Regeneration in the Adult Central Nervous System

January 20

Tuesday, 12:30 pm

Billings Building—Rosedale Room

SPEAKER:

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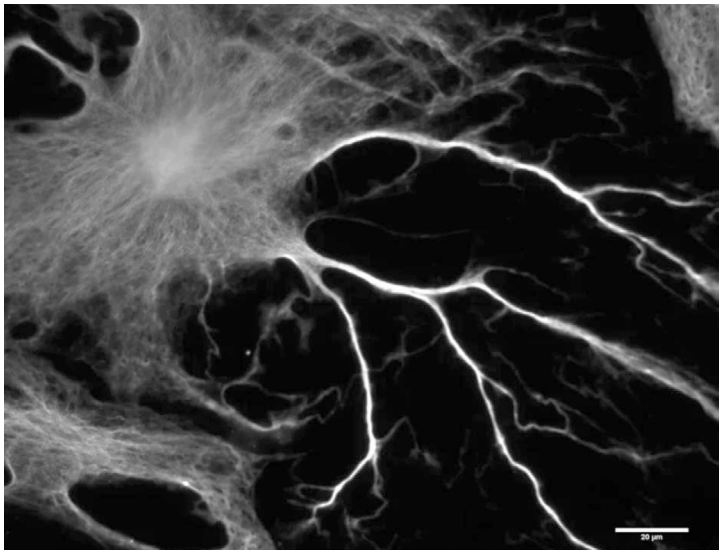
Abstract

There is limited regenerative capacity in the adult mammalian central nervous system (CNS). My lab studies this loss of regeneration in two different contexts: Adult neurogenesis, where neural stem cells (NSCs) make newborn neurons in the adult brain, and CNS axon regeneration following an injury, determining how changes during development and aging influence axon regeneration. Adult neurogenesis - NSCs in the hippocampus generate newborn neurons throughout life in a process referred to as adult neurogenesis. Adult NSCs are primarily quiescent, in a reversible G0 state. Upon receiving a signal, quiescent NSCs (qNSCs) activate, entering the cell cycle to initiate population expansion, differentiation, maturation, and integration. During aging and disease, extrinsic and intrinsic factors drive adult hippocampal NSCs deeper into quiescence, reducing NSC quiescence exit, ultimately contributing to cognitive decline. My lab works to identify factors controlling NSC quiescence and quiescence exit to improve neurogenesis and ultimately identify targets to enhance cognitive function. We specifically have focused our efforts in the following areas: proteostasis, translational control, asymmetric inheritance of specific cellular.



A human fibroblast in the process of transdifferentiating into a neuron.

Publications

1. C.S. Morrow, K. Tweed, S. Farhadova, A.J. Walsh, B.P. Lear, A. Roopra, R.D. Risgaard, P.C. Klosa, Z.P. Arndt, E.R. Peterson, M.M. Chi, A.G. Harris, M.C. Skala, D.L. Moore (2024). Autofluorescence is a biomarker of neural stem cell activation state. Cell Stem Cell, 31(4):570-581.e7. PMID: 38521057.

2. C.S. Morrow, T.J. Porter, N. Xu, Z.P. Arndt, K. Ako-Asare, H.J. Heo, E.A.N. Thompson, D.L. Moore (2020). Vimentin coordinates protein turnover at the aggresome during neural stem cell quiescence exit. Cell Stem Cell, 26(4):558-568. e9.*B.P. Lear, *E.A.N. Thompson, K. Rodriguez, Z.P. Arndt, S. Khullar, P.C. Klosa, R.J. Lu.

3. C.S. Morrow, R. Risgaard, E.R. Peterson, B.B. Teefy, A. Bhattacharyya, A.M.M. Sousa, D. Wang, B.A. Benayoun, D.L. Moore. Age-maintained human neurons demonstrate a developmental loss of intrinsic neurite growth ability. bioRxiv 2023.05.23.541995; doi: 10.1101/2023.05.23.541995, In revision at Nature Communications. *Co-first authors.