

A NEW PATHOGENIC BACILLUS ISOLATED FROM
AN ENLARGED PROSTATE GLAND.

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DURING my bacteriological investigations on the enlarged prostate gland which I am carrying out in conjunction with Mr Cuthbert Wallace, I have isolated a bacillus which presents the following characteristics and which appears to be, so far as I can ascertain, an organism which has not previously been met with.

There is nothing of special interest in the history of the patient from whom the culture was obtained. Mr J. E. Adams, Surgical Registrar to St Thomas's Hospital, informs me that the man is said to have had typhoid fever 25 years ago, but I have only the patient's statement to go on.

Source of bacillus. Film preparations were made from the prostatic exudate, but no micro-organisms were found, only large mononuclear cells. A broth tube was inoculated with this fluid, and a piece of the gland was dropped into a tube of broth; these tubes were incubated at 37° C. Marked turbidity of the broth tube was found in each instance at the end of 24 hours' incubation.

Morphology. A short fat bacillus with rounded ends and which morphologically resembled the colon bacillus was obtained from the broth media and from various other media which were employed. It stained well with the ordinary dyes but not by Gram's method. It was not capsulated. It was very slightly motile, in fact it was a matter of considerable difficulty to determine whether it was motile or not, but there was no doubt that the bacillus showed very slight motility in emulsions made with normal saline from surface colonies on gelatin and agar.

Agglutination test. A normal saline emulsion of the bacillus was made from a gelatin slope of 24 hours' growth, and was tested with positive typhoid serum obtained from a patient suffering from typhoid fever, and also positive typhoid horse serum. In neither instance was the slightest reaction obtained, although the horse serum caused immediate clumping of typhoid bacilli with a dilution of 1 in 1000.

Cultural tests. The organism was plated on Drigalski and Conradi's medium and reddish-coloured colonies developed at the end of 24 hours, while the whole medium finally became acid.

Subcultures were then made with the following media.

Agar slope. A diffuse, rather dirty-white moist growth was obtained with a margin which showed a tendency to spread.

Gelatin slope. Thick opaque colonies developed which extended downwards into the substance of the medium. Each colony had, therefore, a rather triangular appearance, the apex being on the surface of the medium.

MacConkey's medium. (Anaerobic culture at 42° C.) Large amount of acidity produced but no gas formation.

Indol reaction. A good reaction was obtained in a 24 hours' culture in peptone water at 37° C., at the end of a few minutes from the addition of the reagents.

Glucose agar shake. No gas formation at the end of three weeks' growth.

Neutral-red broth. Orange-yellow coloration produced, and a green fluorescence in several days.

<i>Litmus lactose lemco</i> ¹	Acid.	No gas	} Tubes remained the same for 16 days, except that the media which were acidified gradually became de-colored.
„ <i>dextrose</i> „		Ditto	
„ <i>sorbite</i> „	Acid +.	No gas	
„ <i>mannite</i> „	Acid.	No gas	
„ <i>salicin</i> „		Ditto	
„ <i>maltose</i> „		Ditto	
„ <i>raffinose</i> „	Unaffected		
„ <i>Cane-sugar</i> „		Ditto	

¹ Lemco which forms the basis of these sugar media is a meat extract which is free from carbo-hydrates.

Litmus milk. Acidity produced in 24 hours, but no thickening or clotting occurred at the end of one month's incubation, at 37° C.

The acidity persisted during the whole of this period.

0.5% *Urotropine broth.* Very faint growth occurred even after several days' incubation.

1% *Urotropine broth.* Sterile.

Pathogenic properties of the bacillus. 1 c.c. of a 48 hours' old broth culture was injected into the peritoneal cavity of a guinea-pig. The death of the animal occurred within 20 hours from peritonitis and septicaemia. The peritoneal infection was most marked in the upper region of the abdominal cavity. The great omentum and the under surface of the diaphragm were covered with fibrinous pus.

A bacillus identical with the bacillus which was used for the inoculation experiment was obtained in pure culture from the peritoneum. Film preparations of the heart blood showed the bacilli in some of the polynuclear cells.

It will be seen by studying the points which I have mentioned in this paper that we are dealing with a bacillus having some of the cultural characteristics of *B. coli* and *B. typhosus* respectively.

It is impossible, however, to place it in either category.

Although this organism presents many features similar to those common to the *B. typhosus*, yet the very fact that there was complete absence of any reaction with positive typhoid serum obtained from a case of typhoid fever and also with positive typhoid horse serum is the strongest evidence against this bacillus being classed as a typhoid bacillus. The extremely sluggish motility, even when young surface colonies on gelatin media were employed, is also important evidence against typhoid; this in addition to many other facts which can be seen on reference to the records of the cultural tests. On the other hand, this bacillus has many attributes common to members of the *coli* group, while as much evidence is forthcoming to show that it is not a member of this family. The fact that it will not react with positive typhoid horse serum even with a dilution of 1:20, and that it was only very slightly motile, certainly favour the supposition that it is related to *B. coli*. It has been stated by many workers on the agglutination reaction that *B. coli* will give a positive reaction with typhoid serum; I have tried to obtain such a reaction with *B. coli* obtained from every possible source but have failed to observe any reaction, without exception, with serum dilutions as low as 1:10 and 1:20.

It is, therefore, evident that this organism cannot be classified in either the *coli* or *typhoid* group.

Dr W. G. Savage, Medical Officer of Health for Colchester, to whom I wrote concerning the nature of this bacillus, has given me his opinion, which he has very kindly allowed me to publish. He says, "The organism which you have isolated seems to be a very interesting one, particularly as it is pathogenic. I have never come across a precisely similar organism, although I have met with bacilli from water and soil which might be classed in the same group. Such organisms are not uncommon in nature but of course from the human body are of the greater significance." He also consulted Ford's paper¹ but was unable to find an account of a bacillus similar to mine.

Dr Houston isolated bacilli, which in some respects are similar to mine², from the stools of four healthy persons. Nevertheless his bacilli present many differences, and they were only feebly pathogenic for guinea-pigs. There is no evidence with regard to their being pathogenic for man. The four cultures which Dr Houston studied presented the following features:

1 c.c. of a 48 hours' broth culture was injected into the subcutaneous tissues of a guinea-pig, but the animal was only slightly affected and rapidly recovered. The result was similar in each instance.

The cultural tests of the four strains were as follows:

Lactose Peptone.	Incubated for 48 hours at 37° C.	Acid. No gas. In each instance.
Neutral-Red Broth.	" " " "	Fluorescence. " "
Glucose Peptone.	" " " "	No gas. " "
Indol Broth Cultures.	" " 5 days "	Positive in one instance. Negative in three instances.
Litmus Milk.	" " " "	Acid. No clot. In every instance.
Gelatin Shake.	" " 24 hours at 20° C.	Negative. In every instance.

I am unable to find mention in the literature of a pathogenic organism similar to mine, neither am I able to classify it among the typhoid, coli, para-typhoid, or para-colon groups.

It seemed to me that an organism having characters such as this one should be recorded, as it might serve a useful purpose for those engaged in investigating so vast and difficult a subject as the classification of the coli-like and typhoid-like bacilli.

¹ "The Classification and Distribution of the Intestinal Bacteria in Man." *Studies from the Royal Victoria Hospital, Montreal*, vol. 1, No. 5 (Pathology, II), March, 1903 reprinted for *Studies from the Rockefeller Institute for Med. Research*, Reprints, vol. II, 1904, 95 pp.

² Houston, A. C. (1903-4.) "Report on the Bacterial Examination of Normal Stools from Healthy People." *Supplement to the Local Government Board Report*.