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Post-natal development of EEG responses to noxious stimulation in pigs (*Sus scrofa*) aged 1–15 days

NJ Kells^{*†}, NJ Beausoleil[†], MA Sutherland[‡] and CB Johnson[†]

[†] Animal Welfare Science and Bioethics Centre, Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Private Bag 11222, Palmerston North 4442, New Zealand

[‡] AgResearch Ltd, Ruakura Research Centre, Hamilton 3216, New Zealand

* Contact for correspondence: N.J.Kells@massey.ac.nz

Abstract

This study examined electroencephalographic (EEG) indices of acute nociception in pigs (*Sus scrofa*) aged 1, 5, 7, 10, 12 and 15 days, post-natal. Ten pigs per age were anaesthetised with halothane in oxygen and maintained at a light plane of anaesthesia. EEG was recorded bilaterally using a five-electrode montage. Following a 10-min baseline period, tails were docked using side-cutter pliers and recording continued for a further 5 min. Changes in the median frequency (F50), 95% spectral edge frequency (F95) and total power (P_{TOT}) of the EEG were used to assess nociception. Tail-docking at one day of age induced no significant changes in the EEG spectrum. A typical nociceptive response, characterised by an increase in F50 and decrease in P_{TOT} , was evident at ten days of age, with five and seven day old pigs exhibiting responses in either F50 or P_{TOT} only. Pooling of data into ≤ 7 days of age and > 7 days of age revealed F50 was higher overall in the older group. Whilst P_{TOT} decreased after docking in both groups, this response was larger and more prolonged in the older group. F95 increased after docking in the older pigs only. Overall, these data provide evidence of an increase in cortical responsiveness to noxious stimulation with increasing post-natal age, suggesting there may be qualitative differences in pain perception between age groups. Further, the data provide some support for current recommendations that tail-docking and other painful husbandry procedures be performed within seven days of birth in order to minimise their impact on animal welfare.

Keywords: animal welfare, EEG, nociception, pain, pig, tail-docking