**Exposure to the mother activates the main olfactory bulb of lambs**

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The brain structures by which the lamb recognizes and bonds to its’ mother are unknown. The aim of this study was to compare the neuronal activation of the main olfactory bulb (MOB) of lambs exposed to their mothers, lactating ewes or no social stimuli. The testing pen consisted of two similar pens (3mx2m) separated by a metallic fence. At separation, suckling lambs of one month of age were isolated for 90 min in one area of the testing pen. Thereafter, either the mother (n=10; group MOT) or a lactating-ewe (n=9; group LE) were introduced to an adjacent pen for another 90 min. In the third group, lambs remained isolated (n=9, group ISO). Neuronal activation was investigated 90 min later according to the time required for maximum c-Fos expression in sheep. A lamb was considered to be in the contact zone of a ewe when it was less than 80 cm from it. The time spent by the lamb walking in the contact zone, the time sniffing the ewe, the number of vocalizations and contact attempts with the ewe were recorded during the first 20 min. Thereafter, the lambs were anaesthetized with an I.V. injection of sodium thiopental (12.5 mg/kg) followed by bleeding. The MOBs were dissected and fixed in paraformaldehyde and stored in sucrose solution. The MOBs were sectioned using a cryostat, and sections were used for c-Fos immunohistochemistry. The number of c-Fos-positive cells in the granular layer of the MOB (12 sections/animal) was measured using a light microscope, and the density of labelled cells was determined using the Mercator software. The lambs of the three groups differed in the time walking (3.1±17 s, 29.4±10.0s and 210.5±37.6s; for ISO, LE and MOT lambs, respectively, P<0.0001). MOT and LE lambs vocalized more than ISO lambs (17.3±4.7 and 7.4±4.5 vs 0.1±0.1;P=0.01 and P=0.02, respectively). MOT lambs attempted to reunite with their mother more than LE lambs did with the lactating ewe (21.7±5.8 vs 2.6±1.0;P=0.04), sniffed more often the mother (13.3±3.3 vs 4.0±1.1;P=0.01), and tended to do so during more time (27.1±11.1s vs 4.9±1.4s;P=0.059). C-Fos immunoreactivity differed according to the treatment (P=0.049): it was greater in MOT than ISO lambs (1.59±0.27X10-3mm3 vs 1.17±0.26X10-3mm3; P=0.014), while LE lambs had intermediate values that did not differ from any (1.38±0.28X10-3mm3). Recognition of the mother is accompanied with an increased activation of the MOB of lambs, suggesting that olfactory cues from the mother are important for the recognition process.