

## Introductory Remarks to Symposium 8

## A neurobiological and computational framework for understanding the complex sensory symptoms of autism

Andreas Frick and Susanne Schmid, Bordeaux (France) and London (Canada)

Atypical sensory perception affects most autistic individuals and significantly influences core symptoms like social challenges. This symposium presents translational research on sensory symptoms, covering preclinical and clinical insights into circuit alterations, computational changes, and network shifts.

Susanne Schmid will present her research on how auditory information processing and filtering are disrupted in the *Cntnap2* knockout rat model of autism. Abnormalities in auditory processing are among the most commonly reported sensory challenges in autism, and Susanne will demonstrate how early developmental interventions may help mitigate these changes, potentially reversing some of the core symptoms of autism. Andreas Frick utilizes a novel vibrotactile perceptual decision-making task, coupled with neocortical activity measurements, to investigate the neural basis of atypical tactile perception in the *Fmr1* knockout mouse model of autism. His findings uncover distinct subgroups of mice characterized by variability in tactile perception and corresponding neocortical changes and highlight the potential for targeted pharmacological interventions. Gesine Fiona Müller leverages the zebrafish model in combination with light-sheet microscopy to investigate whole-brain neural activity patterns across different developmental stages. Her research elucidates how neuronal ensembles contribute to the emergence of spontaneous behaviors during early postnatal development. Jean-Paul Noel explores the diversity of autism phenotypes and their biological underpinnings through the lens of computational psychiatry, which seeks to link varied clinical presentations to a set of disrupted underlying computations. Drawing on this framework, Jean-Paul presents data from three monogenetic mouse models of autism (*Fmr1*, *Cntnap2*, *Shankb3*), identifying a shared computational and neural deficit that suggests biological convergence. Katharina von Kriegstein presents findings on alterations in subcortical sensory pathways in autistic individuals. Using high spatial resolution functional magnetic resonance imaging, she demonstrates that autism is associated with changes in these pathways, particularly within the magnocellular division of the lateral geniculate nucleus. This supports the long-standing hypothesis of a 'magnocellular deficit' in autism, offering insights into the difficulties autistic individuals face with visual motion perception.

## Symposium 8

Thursday, March 27, 2025  
10:30 - 12:30, Lecture Hall 101

Chairs: Andreas Frick and Susanne Schmid,  
Bordeaux (France) and London (Canada)

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| 10:30 | <b>Opening Remarks</b>   |
| 10:35 | Susanne Schmid, London, Canada<br>DO EARLY AUDITORY PROCESSING DISRUPTIONS ASSOCIATED WITH AUTISM CAUSE HYPERREACTIVITY TO SOUND? (S8-1)                   |
| 11:00 | Andreas Frick, Bordeaux, France<br>NEURAL ALTERATIONS IN THE NEOCORTEX UNDERLIE TACTILE PERCEPTION CHANGES IN A MOUSE MODEL OF AUTISM (S8-2)               |
| 11:25 | Gesine Fiona Müller, Goettingen<br>IN VIVO INVESTIGATION OF SPONTANEOUS NEURONAL ACTIVITY DURING ZEBRAFISH DEVELOPMENT USING LIGHT-SHEET MICROSCOPY (S8-3) |
| 11:35 | Jean-Paul Noel, Minneapolis, USA<br>ABERRANT UPDATING OF INTERNAL MODELS IN AUTISM (S8-4)  |
| 12:00 | Katharina von Kriegstein, Dresden<br>ALTERATIONS IN SUBCORTICAL SENSORY PATHWAYS IN AUTISM (S8-5)  |
| 12:25 | <b>Closing Remarks</b>   |