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# The rise and fall of microglia regulating central nervous system regeneration

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Veronique Miron did her PhD at McGill University in Montreal under the supervision of Dr. Antel and Dr. Kennedy. After graduating in 2009, she continued in the group of Dr. Antel as Postdoctoral Fellow. In 2010 she moved to the Medical Research Council Center for Regenerative Medicine at the University of Edinburgh. She stayed until 2013 in the groups of Prof. Ffrench-Constant and Prof. Franklin. In January 2014 Veronique Miron started her own lab in Edinburgh as Principal investigator/Assistant Professor at the Queen's Medical Research Institute.

***Career advice:***

• **Be pro-active:** present your work whenever you can, speak to people at conferences, ask for advice on your work, meet with invited speakers, submit funding applications (even if for small amounts). This is all networking that could lead to professional opportunities.
• **Finesse presentation skills**: Give practice presentations, read successful and unsuccessful funding bids, learn to draw your own diagrams to convey your message or hypothesis in a clear simplified way. I recommend the e-book '4 Steps to funding' by Morgan Giddings for a template for the order to present your ideas, and the software BioRender for easy diagram making (even if you are artistically challenged!).
• **Find your niche:** think about what you want to be known for, what gap you are filling in scientific knowledge that will be your specialty and the pitch you use in grant/job applications. e.g. I want to be the 'microglia and regeneration' person. You would then select activities or direct your pitch towards this in talks, applications, etc. to be known for this 'thing'. It could be an area of research, an approach, a technique, anything that sets you apart from the crowd.

***Abstract:***

The prime example of effective regeneration in the central nervous system is that of remyelination, whereby re-enstheathment of axons with myelin restores electrical impulse conduction and trophic/ metabolic support. Remyelination fails in a multitude of neurological disorders, which is considered to contribute to the axonal damage/ loss correlating to clinical decline. The lack of approved therapies promoting remyelination highlights the need to elucidate the underpinning mechanisms. Our previous work showed that efficient remyelination requires dynamic regulation of microglia activation, with a transition from a pro-inflammatory (iNOS+ TNF-alpha+ CD16/32+) to regenerative phenotype (Arg-1+ CD206+ IGF-1+) needed to initiate remyelination. The chronic pro-inflammatory microglia activation commonly observed in neurological disorders suggests an impairment in this transition. However, the cellular and molecular mechanisms regulating the activation of microglia and resolution of inflammation are unknown. Using a combination of ex vivo and in vivo modelling of myelin damage, live imaging of microglia dynamics, and correlation to human CNS pathology, we have unveiled hitherto unrecognized cellular and molecular events that control microglia activation and remyelination. We believe that these reveal novel therapeutic strategies to dampen CNS inflammation-associated pathology and support a regenerative response to reinstate neural health.

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