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Hubert K Zajicek, Weiming Yu, I I Wang, Enrico Gratton, Tiziana Parasassi, and Moshe Levi.

Spatial resolution of the effects of cholesterol deprivation and/or enrichment on OK cell membranes by LAURDAN GP two-photon fluorescence microscopy.

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Biophys J. 1998; 74(2 Pt 2): A403, Th-Pos331.

Abstract

To determine the effects of alterations in cholesterol content on membrane lipid dynamics opossum kidney (OK) cells were grown either a) in a lipoprotein deficient serum (LPDS), which resulted in a decrease in cell cholesterol content, or b) in LPDS which was then supplemented with LDL, which resulted in an increase in cell cholesterol content. The cells were labeled with the membrane fluorescent probe 2-dimethylamino-6-lauroyl-naphthalene (LAURDAN) and imaged by a two-photon excitation microscope. From the fluorescence intensity images, LAURDAN generalized polarization (GP) images were calculated. Both in control and in treated cells, a broad GP distribution was observed, with higher GP values in the plasma membrane, intermediate values in the cytoplasm and lower values in the nuclear membrane. In agreement with previous cuvette-based fluorescence spectroscopy studies, cholesterol deprivation resulted in an average decrease of the GP value. From the images, this decrease in GP appeared mainly localized in the plasma membrane. After treatment of the cells with LDL, the average GP reached a value above that of the control cells. This increase of the average GP value was due to both the plasma membrane and the cytoplasmic membranes. Indications of a morphological alteration of the apical brush border membrane following all above treatments were also obtained.