Molecular Biology 2014 vol.48 N2, pages 181-188

Cell targets of antitumor ribonucleases

Mitkevich V., Makarov A., Ilinskaya O.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Several ribonucleases (RNases) are known to exert a toxic effect on tumor cells, but the mechanism of their antitumor activity is still poorly understood. The review considers the RNase-cell component interaction that leads to induction of apoptosis in the tumor cell. The cell surface structures that potentially act as acceptors of exogenous RNases include acidic lipids, glycoproteins, heparan sulfate-containing proteoglycans, actin, and RNA-associated proteins. Normal and malignant cells differ in the membrane composition of these components, and the difference is to a great extent responsible for the selectivity of the RNase effect. Various RNAs may act as intracellular RNase targets, and there is evidence that exogenous RNases may intervene in RNA interference. Potassium channels, the NF-κB signaling pathway, and various caspases play a role in exogenous RNase-induced apoptosis. The cell sensitivity to exogenous RNases proved to be related to expression of certain oncogenes, such as RAS, KIT, and AML1-ETO. Understanding the mechanisms that sustain RNase cytotoxicity in susceptible malignant cells is thought to provide a basis for designing new drugs for targeted anticancer therapy. © 2014 Pleiades Publishing, Inc.

http://dx.doi.org/10.1134/S0026893314020137

Keywords

actin, apoptosis, cell surface, cytotoxicity, endocytosis, oncogenes, ribonuclease, RNA interference