

Animal Model

Tenascin-R knock-out mice

Reference Number 21-00013b

Abstract

Challenge

Genetically modified animals are essential research tools in modern neuroscience, since they allow researchers to study the role of specific genes in pathological processes leading to neurodegenerative diseases. Tenascin-R (TNR) is an extracellular matrix glycoprotein expressed predominantly in the central nervous system and localizes to the nodes of Ranvier and perineuronal nets. TNR has also been implicated to have a positive effect on nerve regeneration.

Open field behavior of TN-R^{-/-} and wild-type mice: representative paths of wild-type (left) and TNR^{-/-} (right) mouse during the first 5 min of test. TNR^{-/-} mice spend considerably more time in the central area of the maze.

Technology

TNR ^{-/-} mice were generated by inactivating the Tnr gene via homologous recombination in embryonic stem cells and creating transgenic mice. Although TNR ^{-/-} mice appear to be normal with regard to general health condition and neurological state, deficits in the rota-rod, open field, water maze and two-way active avoidance paradigms have been observed, which indicate impairment in motor coordination and in spatial and associative learning. Furthermore, the knock-out animals displayed a significant decrease in conduction velocity of compound action potential recordings from optic nerves.

Commercial Opportunity

Breeding pairs are available under a Tangible Property License Agreement.

Further Reading

- Weber et al.: Mice deficient for Tenascin-R display alterations of extracellular matrix and decreased axonal conduction velocities in the CNS. *J of Neuroscience*, 1999, 19(11): 4245-4262.
- Montag-Sallaz and Montag: Severe cognitive and motor coordination deficits in Tenascin-R-deficient mice. *Genes, Brain and Behaviour* (2003) 2: 20-31.
- Hargus et al.: Tenascin-R promotes neuronal differentiation of embryonic stem cells and recruitment of host-derived neural precursor cells after cytotoxic lesion of the mouse striatum. *Stem Cells*. 2008 Aug;26(8):1973-84. Epub 2008 May 22.