ACTINOMYCETIN

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It has been stated (Hoogerheide, 1944) that actinomycetin is not an antibiotic, on the ground that it is supposed to be inactive toward living bacteria. This appears to be a misinterpretation of our data or an overlooking of some of the facts established. It therefore calls for some explanation.

Since 1924 it has been well known that certain strains or species of actinomycetes are able to dissolve various bacteria, such as Staphylococcus aureus, in the living state (Gratia and Dath, 1924), as well as a wide variety of dead micro-organisms. The former is no doubt an antibiotic effect.

Culture filtrates from broth cultures of these actinomycetes have a strong lytic action on suspensions of dead bacteria, but, in addition, they are able to cause a rapid lysis of a few bacterial strains in the living state. This was shown to be true for some strains of Streptococcus pyogenes and Diplococcus pneumoniae (Welsch, 1937a). A survey made in 1942, of the bacteriolytic properties of a large series of actinomycetes enabled us to state that about 20 per cent of the strains examined gave a filtrate capable of lysing, at least partly, suspensions of S. aureus (Welsch, 1942). Such active filtrates have been called actinomycetin (Welsch, 1937b), and, therefore, we feel justified in stating that actinomycetin is endowed with antibiotic activity.

It is true that we have found difficulties in demonstrating the activity of actinomycetin upon living cells, since this phenomenon is highly sensitive to a number of influences such as the pH of the medium, the concentration of mineral salts, the presence of peptones and carbohydrates, etc. However, it has been found recently that in culture media containing the right kind of peptone, for instance Difco tryptone or Wilson's bacteriological peptone, as well as a small amount of agar-agar (0.1 per cent) or 10 per cent starch or dextrin, the actinomycetin-producing strain "G" Streptomyces albus furnishes, after incubation in shallow layers at 25 C for 3 weeks, a paper filtrate which causes in 1 to 3 hours the lysis of living S. aureus suspended in water or in dilute buffer. This filtrate has also a lytic effect upon Corynebacterium diphtheriae, Bacillus megatherium, and S. pyogenes. The last organism may even be lysed by the filtrate when suspended in broth or peptone water. The antibiotic properties of actinomycetin are thus definitely established (Welsch, 1946).

Since actinomycetin is a crude culture filtrate, it cannot be stated that it is an antibiotic, but one may safely assert that it contains one or more antibiotic agents. It is possible that the lytic action of actinomycetin is the result of two types of activity: bactericidal action, followed by a secondary lytic effect upon the cells already killed by the first agent. This mechanism was assumed as a working hypothesis previously, when filtrates or concentrates active on living cells could
not be obtained (Welsch, 1941). This hypothesis will have to be revised now since preparations of actinomycetin strongly active upon living cells can now be obtained. The results will be published shortly.

REFERENCES


Welsch, M. 1937b Influence de la nature du milieu de culture sur la production de lysines par les Actinomyces. Compt. rend. soc. biol., 126, 244-246.

