ELSC Seminar: Hermona Soreq

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A the lecture given by:

Hermona Soreq
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On the topic of:

"The promises and challenges of neuronal microRNAs"

December 19, 2013

Abstract:

MicroRNA (miRNA) regulators of gene expression are yet evolving miniature genes (100-fold smaller than regular genes) that can efficiently control neuronal signaling pathways by simultaneously dimming down the expression of multiple target genes each. Specifically, miRNA controllers of acetylcholine signaling, which we designate "CholinomiRs" modulate both anxiety and inflammation reactions to external insults. We predict a physiologically relevant bidirectional competition of CholinomiRs on the interaction with their targets. Studying this concept, we found rapid increases of the evolutionarily conserved acetylcholinesterase (AChE)-targeted CholinomiR-132 in acute stress, inflammation and post-ischemic stroke, inversely to its drastic reduction in the Alzheimer's disease brain. In comparison, we find mutations interfering with the AChE-silencing capacities of the primate-specific CholinomiR-608 to associate with elevated trait anxiety, inflammation and mal-recovery from stroke in human volunteers. Deepened understanding of the evolution and complexity of neuronal miRNAs may highlight their role in the emergence of human brain functions while enhancing the ability to intervene with diseases involving ACh signaling impairments.
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