

Thayabaran, M., Department of Human Biology, Faculty of Health-Care Sciences,
Eastern University of Sri Lanka
S.G.Yasawardene, Department of Anatomy, Faculty of Medical Sciences,
University of Sri Jayewardenepura

Paper: Diversity

Immunohistochemical localization of $\alpha 1$ nicotinic acetylcholine receptors in lymphoid tissues of humans

Although neuroanatomical studies have indicated the occurrence of nicotinic acetylcholine receptors (nAChR) in mononuclear lymphocytes of humans, no specific subtypes of nAChR or their distribution in lymphoid tissue have been investigated. The identification of $\alpha 1$ nAChR in immune tissues of post mortem samples was done by immunohistochemistry using antibodies against the subunits of nAChRs. The tissues were processed for Hematoxylin and Eosin staining and indirect immunohistochemistry. Monoclonal anti-nAChR ($\alpha 1$ subunit) raised in rat was applied to label the tissues and linked to biotinylated anti-rat IgG. Labeled Streptavidin Biotin method was applied with Diaminobenzidine as chromogen. Skeletal muscle (positive to $\alpha 1$ nAChR) was processed as control. The microscopic images of immunostained slides were computerized for digital image analysis. The intensity of the staining was determined based upon a score of 0, 1+ (focal staining, > 10% cells), 2+ (focal to diffuse staining, 10% > 50% cells), 3+ (diffuse staining, 50>100% of cells).

Diffused (1+) distribution of $\alpha 1$ nAChR was observed in the parenchyma of liver. Similar distribution of $\alpha 1$ nAChR was observed in Peyers patches and the lymphoid aggregation of the posterior part of the tongue. The capsule and red pulp areas of spleen were highly immunoreactive to anti- $\alpha 1$ nAChRs, while a low grade immunoreactivity (IR) was observed in periarteriolar lymphoid aggregations and germinal centres. In lymph nodes, the sub scapsular sinus, medullary cords and trabeculae were intermediately IR to $\alpha 1$ nAChR, while in lymphoid follicles it was absent. Overall, the $\alpha 1$ nAChR IR was high in regions predominantly having T cells and macrophages, and it was low in regions having B cell subsets of lymphoid tissues. These findings confirm that the neuroimmune modulation could be brought by the presence of parasympathetic nerves in lymphoid tissues through $\alpha 1$ nAChRs. Further investigations are needed using antibodies against different cholinergic components to confirm the complete architecture of cholinergic nerve supply in immune tissues which would be essential in understanding the neuro immune modulation.