

IGSN CONFERENCE

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Session 1: Neuroscientific Perspectives: From Cellular Models to Neural Circuits and Behavioral Functions

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NEW ROLES FOR AN OLD CELL: BEYOND MYELINATION — OLIGODENDROCYTE PRECURSOR CELLS IN NEURAL CIRCUIT FORMATION

Over the past decades, it has become increasingly clear that the tuning of synaptic connectivity and function within neural circuits is not driven by neurons alone. Glial cells — which comprise up to half of all cells in the vertebrate central nervous system — play crucial roles in shaping circuit connectivity through the modulation of synapse formation and remodelling.

More recently, we and others have begun to attribute some of these functions to oligodendrocyte precursor cells (OPCs). While OPCs are best known as the progenitors of myelinating oligodendrocytes, a substantial proportion do not differentiate but instead persist as a widespread and evenly distributed population throughout the CNS. These cells tile neural tissue with elaborate process networks and even form bona fide postsynaptic connections with neurons, positioning them to directly sense and influence circuit activity.

In this talk, I will present our investigations into the diversity and function of OPCs using the zebrafish model. I will focus on recent work demonstrating that OPCs exert myelination-independent roles in synapse remodelling that are essential for the refinement of visual circuit function and the development of visual acuity. Finally, I will discuss ongoing efforts to elucidate the mechanisms by which OPCs tune visual circuitry, and consider how OPC dysfunction may contribute to disorders of the developing CNS.