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Pharmacological Stimulation of Regeneration.The Regennova Project

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Although currently pharmacological treatment is not the leading approach in regeneration studies, pharmacological solutions could become, if not an alternative, at least an attractive complementation to cell-based methods. The "REGENNOVA" project, an interdisciplinary research program, which combines chemical synthesis, cell culture and animal models with molecular biotechnology, aims to screen for novel drug candidates for regenerative therapies. Increased regenerative capacity typical of foetal period and the differentiation potential of stem cells suggest that epigenetic regulation could be a key to regeneration. A selection of epigenetic agents and morphogens were tested for their pro-regenerative activity using a murine skin injury model. A prominent regenerative response to one of examined substances was observed. Enhanced expression of several pluripotency and neurogenesis genes as well as alterations in DNA methylation were found in the tissues collected from the area of injury and repair in the group of treated animals. In addition, DNA damage was examined within the wound site. The results show that pharmacologically induced epigenetic remodelling is an effective solution to trigger regenerative processes. This study indicates that the epigenetic changes which lead to the loss of regenerative abilities in the course of develoment could be reversed by pharmacological intervention.

Biography

Paweł Sachadyn completed his PhD dissertation in the field of molecular biotechnology at the Faculty of Chemistry of the the Gdansk University of Technology in 2000. His present studies are focussed on molecular basis of mammalian regeneration, including the epigenetic aspects of regenerative potential and novel methods for pharmacological stimulation of regeneration processes. He is an associate Professor at the Faculty of Chemistry, Gdańsk University of Technology and the leader of the Laboratory for Molecular Basis of Regeneration.

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