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Research domain: Welfare

Title: Hair hormones as biomarkers of welfare in swine

Short description:

Research suggests that the hormones cortisol and dehydroepiandrosterone (DHEA) relate to stress and physical and mental wellbeing respectively and thus may serve as biomarkers of welfare in swine. The goal of this research is to determine if evaluating the circadian rhythms of these hormones as well as their concentrations within hair could serve as biomarkers of long-term welfare in swine

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Summary:

There is a need for objective and quantifiable indicators of welfare in pigs, specifically, there is a lack of biomarkers able to inform on long-term welfare. Identifying biomarkers of welfare would provide the ability to objectively inform on how different management practices influence welfare, on individual welfare, and may serve as a tool for genetic selection for more resilient pigs. Hormones deposited in hair, in addition to the circadian rhythm of hormones may offer a measure for chronic stress in swine. Increased levels of cortisol in hair and a blunted circadian rhythm have been suggested to be a biomarker of chronic stress, whereas lower levels of dehydroepiandrosterone (DHEA) has been suggested to relate to decreased physical and mental well-being. Prior to using these hormones as biomarkers in swine, factors influencing hormone concentrations need to be understood. This experiment determined whether the rearing environment influenced the circadian rhythm of cortisol and DHEA, and the hormone concentrations in hair. Pigs were raised in either barren environments or with daily straw provisions (8 pens/treatment over 2 batches, 12 pigs/pen) from birth to slaughter. At 12 and 20 weeks of age hair and saliva was collected, with saliva collection occurring over 12 hours to assess the circadian rhythms. Pigs reared with straw had more pronounced circadian rhythms with higher salivary cortisol concentrations at 11:00am, 3:00 and 5:00pm at 12 weeks of age and at 1:00 and 5:00pm at 20 weeks of age. Salivary DHEA was higher in the straw group at 3:00 and 5:00pm at 12 weeks of age and at 9:00am, 1:00 and 5:00pm at 20 weeks of age. Hair hormone concentrations did not differ between treatments, but pigs reared in batch 1 (those born in spring) had higher hair cortisol concentrations compared to those in batch 2 (those born in fall) at both ages suggesting a possible seasonal effect. Further studies are required to understand how the contribution of factors such as season, and genetics contribute to hormone concentration to determine the sensitivity of hair cortisol and DHEA as biomarkers of welfare in swine.