gonads, new possibilities for diagnosing physiologic and pathologic conditions involving these organs are enabled by analysis of AMH. In the last decades, commercial immunoassays for analysis of AMH have been developed, and the number of publications related to AMH has increased dramatically, from less than 20 per year before year 2000, to >300 per year from year 2013 onwards. The first commercial assays were developed for diagnosing AMH concentrations in human samples. They have been used for several clinical indications, such as the prediction of the ovarian reserve, or the diagnosis of the polycystic ovarian syndrome. AMH is highly conserved between mammalian species, and the assays developed for use in human samples have also proven useful for several animal species. In dogs, the first published study reported the value of AMH analysis for diagnosing presence of gonads [1], and the analysis has also been shown to be valuable for indicating the presence of Sertoli cell tumors [2]. In cats, the assay has proven useful for diagnosing gonads in both males and females [3]. Increased knowledge of physiologic and pathologic variations of AMH will possibly enable the use for other indications, such as infertility investigations, in vitro fertilization settings, and for diagnosing disorders of sexual differentiation. The analysis of AMH is thus a valuable tool for the practitioner within small animal reproduction, and can, together with the analysis of steroids, give a better picture of pathological aberrations. For analysis of steroids, liquid chromatography-tandem mass spectrometry (LC-MS/MS) is a new method that is often considered the reference method [4]. Presence of autoantibodies, presence of anti-reagent antibodies and the high-dose hook effect are examples of problems related to the since long used immunoassays that can be avoided by using LC-MS/MS [5]. Another advantage with the method is the possibility of analyzing panels of multiple steroids from small sample volumes, resulting in a better picture of the hormonal pattern in an individual. Both analysis of AMH and the new possibilities with LC-MS/MS give new insights into small animal reproduction.