Docket #: S11-480

LilrB2/PirB -A novel receptor for Aβ oligomers

Researchers in Dr. Shatz's lab have identified murine PirB and its human ortholog LilrB2 as receptors for β-amyloid (Aβ) oligomers. Aβ oligomers play a central role in a number of pathologies. They are thought to be mediators of cognitive dysfunction in Alzheimer's disease (AD) as well as Down syndrome (DS). Currently there are no effective therapies for arresting or reversing the cognitive impairment associated with these diseases and new therapeutics are needed. The inventors' findings provide a new avenue for therapeutic development for AD and other amyloidopathies including DS.

Stage of research
The inventors have identified LilrB2/PirB as receptors for Aβ oligomers and have identified the domains of LilrB2/PirB that mediate interaction with Aβ oligomers. Also included with this technology are PirB/LilrB2 peptides that can inhibit Aβ oligomer binding to PirB/LilrB2. In addition, using mouse models of AD, they identified signaling mediators downstream of the receptors and showed that Aβ oligomer activation of LilrB2/PirB sets in motion synaptic destruction.

Applications

- Therapeutic development for:
  - Alzheimer's disease
  - Down syndrome
  - Glaucoma
- Basic research

Advantages

- New target for therapeutic development

Publications

- Blocking pirb upregulates spines and functional synapses to unlock visual cortical plasticity and facilitate recovery from amblyopia (Published PCT patent appliction WO2016044022)
- Kim T, Vidal GS, Djurisic M, William CM, Birnbaum ME, Garcia KC, Hyman BT, Shatz CJ. Human LilrB2 is a ?-amyloid receptor and its murine homolog PirB regulates synaptic plasticity in an Alzheimer's model. Science. 2013 Sep 20;341(6152):1399-404
- Goldman B. Scientists reveal how beta-amyloid may cause Alzheimer's. Inside Stanford Medicine. September 19, 2013
- Published International Patent Application WO 2014164519

Patents

- Published Application: WO2014164519
- Published Application: 20160009782
- Published Application: 20170274003
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