Long non-protein-coding RNA molecules as therapeutics for epilepsy.

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Technology description

Technology Summary:

Long Non-coding RNA (lncRNA) were first described in 2002 from mouse, making this a relatively new technology.lncRNA transcripts far exceed the number of protein coding mRNAs in the mammalian transcriptome, but in lower copy numbers.Inventors have performed in vitro system perturbations of a subset of these lncRNA-mRNA cis-pairs and trans-pairs, showing that by modulation (increasing or decreasing) the lncRNA level, we can directionally and specifically alter the level of mRNA from the same pair.

Thirty four lncRNAs were identified (CDNA and Microarray) that are highly up-regulated in human brain where seizures start (foci).One of these lncRNA?s, BDNFOS (primate specific) was found to down-regulate Brain Derived Nuerotrophic Factor (BDNF).BDNF supports neuronal survival and encourages the growth/differentiation of new neurons and synapses (hippocampus and forebrain).BDNF is up regulated in epilepsy and implicated in causing epileptogenesis (epileptic brain tissues and KO mice).

Epilepsy affects over 3 million Americans of all ages; more than Multiple Sclerosis, Cerebral Palsy, Muscular Dystrophy and Parkinson?s Disease combined.About 125,000 to 150,000 cases per year and 30% of those diagnosed are children.In about 2/3rds of cases, the cause of seizures is unknown.At the present time, there are no treatments that cure epilepsy; only drugs that suppress seizures.

US epilepsy therapy market will increase from $2.9 billion in 2011 to nearly $3.7 billion in 2016.Military veterans that have suffered traumatic brain injuries are at an elevated risk of developing post-traumatic epilepsy (PTE) and it has been estimated that between 48,000 and 169,000 soldiers that served in Iraq and Afghanistan are expected to have develop PTE.

Application area

BDNFOS as a therapeutic target for epilepsy

Screening methods to identify lncRNA?s in the brain related to neurological diseases.

Comparison of disease tissue and non disease tissue.

Identifying key mRNA.

Identifying lncRNA complement to mRNA.

Institution

Wayne State University