DANDRITE
Danish Research Institute of Translational Neuroscience
Nordic EMBL Partnership for Molecular Medicine

AARHUS UNIVERSITY

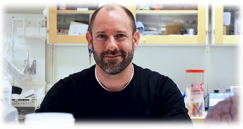
# Virtual DANDRITE Lecture

## Thursday 15 April 2021

**15.00 – 16.00**

**Online via Zoom**

Please find Zoom link via the Outlook calendar invitation. If you have not received this, please write an e-mail to Kathrine: kh@dandrite.au.dk




## Christian Broberger

Professor at the Department of Biochemistry and Biophysics,
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## From membrane properties to behaviour: Gap junction connectivity as a determinant of paternal pup care


The work in my laboratory aims to determine how the membrane properties and connectivity of specific neurons in the hypothalamus give rise to complex network rhythms and, ultimately, the innate behaviours necessary for individual and species survival. - Parental behavior is pervasive throughout the animal kingdom and essential for species survival. The relative contribution of the father to caring for offspring differs, however, markedly across animals, even between related species. The mechanisms that organize and control paternal behavior remain poorly understood. Using rats and mice, two species at opposite ends of the paternal spectrum, we identified that distinct electrical oscillation patterns in neuroendocrine dopamine neurons - resulting from the presence or absence of gap junctions - link to a chain of low dopamine release, high circulating prolactin, prolactin receptor-dependent activation of medial preoptic area galanin neurons and paternal care behavior in male mice. In rats, the same parameters exhibit inverse profiles. Optogenetic manipulation of these rhythms in mice dramatically shifted serum prolactin and paternal behavior, while injecting prolactin in non-paternal rat sires triggered expression of parental care. These findings identify a frequency-tuned brain-endocrine-brain circuit that can act as a gain control system determining a species' parental strategy.