STREPTOMYCIN BLOCKS CHLOROPHYLL SYNTHESIS IN PEA-SEEDLINGS

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During tests for mutagenicity of different antibiotics, streptomycin proved to be a blocker of chlorophyll synthesis in M1 (Fig. 1). (According to some medical authorities streptomycin appears to be mutagenic.) Air-dried pea seeds of the variety 'Dippes Gelbe Viktoria' were treated as follows:

1) 100 seeds in *0.25%* streptomycin solution for 14 hours.
2) 100 seeds in 0.50% streptomycin solution for 14 hours
3) 300 seeds in 1.00% streptomycin solution for 14 hours

The figure shows several differently affected plants of the third group. The control plants were about twice as long as the plant on the extreme left, were of normal green color, and had a strong root system. All the plants of the third group including the controls were grown in a growth chamber. The conditions were as follows: light, 100 lux of fluorescent tubes (equivalent to 6000 lux for plant growth); 16-hour photoperiod; temperature 21C; age, 15 days, including time for soaking in streptomycin solution. The first two groups were grown on an experimental field at Bonn. All three groups had the following features in common: development of the affected plants was slowed down (stem, leaves and roots), and chlorophyll synthesis was blocked and/or disturbed to a different extent in different plants. Percentages of affected plants for the three groups were as follows:

1) 23.1$ (0.25% streptomycin solution)
2) 39.6$ (0.50% streptomycin solution)
3) 94.3$ (1.00% streptomycin solution)

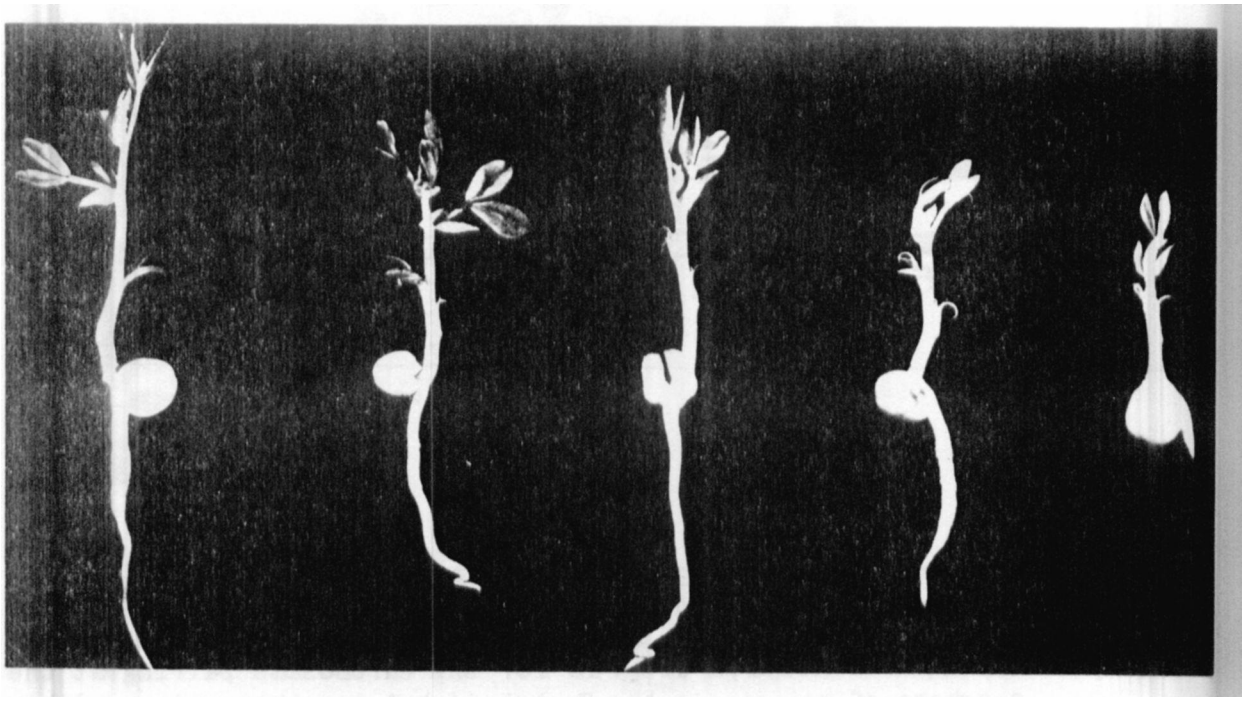

Fig. 1. Pea seedlings showing varying effects of treatment with streptomycin. All the stems are white, and most of the leaves are green in the center and white along the edges. The leaves of the fourth plant from the left are entirely white.

The extent to which the different plants were affected varied from an entirely white stem extending to the first normal leaf (so that this and the primary leaves were white) to different degrees of spotted and light green leaves. Most of the affected plants of the first two groups survived this "white stage" and further development of the plants was normal. In the third group, however, many of the seedlings did not survive and the few that did had spots on upper leaves. Biochemical studies could show whether there is interference with membrane transport, RNA-synthesis, and respiration as is the case with another antibiotic (1). The M2 will show whether there is also an interference with DNA-synthesis.

1. Galling, G. 1982. In: Encyclopedia of Plant Physiology. Vol. 14 B. B. Parthier and D. Boulter, eds. Springer.