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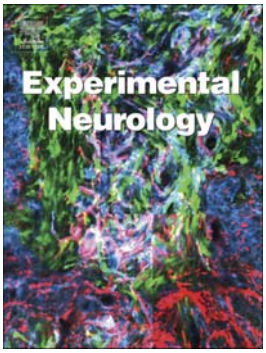

Increased precursor microRNA-21 following status epilepticus can compete with mature microRNA-21 to alter translation

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Increased precursor microRNA-21 following status epilepticus can compete with mature microRNA-21 to alter translation

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ABSTRACT:

MicroRNA-21 (miR-21) is consistently up-regulated in various neurological disorders, including epilepsy. Here, we show that the biogenesis of miR-21 is altered following pilocarpine status epilepticus (SE) with an increase in precursor miR-21 (pre-miR-21) in rats. We demonstrate that pre-miR-21 has an energetically favorable site overlapping with the miR-21 binding site and competes with mature miR-21 for binding in the 3'UTR of *TGFBR2* mRNA, but not *NT-3* mRNA *in vitro*. This binding competition influences miR-21-mediated repression *in vitro* and correlates with the increase in *TGFBR2* and decrease in *NT-3* following SE. Polysome profiling reveals co-localization of pre-miR-21 in the ribosome fraction with translating mRNAs in U-87 cells. The current work suggests that pre-miR-21 may post-transcriptionally counteract miR-21-mediated suppression following SE and could potentially lead to prolonged TGF-β receptor expression impacting epileptogenesis. The study further supports that the ratio of the pre to mature miRNA may be important in determining the regulatory effects of a miRNA gene.

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