

seems to be different depending on the type of cataract: bigger in senile cataract (~ 58%), intermediate in complicate cataract (~ 38%) and less in a subclass of ipermyope cataract (~ 15%). Sex or age do not influence the GSH levels.

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## References

- Ghylack, L.T. Jr., Leske, C., McCarthy, D., 1989, Arch. Ophthalmol. 107, 991.  
 Micheli, L., Giorgi, G., Segre, G., 1988, I Congresso di Farmacologia Oculare, Firenze 16-19 ottobre, pp. 66.  
 Micheli, L., Fiaschi, A.I., Cerretani, D., Bianchi, E., Giorgi, G., 1989, Pharmacol. Res. 21, 669.

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## Effect of mucolytic agent on the viscosity of nasal secretions

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The effect of various mucolytic agents such as proteolytic enzymes or N-acetyl-L-cysteine on nasal and bronchial secretion viscosity has been intensively studied in vitro and in patients to assess the effectiveness of many marketed drugs.

It is known that molecules producing mucus viscosity in several clinical conditions are heteropolymeric complexes deriving from polysaccharides and proteins; for these reasons, the best mucolytic therapy is a combination of substances containing free sulfhydrylic groups and possessing physiological reducing power, with proteolytic enzymes acting in sense of degradation of the polypeptide chains in the proteic component of mucus. It was therefore interesting to investigate on nasal secretions from two different pathological conditions of rhinitis, the acute-purulent one and the cronic-mucous one. For this purpose were used not only the most commonly prescribed drugs such as lysozyme, papain, N-acetyl-L-cysteine, but also a combination of them.

Lysozyme found in tears, nasal mucus, milk, saliva, blood serum, in a great number of tissue and secretions of different animals, vertebrates and invertebrates, in egg white, in some malts, and in the latex of different plants.

The papain molecule consists of one folded polypeptide chain of 212 residues, first recognized number of the class of proteolytic enzymes that needs a free sulfhydryl group for activity.

The mucolytic activity of the substances was evaluated by analyzing their ability to modify the exudates obtained from 560 patients having common cold in secretive phase and 442 patients with chronic catarrhal relapsing rhinitis. Mucus was taken three times in the morning from each subject and, after the volume measurement, was weighed and homogenized. Fluidification test were done by adding to 2 ml of exudate diluted with 0.5 ml of 0.5 N phosphate buffer containing 2.5 mg of lysozyme or 0.25 mg of papain or 0.5 mg of N-acetyl-L-cysteine or a mixture of the three drugs at the same doses. Tests were performed at 37°C and the relative viscosity was determined after 1-2-3-6-9 and 12 minutes.

The obtained results show that mucolytic effect is different within the two considered groups. The effect in both mucopurulent and catarrhal exudate is maximum in the association of the three drugs showing that the combined action is bigger than that of the single drugs separately administered at very low dosages. Furthermore, the mucolytic action of papain and N-acetyl-L-cysteine is in good agreement with data of literature, whereas the stronger action of lysozyme depends in our experiment on the higher administered dose.

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