

Structural and functional interaction between polyamine-related molecules and biological membranes.

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Changes induced by PA on nucleic acid (NA) conformation and synthesis is proven to be a major reason for PA essentiality (1-3). However, PA interactions with other polyanions, for instance polyanionic membrane lipid bilayers and glycosaminoglycans have received less attention (3-4). The functional importance of these interactions still is an obscure but interesting area of cell and molecular biology, especially in mammalian cells for which specific PA transport systems are not fully characterized (5). In mammals, activity and turnover of the polyamine (PA) synthesis key enzyme is controlled by a set of proteins: Antizymes (OAZ1-3) and antizyme inhibitors (AZIN1 and 2). It is demonstrated that AOZ modulate polyamine uptake (6), and that PA transport to mitochondria is linked to the respiratory chain state and modulates mitochondrial permeability transition (7). Antizyme expression variants have been located in mitochondria, being proposed as a proapoptotic factor (7-8). AZIN 2 is only expressed in a reduced set of tissues that includes mast cells, where it is associated to mast cell granules membrane (9). This fact, together to the abnormalities observed in bone marrow derived mast cell granules when they are differentiated under restricted PA synthesis conditions (10 and unpublished results), point out to important roles of PA and their related proteins in structure and function of mast cell granules. We will also present novel biophysical results on tripartite interactions of PA that remark the interest of the characterization of PA interactions with lipid bilayers for biomedicine and biotechnology.

Thus, the information reported in this paper integrates previously reported information with our still unpublished results, all indicating that PA and their related proteins also are important factors for structure and dynamics of biological membranes and their associated functions essential in human physiology; for instance, solute interchange with the environment (uptake and secretion), oxidative metabolism and apoptosis. The importance of these involved processes for human homeostasis claim for further research efforts.

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