National Human Genome Research Institute (NHGRI)
Patent-Pending Technology Available for Licensing

Assay for Predicting the Time of Onset of Niemann-Pick Disease Type C (NPC)

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Lead Inventor
Wiliam J. Pavan, Ph.D.
Senior investigator, Genetic Disease Research Branch, NHGRI, NIH

NHGRI Contact
Claire T. Driscoll
Director, NHGRI Technology Transfer Office
cdriscoll@mail.nih.gov

Summary

Niemann-Pick Disease, type C (NPC) is a rare, autosomal recessive, neurodegenerative disease. Approximately 95% of patients with NPC have mutations in NPC1, a gene implicated in intracellular cholesterol trafficking. Mutation of NPC1 causes intracellular accumulation of unesterified cholesterol in late endosomal/lysosomal structures and marked accumulation of glycosphingolipids, especially in neuronal tissue. Thus, NPC patients generally present with hepatosplenomegaly (enlargement of liver and spleen) and neurological degeneration.

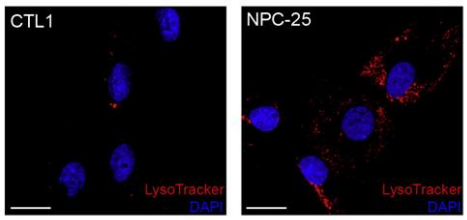
NPC is highly heterogeneous in both mutations and time of onset. Most mutations in individuals with NPC are unique to the pedigree, are not localized to specific domains and have not been correlated to time of onset or disease severity. Time of onset of the disease varies from neonatal periods to adulthood. We have shown that lysosomal staining in patient derived fibroblasts quantified by FACS analysis is directly correlated to the time of onset of disease symptoms. For the first time we are able to provide a prognostic assay for NPC, allowing for better treatment and quality of life for sufferers.

Potential Commercial Applications

This assay provides a prognostic tool for predicting time of onset for individuals carrying putative genetic alterations identified in per-and perinatal genetic testing. This approach may be applicable to additional lysosomal storage disorders.

Related Article

J.L. Rodriguez-Gil et al., *A somatic cell defect is associated with the onset of neurological symptoms in a lysosomal storage disease* 110 (2013) 188–190
Molecular Genetics and Metabolism
http://www.sciencedirect.com/science/article/pii/S1096719213002126



Confocal microscopic images of LysoTracker Red staining in fibroblasts from an individual with NPC1 (NPC-25, right) compared to control fibroblasts (CTL1, left).