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Preceptor: Felix Eckenstein

The interaction of prototoxins with nicotinic acetylcholine receptors

Abstract

Prototoxins are a family of mammalian proteins that show structural homologies with snake venom alpha-bungarotoxin (aBTX), which binds with high affinity to muscle nicotinic acetylcholine receptors (nAChRs). Analogous to aBTX, some endogenous prototoxins, such as lynx1 and lynx2, are thought to bind to and inhibit the function of nAChRs. It is not known, however, whether specific members of the prototoxin family are co-expressed in the same cell with specific subtypes of nAChRs, and whether the sub-cellular localization of the prototoxins and the nAChRs allows them to interact. This is mainly due to the lack of reliable antibodies to prototoxins and the fact that no stable cell lines that co-express lynx and nAChRs are currently available. This study seeks to elucidate the sub-cellular localization of lynx1, co-localization of lynx1 and specific nAChR subtypes, and effect of lynx1 co-expression on aBTX staining, since previous studies have shown strong binding of the two molecules *in vitro*. We are using immunofluorescent localization of epitope-tagged lynx1 to assess whether this prototoxin is present on the cell surface and/or in specific intracellular compartments. To assess co-localization, epitope-tagged lynx1 and alpha7, a nAChR subunit, are stained simultaneously and visualized for overall spatial distribution. aBTX staining is used to assess the influence of lynx1 co-expression on the localization of nAChRs. The data and cell lines created will be used in future studies designed to investigate how lynx affects the response of specific subtypes of nAChRs to acetylcholine and nicotine.