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Editorial Open Access

Regeneration of Peripheral Nerves can be as Challanging as those Occurring in the Central Nervous System after Traumatic Injuries

Ana Maria Blanco Martinez*

Department of Pathology, Federal University of Rio de Janeiro, Brazil

***Corresponding author:** Ana Maria Blanco Martinez, Laboratory of Neurodegeneration and Repair, Department of Pathology, Faculty of Medicine, HUCFF, Federal University of Rio de Janeiro, Brazil, E-mail: martinez@histo.ufrj.br

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Editorial

There is a general belief that regeneration in the Peripheral Nervous System is a successful event; however, complete functional regeneration is seldom achieved in patients that suffered an acute nerve traumatic injury. In fact, what is clinically observed is that these patients live with permanent disabilities that interfere negatively in their daily routine activities. Also, the majority of such cases occur in young males that due to physical disabilities have to abandon their jobs. This scenario represents a great economical, social and health problem for the society [1].

Peripheral nerve injuries with either long-distance defects or occurring far from the target tissue are particularly challenging and in general, the regeneration process is as challenging as those occurring in central tracts, where regeneration does not occur spontaneously. In cases where there is tissue loss a direct neurorraphy is not possible without causing nerve tension and therefore another repair technique is needed. Clinically these lesions are repaired by nerve autograft, a technique that demands a second surgery to harvest a segment of a donor nerve, a disadvantage of the method. Also, the area covered by the donor nerve becomes denervated and function is lost. Another technique that is employed by surgeons is nerve transfer, in which a healthy nerve is transferred to the distal stump of the sectioned nerve. This is the choice technique when the proximal stump is not available. All these techniques present disadvantages and the results obtained are not entirely satisfactory. Therefore there is an urgent need to search for alternative approaches that can overcome these problems and yet improve functional outcome [1-3].

Experimental studies aiming at developing alternative strategies that can improve nerve regeneration have increased over the last decades. Particularly, the search for nerve guiding conduits or tubes that can be used to bridge the nerve defect has received considerable attention from researchers all over the world [4]. These conduits can be manufactured from synthetic or biological materials. Ideally, they should be biodegradable and biocompatible, have adequate permeability so as to permit the entrance of nutrients into the tube lumen and yet avoid the passage of cells that can interfere negatively in the regeneration processes, such as fibroblasts and inflammatory cells. Also, the ideal tube should have adequate mechanical properties so as to support suture and avoid collapse of the walls into the lumen, which could disrupt the regenerative process.

The desired tubes are not only good alternatives for bridging peripheral nerve defects but also they can be used in association with other pro-regenerative strategies such as cell therapy [5-7], gene therapy [8-10], growth-factors [11,12], among others. We hope that in the future, the clinical use of these combined strategies will result in better nerve regeneration and improved functional outcome.

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