"Biomechanical forces regulate gene transcription in mammalian neurons"

Joseph R. Loverde, Ph.D.
The Geneva Foundation
United States Military Academy
Department of Chemistry & Life Sciences
West Point, NY

Abstract:
The development of meter-long axons within peripheral nerves and white matter tracts is a remarkable yet unresolved biological process. Following the formation of synaptic connections, and the cessation of growth cone extension, mitotic tissues continue to expand between the proximal and distal segments of spanning axons. Such expansion conceivably applies temporary biomechanical stretch to local axons, which acts to regulate concomitant neuronal growth. While stretch is a known stimulus of neuron growth, the underlying molecular mechanisms are unknown. My primary research aims are to decipher the biological processes underlying long axon growth, and to discover methods of re-activating those mechanisms in order to support regeneration. My secondary aims are to develop methods of guiding new regenerative growth to the proper targets through the design of novel biomaterial scaffolds that may be implanted at sites of injury.

Publications:
