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GLIA

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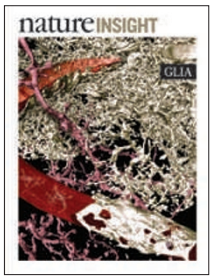

Cover illustration
Mouse astrocyte (white), blood vessels and neuronal dendrites imaged with a Gatan 3View (E. Bushong/ M. Terada/M. Ellisman).

Ever since their discovery more than 150 years ago, glial cells have been defined by what they couldn't do. Above all, they have lacked the ability to communicate with other cells through fast electrical and chemical signals — action potentials running down axons and transmitter release at synapses. This has been the exclusive property of neurons, their arch rivals in the battle for researchers' attention — and funding. And because action potentials remain the dominant currency of information processing in the brain, most neuroscientists still see glia as second-class supporting material — the brain's 'glue'.

But sure enough, each year brings further exceptions to such a strict division of labour. In 2008, for example, a subclass of glial cell was reported to fire bona fide action potentials. And a sizeable fraction of the glial research community entertains the radical view that evoked release of neurotransmitters by glial cells — 'gliotransmission' — must contribute to the information-processing power of the brain (see News Feature, page 160).

Neuron-envy should now become a thing of the past. Recent years have seen an explosion of new findings demonstrating that glial cells play an irreplaceable part in all aspects of brain function. And with this collection of reviews, we want to illustrate some of the most vibrant sectors of glial research, and the major impact that glia have on issues as diverse as brain development, neuronal plasticity and the control of cerebral blood flow, which makes functional brain imaging possible.

As every article in this supplement also amply demonstrates, glia have a central role in many diseases of the nervous system. And the numerous new molecular markers and tracing techniques discussed here offer just as many fresh opportunities for research and therapeutic intervention.

We hope this supplement will make it clear that a brain cell doesn't need to be a neuron to enjoy a lot of the action and to offer great potential. At the very least, glial cells should now be defined by what they can do.

Tanguy Chouard and Noah Gray
Senior Editors

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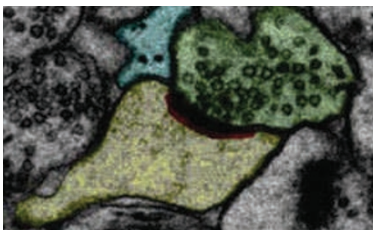

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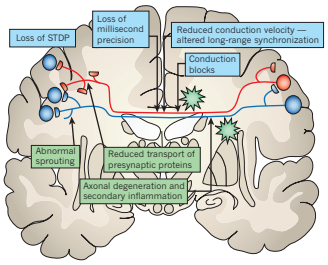

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