



**HAL**  
open science

## Motherhood and olfactory neurogenesis

Rebeca Corona, Maryse Meurisse, Fabien Cornilleau, Chantal Moussu,  
Matthieu Keller, Frédéric Lévy

► **To cite this version:**

Rebeca Corona, Maryse Meurisse, Fabien Cornilleau, Chantal Moussu, Matthieu Keller, et al.. Motherhood and olfactory neurogenesis. Parental Brain 2018: Biological and Behavioral Perspectives on Parental Health, Jul 2018, Toronto, Canada. , 110 p., 2018, Parental Brain 2018 Final Program. hal-02733733

**HAL Id: hal-02733733**

**<https://hal.inrae.fr/hal-02733733v1>**

Submitted on 2 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

## MOTHERHOOD AND OLFACTORY NEUROGENESIS

Corona R ; Meurisse M, Cornilleau F; Moussu C; Keller M; Lévy F

INRA, UMR 85 Physiologie de la Reproduction et des Comportements, 37380 Nouzilly;  
CNRS, UMR 7247; Université François Rabelais, IFCE, France

Profound behavioral changes occur in the mother at parturition, a time when the maternal brain undergoes extensive remodeling of neural circuits. Adult neurogenesis, a form of brain plasticity, could constitute an adaptive response to motherhood. New neurons are continuously added in the olfactory bulb and the aim of our research is to characterize the importance of olfactory neurogenesis in the establishment of maternal behavior. In sheep, odor cues emitted by newborns are essential to establish maternal behavior at parturition and to provide a basis for individual recognition of the offspring. We characterized the activation of adult-generated olfactory neurons in mothers exposed for 2 hours to either their own lamb, an unfamiliar lamb or a familiar adult sheep, after having 2 days of contact with their lamb. Bromodeoxyuridine, a marker of cell division, was injected 3 months before parturition and revealed through immunocytochemistry in combination with markers of activation or neuronal maturation. Results show that the 3-month-old neuroblasts, are preferentially activated by lamb exposure and not by adult exposure and that the preferential activation is specific to olfactory neurogenesis but not hippocampal neurogenesis. We also hypothesized that chemical disruption of olfactory neurogenesis impair the establishment of maternal behavior. At one month of gestation, ewes received either infusion of the antimetabolic drug Ara-C or saline into the lateral ventricles for one-month. Ara-C infusion dramatically decreased olfactory neurogenesis, but spared hippocampal neurogenesis. Mothers exhibiting more than a 70% reduction in olfactory neurogenesis emitted fewer maternal bleats and they were not able to discriminate their own lamb from an alien lamb. These results indicate that adult-born olfactory neurons are to some extent involved in the establishment of maternal behavior by contributing to the processing of offspring odors and reveal the extreme plasticity of the maternal brain. Acknowledgements to N. Laval, T. Delpuech, UEPAO, platform PIC INRA

Research supported by: Agence Nationale de Recherches (ANR), Programme Blanc.

The authors have no conflicts of interest to declare.