

Docket #: S11-480

LilrB2/PirB - A novel receptor for beta-amyloid oligomers

Researchers in Dr. Shatz's lab have identified murine PirB and its human ortholog LilrB2 as receptors for β -amyloid ($A\beta$) oligomers. $A\beta$ 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' patented findings provide a new avenue for therapeutic development for AD and other amyloidopathies including DS.

Stage of Development

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

Applications

- Therapeutic development for:
 - Alzheimer's disease
 - Down syndrome
 - Axonal regeneration
 - Stroke
- Basic research

Advantages

- New target for therapeutic development

Publications

- Bochner, D. N., Sapp, R. W., Adelson, J. D., Zhang, S., Lee, H., Djurisic, M., ... & Shatz, C. J. (2014). [Blocking PirB up-regulates spines and functional synapses to unlock visual cortical plasticity and facilitate recovery from amblyopia](#). *Science translational medicine*, 6(258), 258ra140-258ra140.
- Kim, T., Vidal, G. S., Djurisic, M., William, C. M., Birnbaum, M. E., Garcia, K. C., Hyman B. T., & Shatz, C. J. (2013). [Human LirB2 is a \$\beta\$ -amyloid receptor and its murine homolog PirB regulates synaptic plasticity in an Alzheimer's model](#). *Science*, 341(6152), 1399-1404.
- Goldman B. [Scientists reveal how beta-amyloid may cause Alzheimer's](#). September 19, 2013. Inside Stanford Medicine.

Patents

- Published Application: [WO2014164519](#)
- Published Application: [20160009782](#)
- Published Application: [WO2016044022](#)
- Published Application: [20170274003](#)
- Issued: [10,138,286 \(USA\)](#)

Innovators

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