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Schwann cells and the neuro-immune axis in the tumour microenvironment

Michael R. Shurin

Departments of Pathology and Immunology, University of Pittsburgh Medical Center and University of Pittsburgh Cancer Institute, Pittsburgh, PA, USA

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***Correspondence:** Michael R. Shurin. Departments of Pathology and Immunology, University of Pittsburgh Medical Center and University of Pittsburgh Cancer Institute, Pittsburgh, PA, USA. E-mail: shurinmr@upmc.edu
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Abstract

Solid tumor innervation is an important compartment of the tumor microenvironment, which regulates tumor growth, spreading, and metastasis formation directly or indirectly via tumor-infiltrating immune cells, endothelial cells, and fibroblasts. Our data focusing on the mechanistical analysis of the intratumoral neuro-immune axis revealed that Schwann cells, the main glial cells of the peripheral nervous system covering neuron dendrites and axons, can stimulate tumor cell motility and spreading and can attract and up-regulate the immunosuppressive activity of immune regulatory cells – DCs, MDSCs, and Treg cells. The protumorigenic and immunomodulatory activity of Schwann cells in the tumor microenvironment is mediated, at least in part, by Schwann cell-derived exosomes. For instance, our recent data showed that human Schwann cells up-regulated human lung cancer cell proliferation, motility, and invasiveness by exosomal microRNA-21-5p, as was assessed in several in vitro experiments. Furthermore, animal model studies revealed that Schwann cell exosomal miRNA-21-5p could significantly increase metastasis formation. These and other results support the development of a mechanism-based Schwann cell-targeting approach as a novel neuroglia-centric antitumor therapeutic strategy.