

Abstract Submitted
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Schwann Cells and the Importance of Finite 3D Deformations in Soft Gels¹ CHRISTIAN FRANCK, EYAL BAR-KOCHBA, Brown University, CRISTINA LOPEZ-FAGUNDO, University of Zurich, LIANE LIVI, DIANE HOFFMAN-KIM, Brown University — Schwann cells (SCs) are specialized glial cells that are critical for the development, regeneration, and maintenance of nerves in the peripheral nervous system (PNS). Recent studies have shown that the mechanical properties of the extracellular matrix can significantly affect cell structure and function. Studying the mechanical interactions between SCs and their microenvironment can aid in understanding their physical and morphological changes as well as their native function. Using a recently developed 3-D large deformation traction force microscopy (3D-LDTFM) technique, we investigate the mechanosensitivity of SCs across a physiologically relevant substrate stiffness range (0.24 kPa to 4.80 kPa) in vivo. As oppose to other cell types, we find that the SC spreading area and prominent stress fiber formation was relatively insensitive to substrate stiffness. Consistent with these structural findings, the SCs generated large surface tractions on stiff substrates and large material deformations on soft substrates. Across all moduli, we observed a significant contribution from the out-of-plane traction component, locally giving rise to rotational moments similar to those reported for mesenchymal embryonic fibroblasts.

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Christian Franck
Brown University

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