by the prompt reversibility of this response, however intense it may be, after washing out.

This by no means occurs with bufotenine or with the methyltryptamines, which, on the contrary, may greatly damage the smooth muscle.

(*b*) 5-Methoxytryptamine is the product which most closely approaches to enteramine, both qualitatively and quantitatively; bufotenine (= N,N-dimethylenteramine) does it to a much lesser degree.

It seems, therefore, that for the appearance of the specific antidiuretic and uterus-stimulating actions the peculiar structure of the lateral chain of enteramine (chain with two carbon atoms, with a primary amino-group attached to the terminal carbon atom) is as important as the presence of a free phenolic hydroxy group in position 5.

(*c*) A satisfactory agreement exists between the antidiuretic action of the different substances and their uterus- and bladder-stimulating action. No relationship exists, on the contrary, between the antidiuretic action and the hypertensive action in the spinal cat.

I wish to thank Prof. R. H. Manske for the methyltryptamines.

V. ERSPAMER

Institute of Pharmacology,
University of Bari.
Feb. 29.

[1] Erspamer, V., *Arch. exp. Path. u. Pharmak.*, **196**, 343 (1940); *Ricerca Scient.*, **22**, 694 (1952).

A Bacterial Growth-Factor Synthesized by a Soil Bacterium

EARLIER studies in this laboratory[1] have indicated the presence in soil of bacteria dependent upon growth-factors provided by soil extract but not by yeast extract nor by combinations of amino-acids and vitamins (not including B_{12}). More recently it was shown[2,3] that for many of the indigenous soil bacteria dependent upon essential growth-factors supplied by soil extract, the nutrilite effect of the latter could be replaced by vitamin B_{12}. Other micro-organisms, however, remained dependent upon unidentified growth-promoting substances in soil.

In a study of the growth requirements of certain bacterial strains for the nutrition of which vitamin B_{12} was unable to replace soil extract, it was found that a number of bacteria isolated from soil and having simple nutritional needs were able to synthesize a factor nutritionally equivalent to soil extract. Using a selected test organism requiring the growth-factor (No. 88) and one capable of synthesizing it (No. *B*89), both pleomorphic bacteria of the 'soil diphtheroid' type and apparently undescribed species, more detailed study was made. With a basal medium of inorganic salts, sugar and yeast extract ('Difco'), the test organism gave no response to the addition of any of the following: thiamine, riboflavin, niacin, pyridoxin, pyridoxal, pyridoxamine, pantothenic acid, biotin, folic acid, vitamin B_{12}, *p*-aminobenzoic acid, inositol, choline, combinations of B vitamins, cytosine, thymine, uracil, adenine, guanine, xanthine, cystine, β-alanine, ribonucleic acid, deoxyribonucleic acid, oleic acid, tomato juice filtrate, casamino-acids, enzymatic casein digest and soil extract ash. On the other hand, growth resulted from additions of small amounts of the culture filtrate of organism No. *B*89, grown in a simple nutrient medium containing only inorganic salts and sugar (see accompanying table). Partially purified material from the metabolic liquid

GROWTH RESPONSE OF ORGANISM NO. 88 (WASHED CELLS)

Addenda to basal medium*	Optical density (aver. of 4 tests)
None	0·005
Soil extract	0·132
B vitamins, purines and pyrimidines	0·005
0·00001 ml. culture filtrate *B*89/ml.	0·007
0·00002 ,, ,, ,, ,,	0·014
0·00003 ,, ,, ,, ,,	0·044
0·00004 ,, ,, ,, ,,	0·083
0·00005 ,, ,, ,, ,,	0·105
0·00007 ,, ,, ,, ,,	0·149
0·00010 ,, ,, ,, ,,	0·180
0·001 ,, ,, ,, ,,	0·196
Liver extract (0·37 mμ gm. B_{12}/ml.)	0·007
,, ,, (3·75 ,, ,,)	0·075
,, ,, (37·5 ,, ,,)	0·228
,, ,, (75·0 ,, ,,)	0·194
Crystalline vitamin B_{12}, 0·37 mμ gm./ml.	0·003
,, ,, 3·75 ,,	0·003
,, ,, 37·5 ,,	0·004
,, ,, 75·0 ,,	0·003

* Salts, glucose and yeast extract.

gave observable growth response at approximately 0·1 p.p.m. concentration.

It was further found that a growth-factor effect equivalent to that given by filtrate *B*89 was obtained on addition of injectable "15 unit" liver extract. The effect was not attributable to vitamin B_{12} as indicated in the table, showing results with different amounts of liver extract and equivalent concentrations of crystalline vitamin B_{12}. Growth stimulation of *Lactobacillus leichmannii* by a factor in liver extract which promotes growth in excess of that attributable to vitamin B_{12} has been reported[4], while concentrates from liver have been found[5] to contain a factor required by *Leuconostoc citrovorum* which appears to be identical with 'folinic acid'[6]. Since these factors were reported to be present in yeast or yeast extract, there is reason for assuming that the factor produced by organism *B*89 is a different substance. This latter is believed to represent a nutrilite required for the growth of a group of indigenous soil bacteria and to contribute to the growth-promoting properties of soil extract. It is considered a matter of interest that it is nutritionally equivalent (for the test bacterium) to a factor in liver extract and that it is a product of microbial synthesis.

A. G. LOCHHEAD
MARGARET O. BURTON
R. H. THEXTON

Division of Bacteriology and Dairy Research,
Science Service,
Department of Agriculture, Ottawa.
March 14.

[1] Lochhead, A. G., and Chase, F. E., *Soil Sci.*, **55**, 185 (1943).
[2] Lochhead, A. G., and Thexton, R. H., *Nature*, **167**, 1034 (1951).
[3] Lochhead, A. G., and Thexton, R. H., *J. Bact.*, **63**, 219 (1952).
[4] Peeler, H. T., and Norris, L. C., *J. Biol. Chem.*, **188**, 75 (1951).
[5] Sauberlich, H. E., and Baumann, C. A., *J. Biol. Chem.*, **176**, 165 (1948).
[6] Bardos, T. J., Bond, T. J., Humphreys, J., and Shive, W., *J. Amer. Chem. Soc.*, **71**, 3852 (1949).

Inhibitors of Hyaluronidase

AN unsolved problem in the study of rheumatic diseases is whether or not hyaluronidase plays any part in the typical changes in the connective tissue, particularly of the interfibrillar cement substance, which is believed to contain hyaluronic acid. Guerra[1], for example, claimed that sodium salicylate significantly inhibits the spreading power of hyaluronidase injected into the skin, and therefore ascribed the value of salicylate in rheumatic fever to an action of the drug on the hyaluronidase–hyaluronic