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Neurofilament kinetics and changes in axonal caliber after axonal injury TUNG NGUYEN, Ohio University, ANTHONY BROWN, Ohio State University, PETER JUNG, Ohio University — Neurofilaments (NF) are the most abundant cytoskeletal structures in neuronal axons and determine their caliber. NFs are assembled in the cell body, and are also cargo of slow axonal transport moving distally at rate of 0.1 – 1 mm/day. This dual role of NFs, as space filling structures and cargo of slow transport, im- plies a complex relation between axon caliber, NF influx from the cell body and transport kinetics, which is subject of our research. Changes in axon caliber, NF velocity, and NF flux observed after axonal injury, presents a good model system to study these complex relations. Axonal injury signals the cell body to reduce NF and tubulin influx, resulting in a wave of axon thinning, propagating distally at a rate consistent with NF velocity, while at the same time, NF transport rate is in- creasing. We developed a novel computational model for NF transport, where ac- cess of NFs to microtubule tracks and their organization determines their motility. Using this new computational model, we can relate the time-course of post-injury axonal thinning and increase of NF velocity by a reduction of NF flux and tubulin. The subsequent time - course of axonal recovery can be likewise associated with a recovery of NF flux and tubulin abundance.

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