Studies on the ovarian function in female Bernese mountain dogs

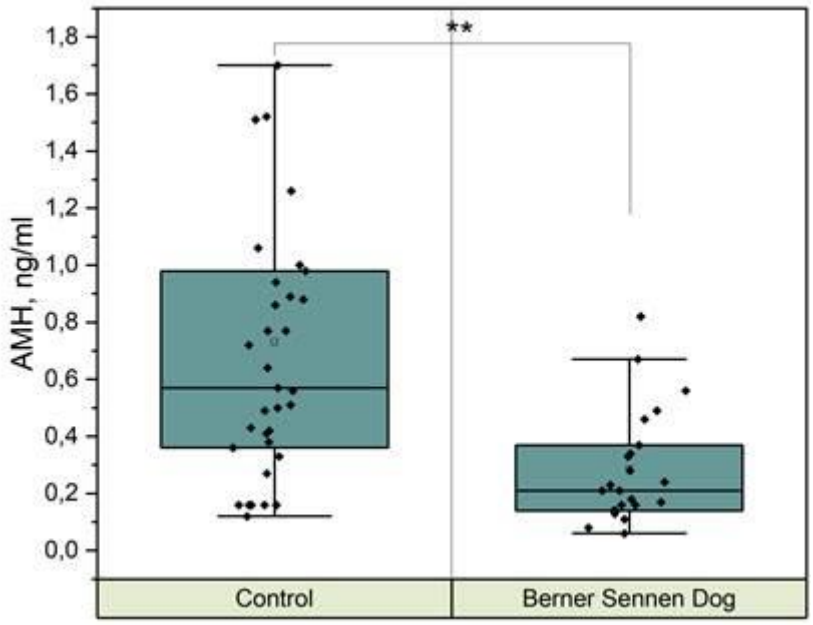
Introduction and aim. In the Bernese mountain dog (BMD), the decreased fertility calls for strategic measures. The whelping rate 2009-2019 was low, 63%, as was the litter size: in a third of litters born there were only 1-4 pups (1). A small litter size is considered to depend predominantly on maternal factors, mainly related to the ovarian function. A poor ovarian function may also lead to a low pregnancy rate, for instance in cases of anovulation. The aim of the present study was to investigate the early ovarian function as a potential cause for the reproductive problems in the BMD.

Materials and methods. Twenty-two BMD bitches and 36 control bitches of 22 different breeds were included. The serum progesterone concentrations were analysed in oestrus and at the time of pregnancy diagnosis, approximately 4 weeks after mating. The concentration of anti-Müllerian hormone, AMH, correlated with the number of ovarian follicles, was analysed in oestrus. Heterophilic antibodies have been described to be more prevalent in the BMD than in most other breeds and may interfere with immunoassays (2). Their presence was also analysed in oestrus,. The concentration of C-reactive protein, CRP, an acute phase protein that is elevated during pregnancy, was measured in oestrus and at pregnancy diagnosis. Ratios were compared using the Fisher's exact test, and continuous variables were compared between BMD and controls using t-test.

Results. The pregnancy rate in BMD was 54.5% compared to 75% in control bitches. Progesterone concentrations at the time of pregnancy diagnosis did not differ between BMD and other breeds ($p=0.15$). Anovulation (diagnosed as no rise in progesterone concentrations) was seen in three BMD bitches but in no control bitch. This difference was not statistically significant ($p=0.08$). Presence of heterophilic antibodies did not differ between BMD and other breeds ($p=0.36$). The AMH concentration during oestrus was lower in BMD bitches than in other breeds ($p<0.001$) and the concentration of CRP at pregnancy diagnosis was also lower in BMD bitches than in other breeds ($p<0.001$).

Conclusions. The pregnancy rate of BMD was low, as previously described. The semen quality of BMD has previously been shown to often be of inferior quality (3). The present study suggests an aetiology to a decreased fertility involving the females. Giant breeds are known to have lower AMH concentrations than small and medium sized breeds (4). However, the presence of anovulatory cycles, which is uncommon in the general dog population, and the low AMH concentration during oestrus may indicate an impaired folliculogenesis and warrants further investigations. More studies are also needed to evaluate the role of CRP during canine pregnancy and the importance of the lower CRP concentrations at pregnancy diagnosis in the BMDs.

References. 1) Axnér et al., Acta Vet Scand 2022;64:28. 2) Bergman et al., Sci Rep 2019;9:14521. 3) Hallberg et al., Rep Dom Anim 2022;57:14-15. 4) Hollinshead et al., Rep Dom Anim 2017;52: 35-40.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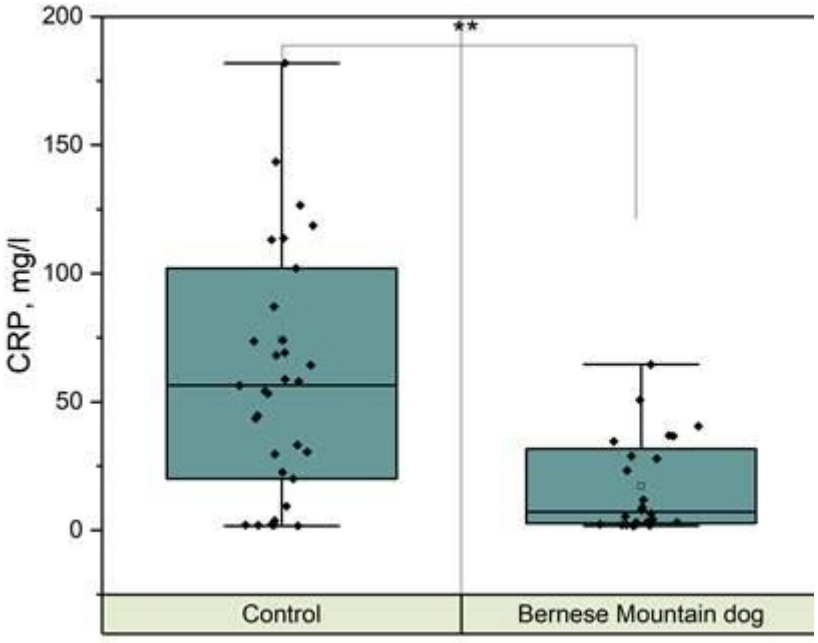
1,8
1,6
1,4
1,2
1,0
0,8
0,6
0,4
0,2
0,0
AMH, ng/ml
Control
Berner Sennen Dog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200
150
100
50
0
CRP, mg/l
Control
Bernese Mountain dog