

Antitumor RNase (binase) induces the alteration of cellular permeability

Cabrera-Fuentes H., Zelenikhin P., Kolpakov A., Ilinskaya O.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Some RNases including ones of microbial origin possess antitumor activity, which mechanisms remains unclear. Here we investigated the first step of RNase action towards eukaryotic cells which is connected with increase of cell permeability for ions and macromolecules. Using radiological analysis of $^{45}\text{Ca}^{2+}$ uptake by *Candida* yeast and fluorescence imaging of human embryo kidney cells HEK stained by Ca^{2+} -specific Fura-2/AM day the level of intracellular Ca^{2+} under treatment with the RNase of *Bacillus intermedius* (binase) was studied. Viability of lung carcinoma epithelial cells A549 treated by binase was measured by WST proliferation kit, stability of erythrocytes was tested by lysis assay. We have shown that binase induces the permeability increase of lower and higher eukaryotic cells for Ca^{2+} as well as the increase of protein permeability of A549 cells. Binase treatment protects erythrocytes from osmotic shock. The protective or cytotoxic binase effect followed by increase of cellular permeability is realized depending on the cell type, where the expression of Kca channels and of certain oncogens, particularly of ras family, is crucial. The obtained data supports the significance of the cell permeability increase as a primary step in the mechanisms of binase-induced biological effects.

Keywords

Binase, Ca^{2+} , Cellular permeability, Cytotoxicity