

Molekulyarnaya Biologiya 2005 vol.39 N1, pages 3-13

Why ribonucleases cause death of cancer cells

Ilinskaya O., Makarov A.

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

Abstract

Molecular properties and possible mechanisms of action of cytotoxic ribonucleases (RNases), potential antitumor therapeutics, are characterized. The analysis of recent publications and own experimental results have allowed the authors, on the one hand, to distinguish cellular components that are responsible for selective activity of exogenous RNases towards malignant cells, and on the other - to identify the contribution of definite molecular determinants to the enzyme cytotoxicity. The predominant effect of the RNase molecule charge on the cell death induction is shown. The RNase cytotoxic effects are caused by catalytic cleavage of available RNA, by products of its hydrolysis, as well as by non-catalytic electrostatic interaction of exogenous enzyme with cell components. Potential targets for RNase action in a cancer cell have been revealed. The role of modulation of the membrane calcium-dependent potassium channels and ras-oncogene functions in the RNase-induced cell damage is defined. The effect of cytotoxic RNases on gene expression via influencing the RNA interference is discussed.
