Study of apoptotic activity of bronchial epithelial cells in tuberculosis with multiple drug resistance

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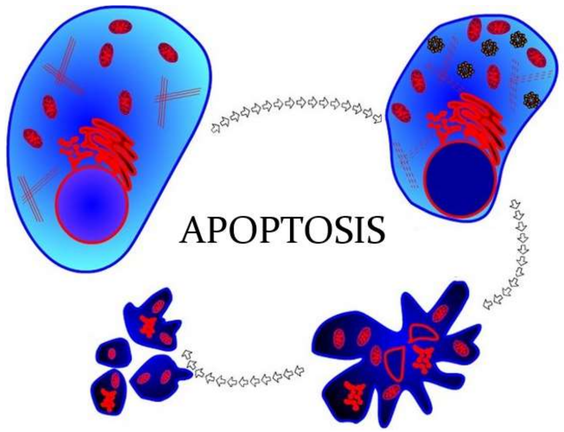
Introduction



Apoptosis - the death of cells, is the main link in the pathological process. The study of the launch pathways and molecular mechanisms of apoptosis deregulation is one of the unsolved problems.

The topicality of this problem is determined by the fact that the dysfunction of the apoptotic program in the body determines the development and progression of diseases, including infectious ones.

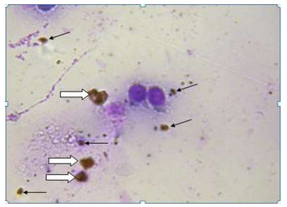
Materials and Methods

We examined 23 patients with sensitive pulmonary tuberculosis (TB) and 21 patients with multidrug-resistant tuberculosis (MDR TB).

All patients were diagnosed with destructive forms of tuberculosis : disseminated in 42.7% of patients and infiltrative in 57.3% of cases.

A biopsy of bronchial epithelial cells was carried out followed by immunocytochemical determination of Bax, Bcl-2, PCNA- and TUNEL-positive nuclei antigens.

Apoptotic activity of bronchial epithelial cells in patients with MDR TB



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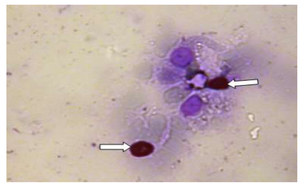

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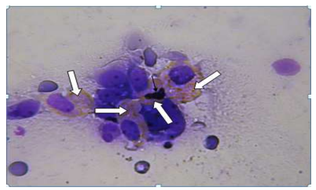

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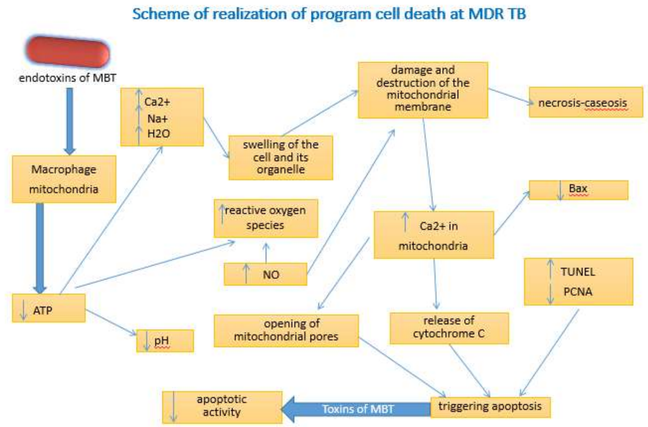
1 Micrograph of a brush biopsy of the bronchial mucosa. Large arrows indicate TUNEL-positive cell nuclei. Small arrows indicate apoptotic bodies, they are also TUNEL-positive. Immunohistochemical method for mynucleosomal DNA breaks - TUNEL.

2 Micrograph of a brush biopsy of the bronchial mucosa. Arrows indicate PCNA-positive cell nuclei. Immunohistochemical method using primary antibodies against the PCNA protein.

3 Micrograph of a brush biopsy of the bronchial mucosa. Large arrows indicate the cytoplasm of cells with Bax-positive granules. The small arrow indicates the cell nucleus with Bax-positive granules, which has signs of karyopycnosis (early stage of apoptosis). Immunohistochemical method using primary antibodies against the pro-apoptotic protein Bax.

Ob. 100x (oil immersion).

Results



In patients with MDR TB, the apoptosis rate is higher than in patients with sensitive TB and accompanied by the reduced proliferation of epithelial cells of the bronchoalveolar lining.

The intensity of apoptosis of bronchial epithelial cells in patients with MDR TB is due to a decrease in the number of PCNA-positive nuclei and an increase in TUNEL-positive nuclei on the background of an increased concentration of proapoptotic protein Bax, which characterizes the intensity of the inflammation process and leads to the death of epithelial cells due to an activation of caseous necrosis.

The activated apoptosis process with the transition to uncontrolled natural cell death characterizes the spread and progression of a specific tuberculosis process and the prognosis for the formation of residual changes.

Main Finding

Conclusions

It has been established that in patients with multidrug-resistant tuberculosis there is an impairing between the processes of apoptosis and proliferation of bronchial epithelial cells. Counting the quantitative structures of apoptosis and proliferation can be used to determine the early manifestations of apoptosis and to predict the severity of the disease.