

Blessed memory of Y. Yu. Komissarchik is devoted

ROLE OF CHOLESTEROL IN MEMBRANE LOCALIZATION OF TRPV5 CALCIUM CHANNELS IN HUMAN JURKAT T CELLS

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Many ion channels are localized in areas of the plasma membrane enriched in cholesterol and sphingolipids, known as lipid rafts. The problem of the interaction of ion channels with lipid rafts is one of the least studied in modern biology and physiology. Here, we explored the role of lipid rafts in the membrane localization of TRPV5 calcium channels (transient receptor potential vanilloid, type 5), which we earlier discovered in human T cells line Jurkat. Immunofluorescence analysis of cells showed the membrane localization of TRPV5 proteins and their colocalization with lipid rafts. The membrane cholesterol depletion with methyl- β -cyclodextrin (MbCD) led to a decrease in the surface expression of channels and their diffuse distribution in the cell cytoplasm. An analysis of cell images obtained by immunoelectron microscopy revealed local aggregation of TRPV5 proteins in the clusters in the plasma membrane of cells. Extraction of membrane cholesterol and destruction of lipid rafts led to the disappearance of channel clusters and the dropping of TRPV5 channels out the plasma membrane of cells. In general, the results showed that the surface expression and localization of TRPV5 calcium channels in the form of clusters in the plasma membrane is critically dependent on the level of cholesterol and the integrity of lipid rafts in Jurkat T cells.

Keywords: TRPV5 calcium channels, cholesterol, lipid rafts, immunoelectron microscopy, Jurkat T cells