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Strategies to improve regeneration after peripheral nervous system trauma

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Strategies aiming to enhance peripheral nervous tissue (PNS) regeneration after traumatic lesions are socially important because this condition is usually associated with permanent disabilities and low quality of life. Even in the PNS where axon regeneration is a well-known process, only about 10% of adults who receive a surgical repair display full functional recovery. To evaluate strategies to improve regeneration, we have established models of trauma in the peripheral nervous system. In general, our projects are preclinical studies, in which we test a regenerative strategy. Our strategies include transection and tubulization with or without cell grafts and transection and tubulization with or without VEGF/GCSF gene therapy. Each one of these strategies is not capable of giving a significant result by itself, therefore there is a need for additional interventions that would have synergistic effects and maximize repair and functional outcomes. For that we use a combination of therapies, such as cell and gene therapy and rehabilitation procedures (treadmill training, for example). The results of our strategies are compared with autografts, the gold standard technique used by surgeons to repair a nerve lesion with tissue loss in humans. The tubulization technique mimics a lesion with tissue loss and is a manner to challenge the nerve to regenerate. The methods used to assess nerve regeneration and functional improvements include: Sciatic Functional Index, grasping test, electroneuromiography, light and electron microscopy (transmission and scanning), immunohistochemistry, and enzyme activity of muscles. Our results clearly show that the strategies used are capable of enhancing peripheral nerve regeneration in terms of morphology and function.

Biography

Ana Maria Blanco Martinez has completed her PhD from University of London, England, and Postdoctoral studies from Rochester University, USA. She is an Associate Professor at the Federal University of Rio de Janeiro, Brazil, since 1985. She has published more than 100 papers in reputed journals and serving as an Editorial Board Member of *"Restorative Neurology and Neuroscience"* and *"International Journal of Neuropathology"*. She has supervised 26 and 16 Master and PhD students, respectively, all in the field of Peripheral and Central Nervous System trauma.

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