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Apical - basal polarity of epithelial cells imaged by Raman microscopy and Raman imaging: capabilities and challenges for cancer research

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Abstract

The common feature of cells is their polarity which refers to cellular asymmetry that reflects the asymmetric organization of the cell including the cell surface, intracellular organelles and the cytoskeleton. Cell polarity is a major regulatory mechanism for controlling spatially restricted signaling, reorganization of the cytoskeleton, and polarized membrane trafficking.

The common feature of cancer development is the increased loss of cell polarity that results in epithelial tissue disorganization. Despite intense interest in determining the origin of tumor tissue disorganization, the function of cell polarity remains unclear. In the study we traced the epithelial cell asymmetry and concentration gradient of main constituents of the cells along the apical-basal axis and monitored ordering of the duct at the apical region compared to basal region in normal and cancerous human breast duct. The results obtained in this paper reveal that the normal duct is polarized with asymmetric distribution of lipids, proteins, carotenoids, triglycerides and that an inverse situation occurred in duct that lost apical polarity upon cancer development. This study shows that in epithelial tissue, the individual epithelial cells are split into two regions, the apical and basolateral regions, which are chemically and structurally different from each other. The apical region of the normal duct is rich in unsaturated

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