Docket #: S13-095

Selective modulation of anxiety features

Researchers in Dr. Karl Deisseroth's lab have developed a selective approach to treat anxiety. Anxiety is characterized by several features that are coordinately regulated by diverse neuronal system outputs. These features range from behavioural choice patterns, such as risk avoidance, to changes in physiology exemplified by respiratory rate alterations. A major limiting step in the treatment of anxiety is the inability to selectively control the various features of the disease. For instance, some features may not be that troubling whereas others, such as elevated respiratory rate, may be debilitating or life threatening. It would be of great value to be able to individually regulate the various disease features. This technology describes a new role for the bed nucleus of the stria terminalis (BNST) in the coordinated modulation of diverse anxiety features and provides methods to selectively tune these features.

Stage of research
The inventors have demonstrated that distinct BNST subregions exert opposite effects in modulating anxiety and define separable anxiolytic roles for different anterodorsal BNST projections.

Ongoing research
Additional work in mapping anxiety circuitry.

Applications

- Treatment of anxiety- including selective regulation of the various disease features.
- Development of research tools to screen new anxiety therapeutics.

Advantages

- Precise
- Specific-could allow selective regulation of different anxiety features.

Publications

- US Published Patent Application 20160038764, "Optogenetic control of behavioral state".
- PCT Published Patent Application WO2014144409, "Optogenetic control of behavioral state".
- Kim SY, Adhikari A, Lee SY, Marshel JH, Kim CK, Mallory CS, Lo M, Pak S, Mattis J, Lim BK, Malenka RC, Warden MR, Neve R, Tye KM, Deisseroth K. Diverging neural pathways assemble a behavioural state from separable features in anxiety. Nature. 2013 Apr 11;496(7444):219-23
- Johansen J. News & Views- Anxiety is the sum of its parts. Nature. 2013 Apr 11;496(7444):174-5.

Patents

- Published Application: WO2014144409
- Published Application: 20160038764

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