

Publication

A RET-ER81-NRG1 Signaling Pathway Drives the Development of Pacinian Corpuscles

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 3658532**Author(s)** Fleming, Michael S.; Li, Jian J.; Ramos, Daniel; Li, Tong; Talmage, David A.; Abe, Shin-Ichi; Arber, Silvia; Luo, Wenqin**Author(s) at UniBasel** [Arber, Silvia](#) ;**Year** 2016**Title** A RET-ER81-NRG1 Signaling Pathway Drives the Development of Pacinian Corpuscles**Journal** Journal of Neuroscience**Volume** 36**Number** 40**Pages / Article-Number** 10337-10355

Axon-Schwann cell interactions are crucial for the development, function, and repair of the peripheral nervous system, but mechanisms underlying communication between axons and nonmyelinating Schwann cells are unclear. Here, we show that ER81 is functionally required in a subset of mouse RET(+) mechanosensory neurons for formation of Pacinian corpuscles, which are composed of a single myelinated axon and multiple layers of nonmyelinating Schwann cells, and Ret is required for the maintenance of Er81 expression. Interestingly, Er81 mutants have normal myelination but exhibit deficient interactions between axons and corpuscle-forming nonmyelinating Schwann cells. Finally, ablating Neuregulin-1 (Nrg1) in mechanosensory neurons results in no Pacinian corpuscles, and an Nrg1 isoform not required for communication with myelinating Schwann cells is specifically decreased in Er81-null somatosensory neurons. Collectively, our results suggest that a RET-ER81-NRG1 signaling pathway promotes axon communication with nonmyelinating Schwann cells, and that neurons use distinct mechanisms to interact with different types of Schwann cells.; Communication between neurons and Schwann cells is critical for development, normal function, and regeneration of the peripheral nervous system. Despite many studies about axonal communication with myelinating Schwann cells, mostly via a specific isoform of Neuregulin1, the molecular nature of axonal communication with nonmyelinating Schwann cells is poorly understood. Here, we described a RET-ER81-Neuregulin1 signaling pathway in neurons innervating Pacinian corpuscle somatosensory end organs, which is essential for communication between the innervating axon and the end organ nonmyelinating Schwann cells. We also showed that this signaling pathway uses isoforms of Neuregulin1 that are not involved in myelination, providing evidence that neurons use different isoforms of Neuregulin1 to interact with different types of Schwann cells.

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