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Those enigmatic NG2 cells . . .

"Enigmatic" is a term that has frequently been applied to NG2 cells, the focus of this special issue of Neuron Glia Biology. NG2 cells of the mature CNS are descended from oligodendrocyte precursors in the embryonic neural tube, and they continue to express oligodendrocyte lineage markers during adulthood, giving them a definite "glial" stamp. However, this simple picture has been blurred recently by the demonstration that NG2 cells express neurotransmitter receptors and other machinery that is more usually associated with neurons. Their split neuron-glial personality has been highlighted further by the discovery that NG2 cells can synapse with and receive synaptic input from neurons. NG2 cells have suddenly become "interesting" – a "fourth neural cell type" distinct from differentiated oligodendrocytes, astrocytes or neurons. This new and exciting (and excitable) side of NG2 cells is attracting the attention of a new generation of researchers who bring a fresh and unfettered outlook to the field, as well as new technical approaches. We hope that this collection of commissioned papers will encourage this trend, by providing an overview of the field as it stands at present and a taste of things to come. We thank those who have contributed their time, data and insights – and acknowledge the many others who could have contributed equally well or better, but for lack of space in the journal and energy (or imagination) on the part of the Associate Editor.

The seven papers include a mixture of short reviews, original research papers and hybrids of the two. Together they provide a solid background to NG2 cell research and some tantalizing new data, both from rodents and humans. The collection is being published in two parts for logistical reasons. Part I (NG2 cells as components of neural circuits) includes papers on the electrical properties of NG2 cells and attempts to detect output signalling to nearby neurons (**Bakiri, Attwell** & **Karadottir**), analysis of their neurotransmitter receptors and their potential role in integrating local signalling activity (**Kukely** & **Dietrich**), NG2 cell morphology and their physical relationships with neurons and other cells (**Wigley** &**Butt**) and, most prescient, a review of myelin development in humans and how electrical activity, white matter plasticity and motor skills learning (e.g. learning to play the piano or juggle) might be causally inter-connected (**Ullen**). Part II (NG2 cells as neural precursors) has papers describing the detection and morphology of NG2 cells in humans during health and disease (**Staugaitis** & **Trapp**), the differentiated fates of NG2 cells in humans and molecular analysis of the signalling pathways that drive their different behaviours (**Sim, Windrem** & **Goldman**) and, finally, NG2 cell cycle dynamics and how rates proliferation and differentiation decrease with age (**Psachoulia, Jamen, Young** & **Richardson**). Overall, the emphasis is on normal biology and physiology but the crucial role that NG2 cells play in myelin repair (e.g. during multiple sclerosis) is a recurring and important theme, as is the multi-lineage differentiation potential that they can display in culture, or in pathological situations.

We again thank the authors for helping to put together an excellent, authoritative and timely NG2 cell primer for the benefit of hardened "myelin-ologists" as well as those who are just awakening to the existence of these fascinating cells and their importance in normal and abnormal CNS function. We commend these articles to you and trust that you will enjoy and benefit from reading them.

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