

Proteomics analysis provides a functional vision into biological characteristic of nerve regeneration

Mehrnaz Moattari^a, Farahnaz Moattari^a, Gholamreza Kaka^c

^aDepartment of Animal Biology, Faculty of Biological Science, Kharazmi University, Tehran, Iran.

^bFaculty of Agriculture and Natural Resources, Persian Gulf University, Bushehr, Iran.

^cNeuroscience Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran.

ABSTRACT

Regeneration of peripheral nerve injury occurs through the synchronized triggering of different pathways and networks. Using proteomics and bioinformatics analysis provide an interpretation of pathway-based organization of nerve regeneration with an instant elucidation of complicated biological processes. They include four significantly enhanced canonical pathways were identified including EIF2 signaling, LXR/RXR activation, acute phase response signaling and actin cytoskeleton signaling. LXR/RXR and acute phase response signaling are elaborated in the regulation of immune responses. EIF2 signaling upregulated which shows protein synthesis and degradation. Aiding Ingenuity Pathway Analysis system (IPA) analysis shows upregulation of cellular assembly and organization, cell morphology, cellular movement categories after sciatic nerve injury. The spatio-temporal regulation of actin filaments and microtubules expressions support nerve assembly after injury and promote axon regeneration and has pivotal role in the regulation of axon growth. Ezrin and Moesin are up-regulated after nerve injury. Both appeared as important regulators of the signaling are components of Schwann cells (SCs) microvilli and mediators of diverse cytoskeletal processes, such as cell adhesion and migration, as well as cell morphology which linked to the cellular plasticity required to support nerve regeneration. Actin and actin-associated proteins are up-regulated in injured tissues. Microtubules and microtubule-associated proteins are down-regulated. Neurofilaments are down-regulated after nerve injury. Above-mentioned shows the incidence of Schwann cells and the nonappearance of neurons in injured tissues and approves that *in situ* breakdown of tissues certified defining with pronounced specificity the sciatic nerve-proteome changes.

Key words: Peripheral nerve injury, Proteomics, Sciatic nerve