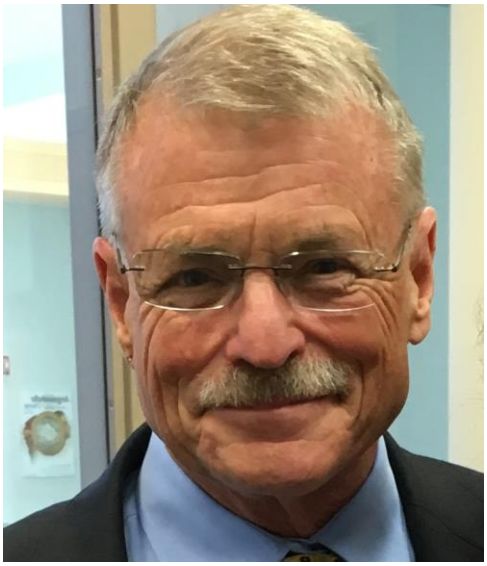
Weekly Colloquium

Tuesday, 5/23/2017, 12:30pm, Billings Building – Rosedale Conference Room

"Progress toward regenerating the corticospinal tract after spinal cord injury"

Oswald Steward, Ph.D.
Director, Reeve-Irvine Research Center
Senior Associate Dean for Research
University of California Irvine School of Medicine



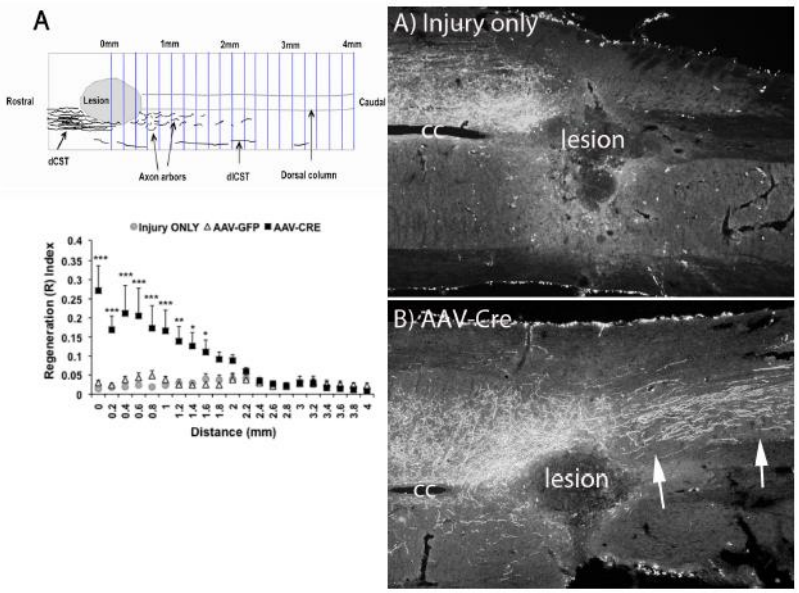
It has long been recognized that the best hope for restoring function after spinal cord injury is to develop ways to enable damaged axons to regenerate past an injury site. Regeneration of the corticospinal tract (CST) is iconic because the CST controls voluntary motor function, so CST regeneration could reverse paralysis. Although there are several barriers to regeneration, reports over the last decade have documented that significant regeneration can be achieved by interventions that boost intrinsic growth capacity of mature neurons. One promising intervention involves deletion or knockdown of the phosphatase and tensin homolog PTEN, which is a negative regulator of the AKT/mTOR pathway. Using AAVshRNA-based gene modification strategies coupled with well-characterized pre-clinical models of SCI, we have shown that potentially translatable interventions targeting PTEN can enhance regenerative growth of the CST and recovery of motor function. Surprisingly, PTEN deletion in uninjured mature neurons also triggers robust growth of neuronal cell bodies, addition of dendrites and axonal enlargement that continues for at least 1 year. Preliminary findings related to the mechanisms of adult neuronal growth will be discussed.

Recent publications:

Lewandowski, G., and Steward, O. (2014) AAVshRNA-mediated suppression of PTEN in adult rats in combination with salmon fibrin administration enables regenerative growth of corticospinal axons and enhances recovery of voluntary motor function after cervical spinal cord injury. J. Neurosci., 34: 9951-9962.

Danilov, C., and Steward, O. (2015) Conditional deletion of PTEN *after* a spinal cord injury enhances regenerative growth of CST axons and motor function recovery in mice. Exp. Neurol., 266, 147-160.

Gutilla, E.A., Buyukozturk, M.M., Steward, O. (2016) Long-term consequences of conditional genetic deletion of PTEN in the sensorimotor cortex of neonatal mice. Exp. Neurol. 279, 27-39.



For more information contact: dwhite@burke.org

Burke Medical Research Institute
Academic Affiliate of Weill Cornell Medicine
785 Mamaroneck Avenue, White Plains, NY 10605 | T. 914.597.2551 | www.burke.org