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Non canonical Drosha pathway regulates hippocampal neural stem cell differentiation

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Self-renewing and multipotent neural stem cells (NSCs) reside in the dentate gyrus of the adult mammalian hippocampus. The Microprocessor, a multimeric complex of the ribonuclease Drosha and the RNA binding protein DGCR8, drives miRNA biogenesis.

The Microprocessor also has miRNA-independent functions, directly targeting and cleaving stem-loop hairpin structures of mRNAs and destabilizing the transcripts. We found that RNase III Drosha regulates NSC maintenance and inhibits oligodendrocyte fate commitments in adult NSCs.

Drosha-CLIP (cross-linking and immunoprecipitation) experiment shows that Drosha binds the mRNAs of critical oligodendrocyte and gliogenic transcription factors. Taken together our findings reveal a new miRNA-independent action of the Microprocessor in the maintenance of adult NSCs and control of oligodendrocyte differentiation.

Osipite: Annalisa Buffo