THE HYALURONIDASE ACTIVITY OF THE PATHOGENIC FUNGI

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Hyaluronidase has been found in several parasytic organisms: bacteria, protozoans, and the larvae of trematodes and nematodes. This enzyme is considered to be one of the most important factors responsible for penetration of parasites deep into the host's tissues.

For this reason, the study of the hyaluronidase activity of the pathogenic fungi is interesting, and it formed the object of this investigation. The test objects consisted of four strains of Trichophyton gypseum, two strains of Trichophyton violaceum, two strains of Epidermophyton kaufmann-wolfii, and one strain of Candida albicans. For comparison, two species of saprophytes were studied: Mucor sp. and Penicillium sp. The hyaluronidase activity was determined by McClean's method as modified by L. G. Smirnova [1].

In the experiments of series I, the ability of the fungi to secrete hyaluronidase into the surrounding medium was studied. The fungi were grown on liquid and solid Sabouraud's medium at 22-24°. On the 9th, 18th, and 27th days of growth of the fungi, the content of hyaluronidase in the nutrient substrate was determined. However, hyaluronidase could not be found in the culture media.

The formation of certain enzymes by microorganisms can be observed in the presence of the appropriate substrate in the medium. It has been reported that hyaluronidase is produced by Clostridium welchii only in the presence of hyaluronic acid, the nutrient medium. To discover whether hyaluronidase formation in fungi is adaptive in character, the test fungi were grown on liquid and solid Sabouraud's medium with the addition of 1% and 10% hyaluronic acid solutions. Determinations showed that, in the presence of hyaluronic acid, the test fungi did not secrete hyaluronidase into the culture medium. Triple passage of the fungi in media containing hyaluronic acid did not change the results. Similar results were obtained in experiments in which fungi were grown on Sabouraud's medium without sugar, which was replaced by an equal amount of hyaluronic acid. In these cases also, the fungi did not secrete hyaluronidase into the surrounding medium.

In the final series of experiments, tests were made to discover whether hyaluronidase accumulates intracellularly in the body of the fungi. The mass (mycelium and spores) of the fungi grown on liquid and solid Sabouraud's medium without hyaluronic acid and with the addition of this compound was separated and extracted with physiological saline. Fresh fungal mass and the mass preliminarily treated with acetone to increase the cellular premeability, and also mass treated by repeated freezing and thawing, were extracted.

The results of these experiments showed that no hyaluronidase could be found in the mycelia or spores of the tested species of fungi.

The absence of hyaluronidase in the nutrient medium on which the fungi were cultivated and also in their mycelium and spores indicates that the investigated species of fungi are unable to produce hyaluronidase. Consequently, the invasive properties of the pathogenic fungi studied in these experiments are not associated with hyaluronidase activity. These fungi evidently possess other adaptations responsible for their penetration into the host's tissues.

LITERATURE CITED

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