BACTERIOLOGY

Germ-Free Animals

Have been reared through the third generation in sterilized closed cylinders. Will be valuable for dietary and medical researches.

➤ GERM-FREE animals, that have never had a bacterium in their bodies, have been reared in the laboratories of bacteriology at the University of Notre Dame, and carried through to the third generation. This difficult feat, with results important for biological research, was accomplished by Prof. James A. Reyniers of the Notre Dame faculty.

Normally, all animals (including man) are germ-free until they are born, but then immediately pick up a full set of germs with their first food and their first breaths. By bringing young rats and other animals to birth by caesarian operation inside a completely sterilized cylinder, feeding them sterilized food and admitting only filtered air, Prof. Reyniers was able some years ago to produce and rear germ-free animals.

These lived perfectly normal lives in their isolation from our germ-swarming world, but they would not breed. Prof. Reyniers suspected that something was lacking in their diet, but for a long time he was not able to overcome the difficulty. Lately, however, he found the correct diet, and his germ-free rats began to breed as rapidly as normal rats do. By the time the third generation had been born, the germ-free cylinder in which the animals lived was getting pretty crowded; and he needed it for some other work anyway. However, by this time he had proved his point, so he took the rats out and ended the experiment.

The second- and third-generation germ-free rats, Prof. Reyniers said, were exceptionally sleek and healthy. Their muscles and other tissues, on microscopic examination, "looked just like the idealized drawings you find in anatomy textbooks."

Scientists can make effective use of germ-free animals in dietary, medical and other researches, because when you try a new food combination, or a new medicine, on one of them you will know that what happens is its own reaction, and not the response of an animal conditioned by a lot of germs in its insides.

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CHEMISTRY-MEDICINE

Key to Streptomycin

It is most effective against germs that grow best in the air; this may be the key to way in which the drug interferes with growth of disease germs.

➤ STREPTOMYCIN, potent germ-killer like penicillin for aid in our war on disease, is most effective against those germs that grow best in air. In this fact may lie the key to the way in which this substance from the earth interferes with the growth of disease germs, Dr. Amedeo Bondi, Jr., Dr. Catherine C. Dietz and Dr. Earle H. Spaulding of Temple University School of Medicine in Philadelphia, state. (*Science,* March 29)

The antibacterial action of streptomycin against such disease germs as staphylococci is significantly better when the jar in which the germs are growing is open than when it is kept airtight, the bacteriologists noticed. These same disease germs, however, grow best when there is plenty of oxygen.

Duplicate tests with various species of bacteria at a temperature of 99 degrees Fahrenheit were tried with and without air. From 2 to 16 times as much streptomycin was found necessary to arrest the growth of bacteria for 24 to 48 hours when air was excluded than when plenty of oxygen was available. With one exception these results were observed with organisms which normally had their maximum growth when there was plenty of oxygen.

The activity of streptomycin was greatly diminished by such compounds as cysteine, sodium thioglycollate, sodium bisulfite and sodium hydrosulfite. Whether this interference is due to a lowering of oxygen tension or to some specific chemical reaction or both acting simultaneously, will probably be discovered with further research.

It is conceivable that in certain parts of the body where organic reducing agents are present or where a low oxygen tension exists, larger concentrations of streptomycin may be necessary to inhibit the growth of bacteria, they point out.

The antibacterial action of streptomycin, they suggest, may be due to its ability to block some enzyme system, oxidative in nature. This system would seem to be essential only to the growth of susceptible bacteria of the type that grow best in air. Bacteria that grow best when air is excluded do not possess this enzyme system and therefore streptomycin is not such an effective weapon against them.

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CHEMISTRY

2,4-D Promises Usefulness In Stopping Weeds

➤ 2,4-D, THE NEW weed-killing chemical, shows promise of being able to stop obnoxious growths before they even get started, in experiments at the U. S. Department of Agriculture's great experiment station at Beltsville, near Washington, D. C. A concentration equivalent to only 1.5 ounces of 2,4-D in the top inch of an acre of soil was found sufficient to prevent or materially retard the sprouting of weed seed of sensitive species, such as wild mustard. The ordinary rate of application as a spray on foliage of grown weeds is 1.5 pounds per acre—16 times more than the seed treatment.

An important tactical consideration in using 2,4-D in this way, Dr. John W. Mitchell and Dr. P. C. Marth of the station staff point out, is the loss of weed-killing power by the chemical in moist soil. It can therefore be used to kill the weeds in fallow fields in humid regions because it will no longer be there to harm crop plants the following season. On the other hand, the compound retains its plant-killing ability for as long as 12 to 18 months in really dry soil.

In other tests at Beltsville, 2,4-D was shown to be a satisfactory means for the control of Japanese honeysuckle, an introduced woody vine that has become a terrible pest along a considerable stretch of the Middle Atlantic seaboard. In a 1-to-1000 solution in water, two sprayings, in March and June, made a complete kill of the vine. Spraying an acre in this way would cost somewhere around $10 or $12. Further tests are now under way, to determine whether the method can be recommended for general use.

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