MEDIZINISCHE UNIVERSITÄT
INNSBRUCK

Lecture invitation

From Mice to men:
Fine tuning of cholinergic signaling by microRNAs

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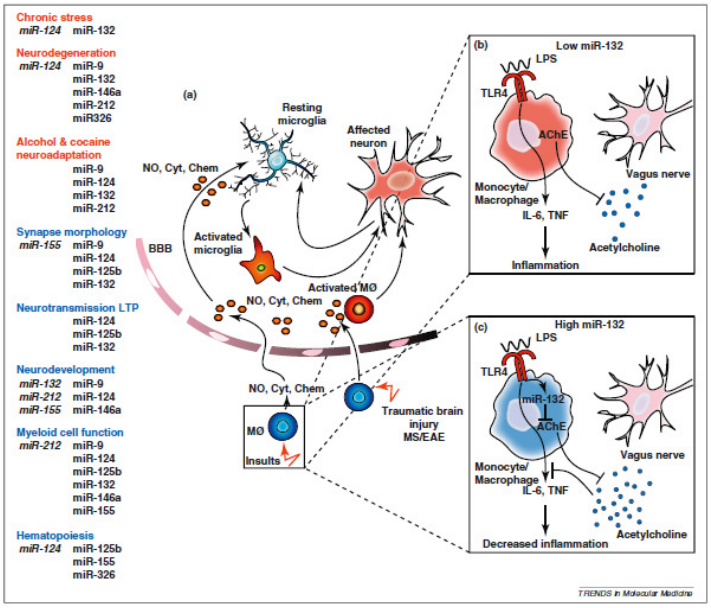
When: 10.07.2014, 17:00 h
Where: Seminar room M01-392, CCB, Innrain 80-82, Innsbruck



Abstract:
Continuous communication between the nervous and the immune system is essential both for maintaining homeostasis and for ensuring rapid and efficient to stressful and infection insults. The emerging level of microRNA (miRNA) regulation provides an exciting and challenging model for studying this communication in anxiety and inflammation. MiRNA regulators of gene expression are yet evolving miniature genes (100-fold smaller than regular genes) that can efficiently control neuronal signaling pathways and may have contributed to the evolution of higher brain functions 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 observe a physiologically relevant bidirectional competition of CholinomiRs on the interaction with their targets. We found rapid increases of the evolutionarily conserved neuro-modulator acetylcholinesterase (AChE)-targeted CholinomiR-132 in acute stress, intestinal inflammation and post-ischemic stroke, inversely to its drastic reduction in the Alzheimer’s disease brain. In comparison, we find single nucleotide polymorphisms interfering with the AChE-silencing capacities of the primate-specific CholinomiR-608 to associate with elevated trait anxiety, inflammation and diverse aging-related diseases 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 cholinergic signaling impairments.

1. **Barbash, Shifman and Soreq, Mol Biol and Evolution 2014**
2. **Shaltiel et al., Brain St and Function 2013**
3. **Nadorp and Soreq, Frontiers in Mol Neuroscience 2014**
4. **Hanin et al., Hum Mol Gen 2014**