

TITLE:

Cholesterol homeostasis and peripheral nerve myelin

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RESEARCH PROJECT DESCRIPTION

Myelin, a multi-layered insulator of neuronal processes, is enriched in certain lipids, such as cholesterol. In a project supported by the Facial Pain Association we are investigating the mechanisms by which cholesterol is delivered to myelin and how it is stabilized in the membrane. We are now expanding our studies to examine cholesterol and lipid pathway-associated genetic and dietary factors that may impact the integrity of myelin in certain individuals and promote the development of trigeminal neuralgia. In the literature there are several reports on the coincidence of statin use and trigeminal neuralgia. On the other hand, certain patients with myelin disorders are able to manage their disease by diet, often through enrichment in certain lipids. Nonetheless, it is unknown how circulating levels of cholesterol, and the transport of cholesterol between blood plasma and the nerves, may influence the development and/or the progression of demyelinating disorders. In expanding our study we plan to perform retrospective clinical data analysis to determine whether there is any association between the lipid profile of an individual and the development of trigeminal neuralgia or other demyelinating diseases. In parallel, we will use our laboratory tool kit to experimentally manipulate (elevate or reduce) the levels of cholesterol in myelinating cultures from mice that are prone to the development of compression induced demyelinating neuropathy. The results from these investigations will provide novel information on understanding the development of demyelination along nerves and may identify critical factors that can attenuate the symptoms of disorders involving myelin damage.