Strain-Specific Action of Division-Inhibiting Agents in *Bacterium anitratum*

The action of sulphathiazol on the cellular morphology of the ordinary strains of *Bacterium anitratum* was described previously[1]. In the present study this drug was tested on strains whose morphology was temperature-dependent[2].

We used the strain H and P which had been used in the detailed study of the influence of incubation temperature on size and shape of *B. anitratum*[2]. Because incubation at 37 °C causes elongation and deformation of the cells of this and many other strains of *B. anitratum*, only the results of the experiments performed at room temperature (about 22 °C) are reported in this paper.

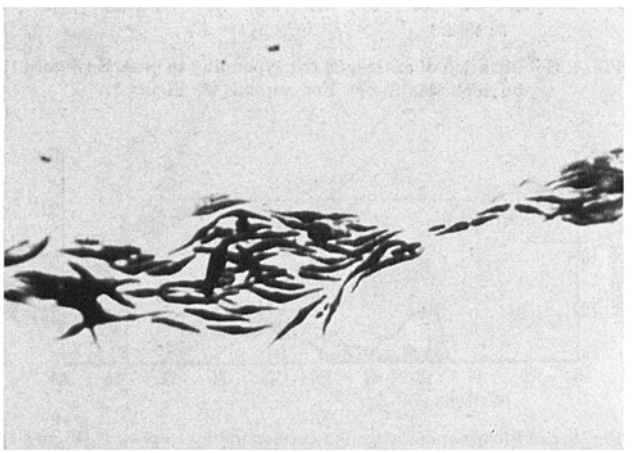

Fig. 1. Strain H. Note central and paracentral enlargements of the elongated cells. Gram stained. ca × 900.

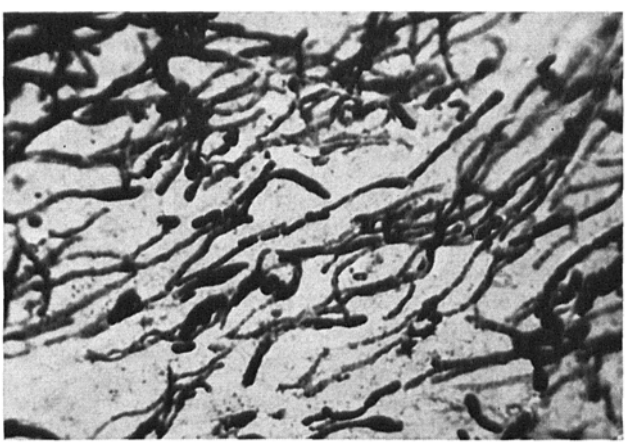

Fig. 2. Strain P. Note terminal and preterminal enlargements of the elongated cells. Gram stained. ca × 1000.

The paper-disc method[3] was used. After 18–20 h growth at room temperature, the cells found in the bacteriostatic zone around the disc soaked with 5% sulphathiazol were elongated and enlarged. The degree of enlargement differed in the 2 strains, and was more pronounced in the cells of strain H (Figure 1). The 2 strains also showed different types of enlargement. In strain H central or paracentral enlargements of the filaments predominated whereas in strain P (Figure 2) terminal enlargements were more usual. The type of enlargement in each strain corresponds with that found in the same strains when they are incubated at 37 °C[2] and also with the type of enlargement found in strain P under the action of penicillin at 37 °C and at room temperature[4].

Also, in other strains of *B. anitratum*, the morphological reaction to sulphathiazol was found to be of 2 types. The first type, represented here by the strain 4, predominated.

The results suggest that the type of deformations caused by various agents is dependent on the strain, or more exactly, on the rigidity of the different portions of the lateral cell walls in *B. anitratum*, rather than on the division-inhibiting agent used. In strain H the central portions of the lateral cell wall, where the new transverse cell wall is expected to form, are apt to lose their rigidity and consequently enlarge under conditions permitting cell growth but inhibiting cell division. In strain P the weak spots are the endings where the bacilli ordinarily grow in length[5].

Zusammenfassung. Es wird die stammspezifische Wirkung von Sulphathiazol auf 2 verschiedene Stämme des *Bacterium anitratum* beschrieben und diskutiert.

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[3] I. G. SCHAUB and M. K. FOLEY, *Diagnostic Bacteriology*, 4th edn (The C. V. Mosby Comp., St. Louis 1952).
[4] B. BRZIN, Zdravst. Vest. *32*, 115 (1963).
[5] L. E. R. PICKEN, *Organisation of Cells and Other Organisms* (Clarendon Press, Oxford 1960).

The Lytic Activity of Immune and Non-Immune Rabbit Serum on *Balantidium coli*

When rabbits are immunized against *Balantidium coli*, they respond in course of time, by production of immobilizing antibodies. The immobilizing effect of these antibodies has been described previously and can be clearly seen with heat inactivated hyper-immune rabbit serum[1]. If, however, the rabbit sera are not inactivated, the cells undergo lysis in both immune and non-immune fresh sera. The purpose of this report is to describe this lytic phenomenon.

The strain of *B. coli* used in these experiments was isolated from a case of Balantidial dysentery in 1963. Since then, it has been maintained in a monophasic medium containing horse-serum, yeast autolysate and starch[2]. It is subcultured every third day and the cultures are kept at 37 °C.

For the conduction of experiments the parasites were first washed by centrifugation at a low speed using physiological saline. 0.2 ml of the concentrated cell suspension was then added to 0.2 ml of undiluted fresh non-immune and immune rabbit serum. The tubes were thoroughly shaken for 30 sec and a drop of luid removed with a pasteur pipette and examined under a phase

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[2] W. R. JONES, Ann. trop. Med. Parasit. *40*, 130 (1946).

contrast microscope. The sequence of events were recorded on a black and white film using an electronic flash at intervals of 15 sec. As seen in the illustrations the first indication of lysis was generally in the form of extrusion of cell contents from 1 or 2 points on the periphery of the cell. These points then enlarged to allow the remaining contents to flow out (Figures 1–3). After a few minutes the only indication of the existence of the cell was a large clump of starch with disrupted cell membrane lying in its vicinity.

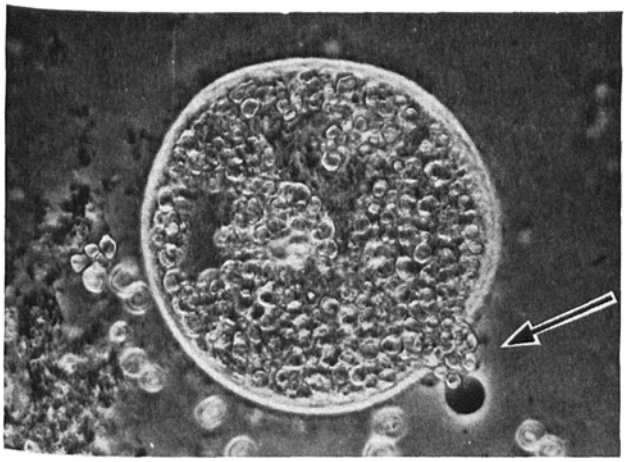

Fig. 1. Beginning of lysis. Arrow marks the point where the cell membrane has ruptured and the cytoplasm has started to flow out. A single cytoplasmic vacuole and a small amount of starch have come out of the cell.

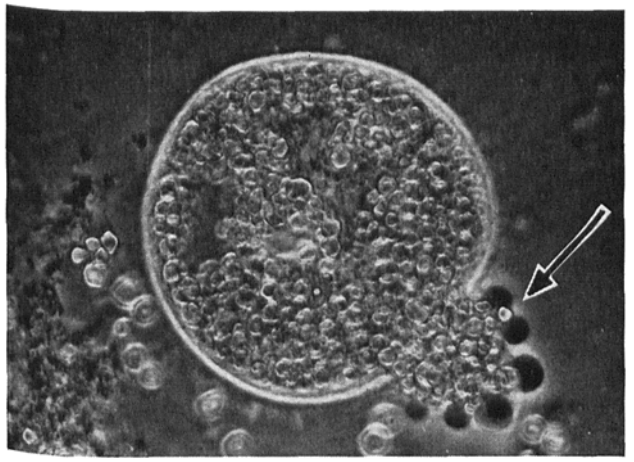

Fig. 2. 15 sec after the beginning of lysis. The ruptured cell membrane has enlarged and more cytoplasmic vacuoles have come out.

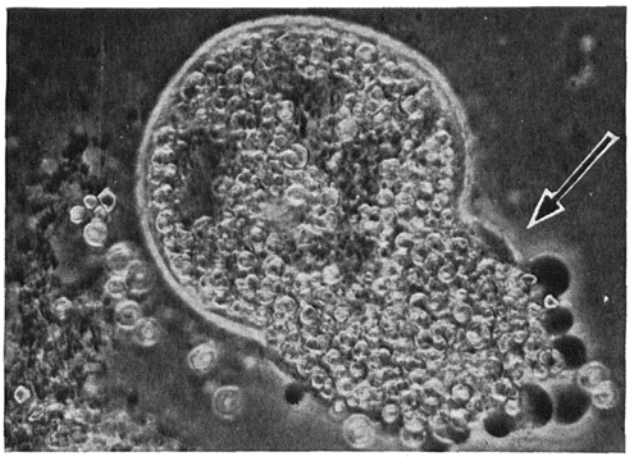

Fig. 3. 30 sec after the beginning of lysis. The ruptured cell membrane has enlarged even further and major portion of the cytoplasmic contents have come out.

This lytic action was seen in both immune and non-immune rabbit sera. The only difference being that in the case of immune sera lysis was faster. The lytic action of both immune and non-immune rabbit sera disappeared on heat inactivation at 56 °C for 30 min. The lytic activity was restored to both the sera on addition of normal guinea-pig serum.

Résumé. Des bacilles *Balantidium coli* ont été dissous après avoir été exposés à l'action du sérum de lapin immunisé et non-immunise. L'activité lytique des 2 sérums se perd par inactivation thermique à 56 °C pendant 30 min, mais elle est restorée dans les 2 sérums après adjonction de sérum de cobaye normal.

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Sensibilité aux UV et photorestauration des types *R* et *S* de *Pseudomonas fluorescens* Mig.

La dissociation en colonies rugueuses et lisses aboutit à des germes ayant une physiologie assez différenciée[1].

L'orientation de l'alternative respiratoire terminale (cytochromique cyanosensible et flavinique cyanoinsensible) est, avec la sensibilité aux rayons UV[2], une des caractéristiques essentielles de cette différenciation; étant donné, que cette orientation dépend étroitement des conditions du milieu (substrat, oxygène)[3], il nous a paru intéressant d'étudier les relations entre la sensibilité aux UV, la photorestauration et le type respiratoire des différentes souches de l'Institut de Botanique Générale à Genève.

Nous constatons que les *S* ont une plus grande sensibilité aux UV que les *R*; d'autre part, plus la souche sauvage est chromogène (c'est-à-dire sur le plan respiratoire, plus flavinique cyanoinsensible), plus la résistance des *S* qui en sont issues est grande. Il est à noter que plus la souche sauvage est chromogène, plus faible est son taux de dissociation dans le sens «Smooth».

[1] A. El-Sabeh, H. Greppin et F. Chodat, C. r. Séanc. Soc. Phys. Hist. nat., Genève *1*, 3 (1966).

[2] A. El-Sabeh, H. Greppin et F. Chodat, Archs Sci., Genève *18*, 726 (1965).

[3] S. Gouda et H. Greppin, C. r. Séanc. Soc. Phys. Hist. nat., Genève *1*, 3 (1966).