

## **Plasma cortisol and noradrenalin concentrations in pigs: automated sampling of freely moving pigs housed in the PigTurn<sup>®</sup> versus manually sampled and restrained pigs**

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### **Abstract**

*Minimising the effects of restraint and human interaction on the endocrine physiology of animals is essential for collection of accurate physiological measurements. Our objective was to compare stress-induced cortisol (CORT) and noradrenalin (NorA) responses in automated vs manual blood sampling in pigs. A total of 16 pigs (30 kg) were assigned to either: (i) automated blood sampling via an indwelling catheter using a novel-penning system called PigTurn<sup>®</sup> which detects the pig's rotational movement and responds by counter-rotating, allowing free movement while preventing catheter twisting; (ii) automated sampling while exposed to visual and auditory responses of manually sampled pigs; or (iii) manual sampling by jugular venipuncture while pigs were restrained in dorsal recumbency. During sampling of (i), personnel were not permitted in the room; samplings of (ii) and (iii) were performed simultaneously in the same room. Blood samples were collected every 20 min for 120 min and measured for CORT (ng ml<sup>-1</sup>) using mass spectrometry and NorA (pg ml<sup>-1</sup>) using High Performance Liquid Chromatography (HPLC). Effects of treatment and time were computed with mixed models adjusted by Tukey post hoc. CORT and NorA concentrations were lowest in group (i) followed by group (ii), which were not different. However, CORT and NorA levels in manually sampled animals (iii) were highest compared to automated methods (i) and (ii). Plasma concentrations across time were not different for CORT, but NorA concentration at time 0 min was higher than at 120 min. The presence of visual and auditory stimuli evoked by manual sampled animals did not affect non-handled pigs' responses. Restraint and manual sampling of pigs can be extremely stressful while the automated blood sampling of freely moving pigs, housed in the PigTurn<sup>®</sup> was significantly less stressful for the animals.*

**Keywords:** animal welfare, blood sampling, cortisol, noradrenalin, pigs, restraint