Regulatory RNAs in the brain and neuroendocrine system

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RNA molecules exhibit plentiful regulatory functions during development, in homeostatic states and disease. We are particularly interested in microRNAs (miRNAs), circular RNAs (circRNAs) and long non-coding RNA (lncRNAs) functions and their contribution to regulating protein-coding genes. Our previous work showed that circRNA Cdr1as is highly expressed in glutamatergic neurons in the mammalian brain where it interacts and stabilizes miR-7 and affects miR-7 target mRNAs [Piwecka et al., 2017]. That regulatory RNA circuit impacts the synaptic output and influences the behavior as evidenced by studying Cdr1as knockout mice and their phenotype. In the first part of my talk, I will comment on the most recent advances in understanding the Cdr1as-miR-7 network in glutamatergic neurons. In the second part, I will turn to our newest results from studies on the Cdr1as-miR-7 network in the part of the neuroendocrine system, a pituitary gland, where miR-7 and Cdr1as ratio is opposite as compared to the brain tissue. Additionally, I will present the preliminary results on the dynamic regulation of circRNA, lncRNA and miRNA profiles in the murine pituitary in the course of postnatal development.

Piwecka et al. (2017) Loss of a mammalian circular RNA locus causes miRNA deregulation and affects brain function. Science 357(6357):eaam8526.