BURKE MEDICAL RESEARCH INSTITUTE

Weekly Colloquium

Tuesday, 3/6/2018, 12:30pm, Billings Building – Rosedale Conference Room

"Timing, Training, & Tinctures – Reorganization & Recovery After Stroke"

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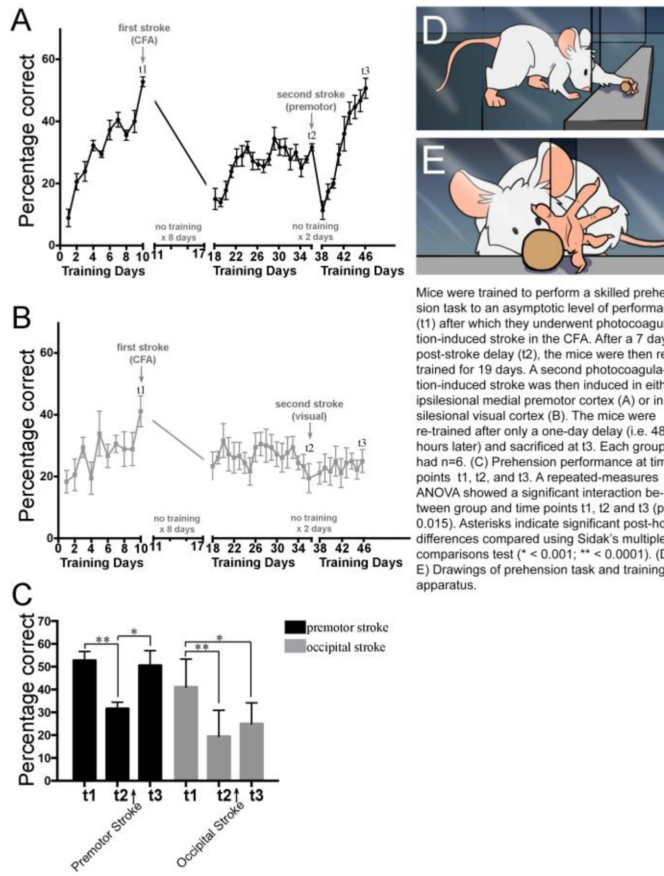

Mice were trained to perform a skilled prehension task to an asymptotic level of performance (t1) after which they underwent photocoagulation-induced stroke in the CFA. After a 7 day post-stroke delay (t2), the mice were then re-trained for 19 days. A second photocoagulation-induced stroke was then induced in either ipsilesional medial premotor cortex (A) or in ipsilesional visual cortex (B). The mice were re-trained after only a one-day delay (i.e. 48 hours later) and sacrificed at t3. Each group had n=6. (C) Prehension performance at time points t1, t2, and t3. A repeated-measures ANOVA showed a significant interaction between group and time points t1, t2 and t3 ($p = 0.015$). Asterisks indicate significant post-hoc differences compared using Sidak's multiple comparisons test (* < 0.001; ** < 0.0001). (D, E) Drawings of prehension task and training apparatus.

Publications:

S.R. Zeiler, R. Gubbard, E. Gibson, T. Zheng, K. Ng, R. O'Brien, J.W. Krakauer. Paradoxical Motor Recovery From a First Stroke After Induction of a Second Stroke: Reopening a Postischemic Sensitive Period. (2015). Sagepub.com/journalsPermissions.nav. DOI:10.1177/1545968315624783.

S.R. Zeiler, J.W. Krakauer. The Interaction between training and plasticity in the poststroke brain. Curr Opin Neurol (2013), 26:000-000. DOI:10.1097/WCO.0000000000000025.

K.L. Ng, E.M. Gibson, R. Hubbard, J. Yang, B. Caffo, R.J. O'Brien, J.W. Krakauer, **S.R. Zeiler**. Fluoxetine Maintains a Stat of Heightened Responsiveness to Motor Training Early After Stroke in a Mouse Model. (2015) stroke.ahajournals.org/lookup/suppl/DOI:10.1161/STROKEAHA.115.010471/-/DCI.

Abstract:

Studies in humans and nonhuman animal models show that most recovery from impairment occurs in the first 1–3 months after stroke as a result of both spontaneous reorganization and increased responsiveness to enriched environments and training. Improvement from impairment is attributable to a short-lived sensitive period of postischemic plasticity defined by unique genetic, molecular, physiological, and structural events. Data suggests that there are hree important variables that determine the degree of motor recovery from impairment all else being equal: (i) the timing, intensity, and approach to training with respect to stroke onset, (ii) the unique post-ischemic plasticity milieu, and (iii) The extent of cortical reorganization. I will present data regarding both the biology of the brain's post-stroke sensitive period and the difficult question of what kind of interventions best exploit this period. I will describe limitations of current post-stroke rehabilitation methods and suggest novel nterventions, which incorporate robotics, video-gaming, and pharmacological interventions including SSRIs and Cerebrolysin. Of import, Cerebrolysin has allowed us for the first time to model spontaneous recovery in an animal model of motor stroke.

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