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## Changes in opioid receptors of sows in relation to housing, inactivity and stereotypies

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It has been suggested that some animals kept in close confinement try to cope with difficult conditions by using endogenous opioids, perhaps to self-narcotise. Behavioural responses to confinement in pigs include inactivity and unresponsiveness, and stereotypies such as bar-biting and sham-chewing. A link between stereotypies and opioids has been established by Cronin et al. (1986) who found that the opioid antagonist naloxone inhibited stereotypies in sows which normally spent long periods showing such behaviour. In this study, opiate receptor densities and affinity in tethered sows on commercial farms were related to their behaviour and compared with those in group-housed sows.

The behaviour of seven tethered sows was directly observed and video-recorded in late pregnancy. Slaughter samples (brain, pituitary and adrenal glands) were collected from these and from four group-housed sows within 30 min of stunning and kept at -70°C. Frontal cortex and caudatum were used for homogenate binding studies, and sections cut for autoradiography. The binding assay described by Hunter et al. (1989) was employed, using DagoI, DPDPE and CI977 as tritiated ligands for Mu, Delta and Kappa receptors, respectively.

Tethered sows varied considerably in the amount of tongue rolling and sham chewing (Figure 1a) and levels of activity (Figure 1b) they displayed. Tethered sows had a significantly higher density of Mu receptors in the frontal cortex than group-housed sows (Figure 1c). This was the only significant effect of housing on maximum binding capacity. The time that individual tethered sows were inactive was positively correlated with DagoI binding to frontal cortex (Figure 1d), indicating a relationship between activity and Mu receptors. CI 977 binding to frontal cortex was inversely correlated with performance of stereotypies (Figure 1e), suggesting that regulation of Kappa receptors by endogenous mechanisms may be related to the occurrence of stereotypies. Both DagoI and CI 977 binding to frontal cortex correlated negatively with the performance of tongue-rolling ( $r_s = -0.78$ ), while sham-chewing showed a negative relationship with CI 977 binding to frontal cortex (Figure 1f). A variety of speculations are offered concerning the mechanisms underlying these relationships.

### REFERENCES

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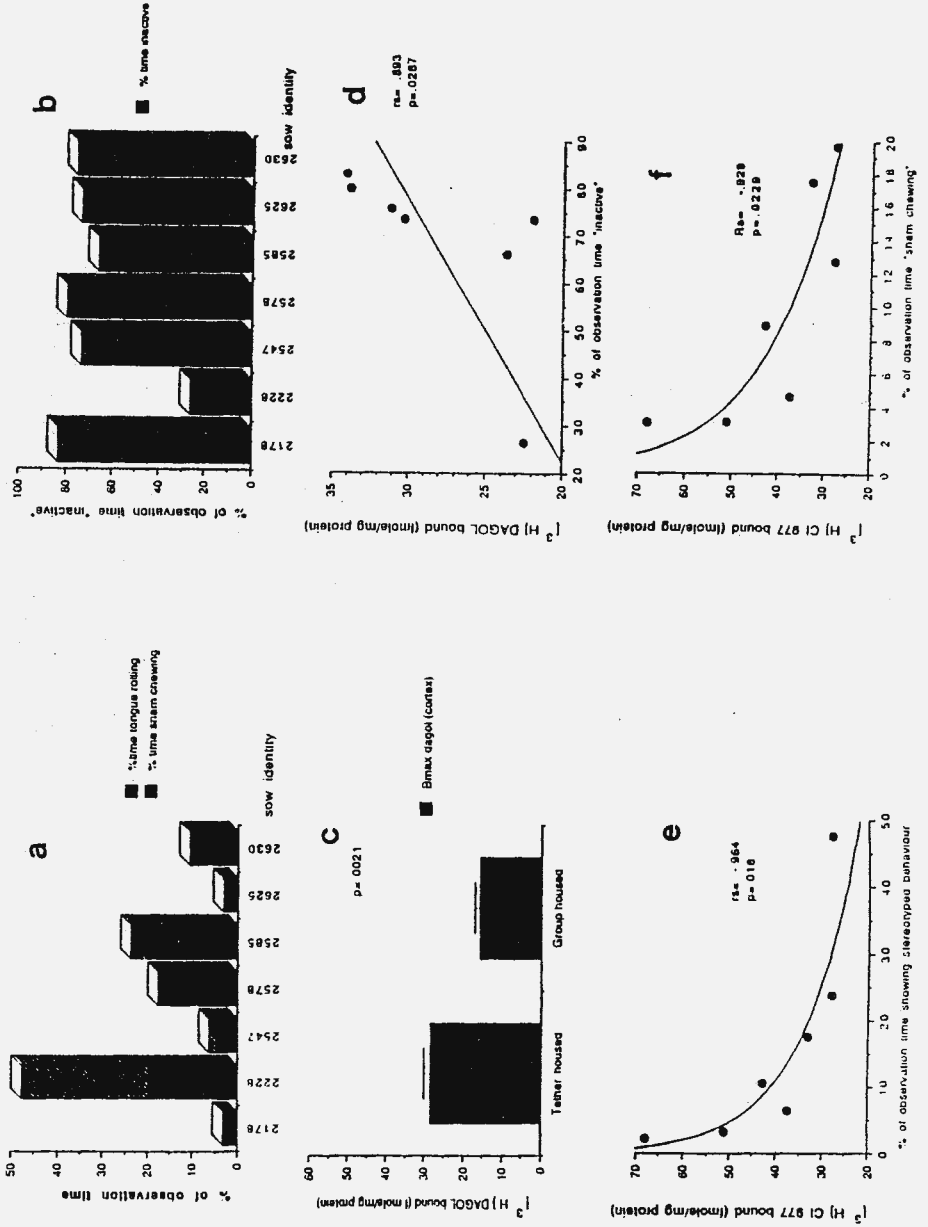


Figure 1 a-f.