Catherine Dulac - selected references

1 Dulac, C., O'Connell, L. A., & Wu, Z. (2014). Neural control of maternal and paternal behaviors. *Science, 345,* 765-770.
Notes: Parental care, including feeding and protection of young, is essential for the survival as well as mental and physical well-being of the offspring. A large variety of parental behaviors has been described across species and sexes, raising fascinating questions about how animals identify the young and how brain circuits drive and modulate parental displays in males and females. Recent studies have begun to uncover a striking antagonistic interplay between brain systems underlying parental care and infant-directed aggression in both males and females, as well as a large range of intrinsic and environmentally driven neural modulation and plasticity. Improved understanding of the neural control of parental interactions in animals should provide novel insights into the complex issue of human parental care in both health and disease

2 Bergan, J. F., Ben-Shaul, Y., & Dulac, C. (2014). Sex-specific processing of social cues in the medial amygdala. *Elife., 3,* e02743.
Notes: Animal-animal recognition within, and across species, is essential for predator avoidance and social interactions. Despite its essential role in orchestrating responses to animal cues, basic principles of information processing by the vomeronasal system are still unknown. The medial amygdala (MeA) occupies a central position in the vomeronasal pathway, upstream of hypothalamic centers dedicated to defensive and social responses. We have characterized sensory responses in the mouse MeA and uncovered emergent properties that shed new light onto the transformation of vomeronasal information into sex- and species-specific responses. In particular, we show that the MeA displays a degree of stimulus selectivity and a striking sexually dimorphic sensory representation that are not observed in the upstream relay of the accessory olfactory bulb (AOB). Furthermore, our results demonstrate that the development of sexually dimorphic circuits in the MeA requires steroid signaling near the time of puberty to organize the functional representation of sensory stimuli.DOI: http://dx.doi.org/10.7554/eLife.02743.001

3 Dulac, C. (2011). Vive la difference: an interview with Catherine Dulac. Interview by Jane Gitschier. *PLoS.Genet., 7,* e1002140.

4 Dulac, C. (2010). Brain function and chromatin plasticity. *Nature, 465,* 728-735.
Notes: The characteristics of epigenetic control, including the potential for long-lasting, stable effects on gene expression that outlive an initial transient signal, could be of singular importance for post-mitotic neurons, which are subject to changes with short- to long-lasting influence on their activity and connectivity. Persistent changes in chromatin structure are thought to contribute to mechanisms of epigenetic inheritance. Recent advances in chromatin biology offer new avenues to investigate regulatory mechanisms

underlying long-lasting changes in neurons, with direct implications for the study of brain function, behaviour and diseases

5 Kimchi, T., Xu, J., & Dulac, C. (2007). A functional circuit underlying male sexual behaviour in the female mouse brain. *Nature, 448,* 1009-1014.
Notes: In mice, pheromone detection is mediated by the vomeronasal organ and the main olfactory epithelium. Male mice that are deficient for Trpc2, an ion channel specifically expressed in VNO neurons and essential for VNO sensory transduction, are impaired in sex discrimination and male-male aggression. We report here that Trpc2-/- female mice show a reduction in female-specific behaviour, including maternal aggression and lactating behaviour. Strikingly, mutant females display unique characteristics of male sexual and courtship behaviours such as mounting, pelvic thrust, solicitation, anogenital olfactory investigation, and emission of complex ultrasonic vocalizations towards male and female conspecific mice. The same behavioural phenotype is observed after VNO surgical removal in adult animals, and is not accompanied by disruption of the oestrous cycle and sex hormone levels. These findings suggest that VNO-mediated pheromone inputs act in wild-type females to repress male behaviour and activate female behaviours. Moreover, they imply that functional neuronal circuits underlying male-specific behaviours exist in the normal female mouse brain

6 Dulac, C. (2005). Molecular architecture of pheromone sensing in mammals. *Novartis.Found.Symp., 268,* 100-107.
Notes: Pheromones have evolved as a discrete class of secreted chemicals that signal the sex and social status of an individual and that promote coordinated motor programs and endocrine changes essential for breeding and aggression. The highly reproducible and species-specific character of the response to pheromones offers a unique experimental system to elucidate the coding of sexual and social information within the brain, and to provide new insights into the molecular and cellular basis of information processing leading to specific behaviours

7 Dulac, C. & Torello, A. T. (2003). Molecular detection of pheromone signals in mammals: from genes to behaviour. *Nature Reviews Neuroscience, 4,* 551-562.

8 Dulac, C. (2000). Sensory coding of pheromone signals in mammals. *Current Opinion in Neurobiology, 10,* 511-518.
Notes: The vomeronasal organ (VNO) of mammals plays an essential role in the detection of pheromones, chemical cues secreted by animals that elicit genetically programmed sexual and aggressive behaviors among conspecifics. The recent characterization of genes encoding molecular components of the VNO sensory response suggests that VNO neurons express a unique set of molecules to recognize and translate pheromone signals into neuronal electrical activity. Identification of these genes, which include putative

pheromone receptor genes, has offered a new opportunity to uncover basic principles of pheromone sensory processing and important aspects of vomeronasal development