Neuronal Specific Targeting of Caveolin Expression

Tech ID: 21446 / UC Case 2010-117-0

BACKGROUND

Understanding the basic mechanisms of cognitive decline and how the subcellular organization of signaling molecules is altered with cognitive decline could potentially yield novel therapeutic targets for neuronal aging and neurodegeneration.

Cholesterol is a major lipid component of synapses and a limiting factor in synapse activity. Age-related impairments in the biosynthesis, transport, or uptake of cholesterol by neurons in the CNS may adversely affect synaptic circuitry. Moreover, caveolin-1 (Cav-1), a cholesterol binding and resident protein of membrane lipid rafts (MLR; discrete regions of the plasma membrane enriched in cholesterol), organizes and targets synaptic components of the neurotransmitter and neurotrophic receptor signaling pathways to MLR.

TECHNOLOGY DESCRIPTION

UC San Diego scientists have discovered a role for Cav-1 and MLR in organizing synaptic pro-survival signaling components that are essential for neuroprotection against ischemic injury and neuronal regeneration and for maintaining synapse stabilization and formation. This invention comprises a new method of treating neurodegenerative diseases by targeting increased expression of caveolin-1 protein to brain neurons. For example, up-regulation of caveolin-1 in stem cells transplanted into the brain or spinal cord may enhance new synaptic connections, thereby significantly accelerating regeneration. This represents a novel means by which function of the aged brain, diseased brain, or injured brain can be improved.

INTELLECTUAL PROPERTY INFO

This technology is available for licensing.

RELATED MATERIALS

▶ Kassan A, Egawa J, Zhang Z, Almenar-Queralt A, Nguyen QM, Lajevardi Y, Kim K, Posadas E, Jeste DV, Roth DM, Patel PM, Patel HH, Head BP. Caveolin-1 regulation of disrupted-in-schizophrenia-1 as a potential therapeutic target for schizophrenia. J Neurophysiol. 2017 Jan 1;117(1):436-444. doi: 10.1152/jn.00481.2016. PMID: 27832597 - 01/01/2017

▶ Mandyam CD, Schilling JM, Cui W, Egawa J, Niesman IR, Kellerhals SE, Staples MC, Busija AR, Risbrough VB, Posadas E, Grogman GC,Chang JW, Roth DM, Patel PM, Patel HH, Head BP. Neuron-Targeted Caveolin-1 Improves Molecular Signaling, Plasticity, and Behavior Dependent on the Hippocampus in Adult and Aged Mice, Biol. Psychiartry Oct 8, 2015 - 10/08/2015

▶ Head BP, Peart JN, Panneerselvam M, Yokoyama T, Pearn ML, Niesman IR, Bonds JA, Schilling JM, Miyanohara A, Headrick J, Ali SS, Roth DM, Patel PM, Patel HH. Loss Of Caveolin-1 Accelerates Neurodegeneration and Aging. PLoS One. 2010 Dec 23;5(12):e15697.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,086,088	10/02/2018	2010-117
United States Of America	Issued Patent	8,969,077	03/03/2015	2010-117
United States Of America	Published Application	20190209707	07/11/2019	2010-117

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OTHER INFORMATION

KEYWORDS

caveolin-1; disrupted-in-schizophrenia-1; schizophrenia; stereotactic injection; synaptic plasticity; synaptic proteins; memory

CATEGORIZED AS

- **Medical**
  - Disease: Central Nervous System
  - Stem Cell

RELATED CASES

2010-117-0

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