Résumé

STUDIES ON THE GLUTAMIC ACID WITHIN THE CELLS OF *CANDIDA ALBICANS*. I

On Free Glutamic Acid within the Cells

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The studies were performed to examine the accumlation of free glutamic acid and formation of combined glutamic acid within the cells of *Candida albicans* and the influences of inhibitors, antibiotics and anti-candida drugs on the accumulation. In this paper, experimental results on free glutamic acid are reported.

Free glutamic acid within the cells was estimated manometrically by glutamic acid decarboxylase preparation (acetone powder of *E. coli*) using washed cell suspension of *Candida albicans* ruptured by boiling for 30 minutes.

The experimental results are as follows :

1) *Candida albicans* retains free glutamic acid within the cells, and the glutamic acid increases markedly when the cells are incubated in phosphate buffer (pH 6.0, final concentration of M/15) containing L-glutamic acid (10 μM/ml) and glucose (4%), at 37°C for 1 hour. This increase of glutamic acid does not occur unless glucose is added in the reaction systems. Under these conditions, combined glutamic acid within the cells does not increase.

2) Increase of free glutamic acid within the cells inhibited markedly by 2,4-dinitrophenol (M/2,000) and sodium azide (M/1,000), slightly by KCN (M/600) and quinhydrone (M/2,000).

3) This increase is accelerated by tetracycline, chlortetracycline and dihydrostreptomycin at the concentration more than 10 mcg/ml, inhibited by viomycin, while not influenced by chloramphenicol.

4) This increase is inhibited markedly by merzonine and trichomycin, moderately by propylparaben and vitamin K_3.

STUDIES ON THE GLUTAMIC ACID WITHIN THE CELLS OF *CANDIDA ALBICANS*. II

On Combined Glutamic Acid within the Cells

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In this paper, conditions of increase of combined glutamic acid within the cells of *Candida albicans* and the influences of inhibitors, antibiotics and anti-candida drugs are reported.

The cells were incubated in phosphate buffer (pH 6.0, final concentration M/15) containing glucose (4%), glutamic acid (10 μM/ml) and other amino acids (3.3 μM/ml of L or DL isomers). After incubation at 37°C for 1 hour, total and free glutamic acid within the cells were estimated. The differences between total and free glutamic acid showed combined glutamic acid. The total glutamic acid content was estimated manometrically by glutamic acid decarboxylase after hydrolysis of cells in boiling 5 N HCl for 12 hours.

Experimental results are as follows :

1) The increase of combined glutamic acid within the cells of *Candida albicans* are not recognized if incubated in phosphate buffer containing glucose and glutamic acid. The addition of asparagine or cysteine seems to be essential for the increased production of combined glutamic acid within the cells. In following description, the reaction systems relating to asparagine or cysteine addition are expressed as asparagine or cysteine system respectively.

2) Monojodoacetic acid inhibits completely the increase of combined glutamic acid in the asparagine and cysteine system, while NaF, NaN_2, 8-hydroxyquinoline, 2,4-dinitrophenol and KCN inhibit slightly, if no remarkable differences between both systems are noted.

3) Tetracycline or chlortetracycline promotes the increase of combined glutamic acid in asparagine system, while inhibits it in cysteine system. The asparagine system is not effected by dihydrostreptomycin, while cysteine system is inhibitory effected. Chloramphenicol inhibits strongly in asparagine system, while not influential in cysteine system.

4) Merzonine, trichomycin, propylparaben or vitamin K_3 inhibits the increase of combined glutamic acid in both systems, especially in cysteine system.

EXPERIMENTAL AND CLINICAL STUDIES ON THE CHANGES OF SERUM ELECTROLYTES INDUCED BY PENICILLIN SHOCK

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The author has reported the changes of serum inorganic phosphate, magnesium and calcium concentrations incited with the anaphylactic shock in rabbits and patients.

1) In the rabbits previously treated with horse serum when the anaphylactic shock was produced by shocking injection of horse serum, it manifested the marked increase in the serum inorganic P and marked decrease in the serum Mg.

2) In the experiments using vitamin K prior to the provocative injection of horse serum, it brought about no anaphylactic reaction. The changes of serum inorganic P and serum Mg were not so marked but showed similar tendency as in 1.

3) Penicillin failed to provoke the anaphylactic shock in rabbits, but produced slight changes in serum inorganic P and Mg. Furthermore, vitamin K reduced down the degree of serum electrolyte changes.

4) In the patients with allergic symptoms or anaphylactic shock induced by penicillin, the decrease in the serum Ca, Ca-ion and Mg and the increase in serum inorganic P were noticed, especially the latter was not pronounced.

CLINICAL OBSERVATIONS ON THE INTRACUTANEOUS REACTION OF STREPTOMYCIN

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A dose of 0.1 ml of 1 : 10 dilution of dihydrostreptomycin (dihydrostreptomycin 10 mg) was injected intracutaneously in the forearm of 204 patients with pulmonary tuberculosis and 30 nurses. The reaction was observed at 30 minutes, 1 hour, 2 hours and 24 hours after the injection.

The author analysed the results by the distribution curve of the redness and recognised the specific peak in reaction after 30 minutes. Besides this type, the other type was observed in a few cases that the redness became the largest after 24 hours. Patients of these type were of vegetative labile or allergic constitution. It was interesting that some of the nurses were of the latter type, although they were not in such a condition.

According to these results, the author concluded that the intracutaneous reaction of streptomycin (test) was not always a suitable test to foresee the appearance of streptomycin shock or other severe streptomycin allergy. But some of the patients of vegetative labile or allergic constitution and some of nurses reacted relatively strong to the test, so it is considered that they should be treated carefully, if they are administered with streptomycin.

CLINICAL OBSERVATIONS OF THE SHOCK AND ALLERGIC REACTIONS BY STREPTOMYCIN

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The present note concerns 6 cases of streptomycin allergy (2 cases of streptomycin shock and 4 cases of other severe allergic reactions) observed by the author for the past 2 years.

All of them had been given 1 g streptomycin intramuscularly twice a week, and PAS 10 g by mouth daily. Streptomycin allergic reactions seemed to happen frequently after about 10 times repetition of streptomycin injection. Symptoms of streptomycin shock appeared generally several minutes after the injection, while symptoms of other allergic reactions appeared several minutes to several hours after the injection. Shock symptoms continued half an hour, and other reactions 10 to 20 days. In one of 6 cases desensibilization was carried out and succeeded. The intracutaneous reaction of streptomycin was, in only 2 cases of them, positive. In consequence, the intracutaneous test is not so reliable.

Before the appearance of symptoms, all these cases had been treated with streptomycin-PAS in combination, so PAS might play an accelerating role in the occurrence of streptomycin allergy. On the other hand, it seemed that the vegetative lability or the allergic constitution might play a role in the appearance of streptomycin allergy.