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EXPLORING THE BASIS OF NEUROREGENERATION: IDENTIFICATION OF KEY MOLECULES WITH PROTEOMICS AND FUNCTIONAL ASSAYS IN THE MAMMALIAN SPINAL CORD

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One of the major challenges of modern biology concerns the inability of the adult mammalian central nervous system (CNS) to regenerate and repair itself after injury. Unlike the situation in adult mammals, lower vertebrates, such as fish and amphibians, and embryonal higher vertebrates can regenerate significant portion of their CNS. It is poorly understood why this potential is lost with evolution and development and becomes very limited in adult mammals. A preferred model to study and reveal the cellular and molecular basis of this loss is neonatal opossum (Monodelphis domestica). Opossums are marsupials that are born at very immature stage with unique possibility to successfully regenerate spinal cord after injury in the first two weeks of their life and thus offer an exceptional opportunity to study neuronal regeneration. We are analyzing the proteoms of the spinal tissue of the opossums of different age, looking for the molecules associated with regenerative axon growth and testing their functional role in neuronal regeneration using in vitro intact spinal cord cultures and advanced imaging. In parallel, we are developing opossum primary spinal cell cultures made from the animals of different age, to reveal dissimilarities in their cellular content (giving focus on stem cells) and metabolic characteristics related to regeneration. Our results are giving new insights into neuronal regeneration in mammals, but also provide candidate targets for future novel therapeutic interventions for neurodegenerative disorders..

BIOGRAPHY

Miranda Mladinic has completed her PhD in 1998 at SISSA, Trieste, Italy. She is the professor at the department of biotechnology of the University of Rijeka, Croatia and the head of the unit for molecular and systemic biomedicine. She is also a member of the council of the senate to the University of Rijeka and to the council for scientific research of the University of Rijeka. She is the member of the evaluation committee of the Croatian Science Foundation in the field of natural sciences – biology. She has over 30 publications that have been cited over 580 times, and her publication H-index is 17 and has been serving as reviewer of reputed journals and International scientific foundations.

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