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Title

Reduced heart rate variability in pet dogs affected by anxiety-related behaviour problems.

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Abstract

We present here the first evidence of correlation between canine anxiety-related behavioural problems and heart rate variability (HRV). HRV is known to be related to a range of mental disorders in humans; however this has not been explored in dogs. Behavioural problems in dogs can result in suffering, property destruction and human injury. Dog behaviour problems were assessed by owner questionnaire and the extreme high and low scoring dogs were recruited into either affected ($n = 10$) or unaffected ($n = 20$) groups. HRV was assessed in dogs at their homes, while being held in lateral recumbency for 5 minutes using manual restraint. Salivary cortisol samples were taken before and after HRV testing. Dogs were assessed as either being reactive to the procedure (barking, growling, struggling or shaking) or unreactive. There was no effect of reactivity or behaviour problems on salivary cortisol levels at baseline or in response to the treatment. There was a significant effect of reactivity on HR ($F_{1,26} = 5.54$; $P = 0.026$), and no effect of behaviour problems ($F_{1,26} = 1.07$; $P = 0.311$). There was no effect of reactivity on any of the HRV measures. The presence of behaviour problems had a significant effect on a range of measures of HRV, with unaffected dogs having higher standard deviation of RR intervals ($F_{1,26} = 6.39$; $P = 0.018$), higher high frequency spectrum ($F_{1,26} = 5.23$; $P = 0.031$) and higher low frequency spectrum ($F_{1,26} = 9.25$; $P = 0.005$) power. There was no effect of behaviour problems on very low frequency spectrum power ($F_{1,26} = 1.40$; $P = 0.248$). Together these results provide evidence for a fundamental physiological difference between dogs affected or unaffected with

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