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OTIC LACTULOSE DOES NOT AFFECT OLFACTORY NEUROGENESIS IN A SHEEP EARLY LIFE STRESS

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Olfactory bulb and the hippocampus represent the main regions in the mammalian brain where neurogenesis is added throughout life. There is a growing body of evidence showing that modifications in gut microbiota affect hippocampal neurogenesis, especially under stress conditions. However, data regarding the effect of prebiotic changes on olfactory neurogenesis are lacking. Here, we investigate the effect of the prebiotic disaccharide promoting the growth of beneficial gut bacteria – on bulbar neurogenesis in a maternal model of early-life stress.

Twenty-four female lambs were separated from their mothers 24 hours after parturition and randomly assigned to the Lactulose group (P, N=12) or the Control group (C, N=12), housed separately. P lambs were fed with lactulose-supplemented milk, while C lambs with non-supplemented artificial milk. At eleven weeks of age, olfactory neurogenesis was quantified by counting the number of neuroblasts (visualized with doublecortin (DCX) immunostaining) in the main olfactory bulb (MOB). DCX-positive cells were counted manually in frontal sections of the left MOB using Mercator software.

The number of DCX-positive cells observed in the granular layer of the left MOB did not significantly differ between P lambs (median=33.75 cells/mm²) and C lambs (median=29.50 cells/mm²).

Conclusion: We found no evidence that lactulose supplementation affects olfactory neurogenesis in a maternal model of early-life stress. However, it remains to be determined whether lactulose can modulate hippocampal neurogenesis in an adult sheep.