

International Conference on Protein Engineering

October 26-28, 2015 Chicago, USA

Neural stem cells promote nerve regeneration through IL12-induced oligodendrocyte differentiation

Ing-Ming Chiu

National Health Research Institutes, Taiwan

Regeneration of peripheral nerve injury is a slow and complicated process which could be accelerated by implantation of neural stem cells (NSCs) or nerve conduit. We previously developed a novel approach to isolate neuronal progenitor cells from mouse and human brain tissues using F1B-GFP reporter plasmid. We showed that F1B-GFP+ NSCs when combined with FGF1 and nerve conduit could promote the repair of damaged sciatic nerves in mice and rats. Implantation of NSCs combining with conduits promotes the regeneration of damaged nerve may be due to conduit provides support and connection of injured nerve whilst preventing fibrous tissue in growth and retaining neurotrophic factors; implanted NSCs differentiate into Schwann cells and maintain a growth factor-enriched micro-environment which helps nerve fiber regeneration. In this study, we identified IL12p80 (the bioactive homodimer form of IL12p40) in the cell extracts of mice which were implanted with nerve conduit combined NSCs. Levels of IL12p80 in these conduits are 1.89 fold higher than those in conduits without NSCs. In the sciatic nerve injury mouse model, implantation of NSCs combined with nerve conduit and IL12p80 improves the motor function recovery and increases the diameter up to 4.5 fold of the regenerated nerve. *In vitro* study further reveals that IL12p80 stimulates the oligodendrocyte differentiation of mouse NSCs through the phosphorylation of Stat3. These results suggest that IL12p80 can trigger neuroglia differentiation of mouse NSCs through Stat3 phosphorylation and enhance myelination and nerve regeneration process in a mouse sciatic nerve injury model.

Biography

Ing-Ming Chiu has completed his PhD from Florida State University and Postdoctoral studies from National Cancer Institute. He is the Director of Division of Regenerative Medicine in Taiwan's National Health Research Institutes. He has published more than 130 papers in reputed journals and serving as Chief Scientific Officer of Taitheon International Company in Taiwan.

ingming@nhri.org.tw

Notes: