Lewis² on the cultivated rat pituitary transplanted into immature female guinea pigs.

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MICROBIOLOGY

Branched and Multiple Forms of *Euglena gracilis*

I HAVE observed in a number of cultures of *Euglena gracilis* (Pringsheim, Z strain) organisms of double or branched form having two, four or even eight flagellate anterior ends, these being joined to a central globular structure as shown in Figs. 1 and 2.

Close examination has failed to reveal any dividing wall within the organisms, and the photographs show a dark mass in the central globe which is evidently the nucleus. The multiple forms appear to have arisen through successive cytoplasmic divisions, unaccompanied by nuclear division.

The locomotion of the double forms is erratic, the direction of movement depending on which anterior

Fig. 1

Fig. 2

end may be for the moment in control. The quadruple and octuple forms are only capable of rolling motion and do not move from place to place through the medium. The causes of the occurrence of these forms are not wholly clear, though the presence of a high concentration of calcium ions has been seen to encourage their development.

The double forms of *Trachelomonas* seen by Pringsheim¹ may be a related phenomenon, but he describes these double organisms as having two (not one) nuclei and nowhere reports quadruple or octuple forms corresponding to those I have seen in *Euglena*.

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Lysine Decarboxylase Activity as a Simple Test in Differentiation of Enterobacteriaceae

MANY efforts have been made to find simple methods for rapid identification of Enterobacteriaceae. Most of the tests are based on the ability of the bacteria to grow on selective media, or to ferment specific sugars, alcohol derivatives, etc. Such tests, in which bacteria are able to grow on selective media, are usually time-consuming, and positive results are recorded, at the earliest, only after 24 h.

There are only a few known tests which are based on pure biochemical action between a mass of bacteria and a specific substrate. One of these tests is the ability of *Proteus* species to decompose urea to ammonia and carbon dioxide. Such tests give good results within a few hours. The activity of various bacteria capable of decarboxylating amino-acids to the respective amines and carbon dioxide at pH range 4-6 was comprehensively investigated by Gale¹.

Lysine decarboxylase, which is found in various bacteria and in *Salmonella*, decarboxylates lysine to cadaverine and carbon dioxide, usually in acid range of pH. The cadaverine produced shifts the pH of the media towards the basic range of pH.

Møller²⁻⁴ tried to adapt ability of *Salmonella* to decarboxylate amino-acids for establishing a simple method for identification of the bacteria. By incubating *Salmonella* under a paraffin oil layer in a medium containing lysine as an amino-acid for decarboxylation, he achieved good results within 1-3 days.

Altmann⁵ simplified this test by incubating a mass of bacteria in a broth containing casitone, glucose, and lysine for 2 h, and extracted the amine which was formed by chloroform. By addition of ninhydrin to the chloroform containing cadaverine a deep violet colour appeared, which indicated that the bacteria strain under test contained a lysine decarboxylase enzyme. By this method all *Salmonella* strains tested by him gave positive results with the exception of *Sal. paratyphi* A. and *Sal. emek*. On the other hand, all *E. coli* strains gave positive results.

Though in the method proposed by Altmann the incubation time is short, the test is rather laborious, and worth while only for differentiation between *Salmonella* and *Shigella*; it does not differentiate between *Salmonella* and *E. coli* strains.

In order to avoid many preparatory steps, while maintaining a relatively short incubation time, a simplified test is proposed here, based on the fact that in a solution containing 1 per cent lysine in weak