SCIENTIFIC APPARATUS AND LABORATORY METHODS

PRODUCTION OF PANTOTHENIC ACID DEFICIENCY IN MICE WITH PANTOYL-TAURINE

MUCH evidence is accumulating to show that compounds with highly similar chemical configurations may interfere with each other with respect to their effects on living cells. The initial observations on the competitive relationships between sulfonamides and p-aminobenzoic acid in their effect on growth of microorganisms have been abundantly confirmed and extended by such reports as that of McIlwain,[1] who showed that pyridine-3-sulfonic acid and its amide interfere with nicotinic acid metabolism in microorganisms; and of Snell,[2] who showed that the physiologically inactive sulfonic acid N-(α, γ-dihydroxy-β, β-dimethylbutyryl)-turine (pantoyl-taurine[3]) interfered with the metabolism of pantothenic acid by lactic acid bacteria and yeast, apparently by blocking the essential pantothenic acid away from its site of action. No adverse effect of pantoyl-taurine on growth was observed if excess pantothenic acid were added simultaneously to the culture. McIlwain[3] has secured similar results with this substance on pathogenic bacteria. No data have been published concerning the effect of this substance on animals.

Pantoyl-taurine is relatively inactive on single oral or intraperitoneal administration to small mammals. No effects are noted from single doses as high as two grams per kilo of body weight in mice and rats. However, on long continued daily oral administration of pantoyl-taurine at a dose level of two hundred milligrams per kilo of body weight, evidence of pantothenic acid deficiency may be noted. After three to four weeks of such daily administration, growth in standard strains of laboratory mice ceased, the hair became roughened and porphyrin deposits appeared on the whiskers. There were also characteristic behavior symptoms similar to those observed in direct pantothenic acid deficiency.[4] These results were secured on a diet of Purina Fox Chow. This ration contains adequate pantothenic acid for mice in the absence of pantoyl-taurine. It thus appears probable that pantoyl-taurine interferes specifically with the metabolism of pantothenic acid in animals, as it does with microorganisms.

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[1] H. McIlwain, *Brit. Jour. Exp. Path.*, 21: 136, 1940; *Nature*, 146: 653, 1940.
[2] E. E. Snell, *Jour. Biol. Chem.*, 141: 121, 1941.
[3] H. McIlwain, *Brit. Jour. Exp. Path.*, 23: 95, 1942.
[4] J. G. Sandza and L. R. Cerecedo, *Jour. Nutrition*, 21: 609, 1941.

A NEW FIXATIVE FOR ANIMAL TISSUES

A NEW general fixative, superior to any other so far tested, has been developed in connection with the routine toxicological work carried on in this laboratory. This solution not only fixes the tissues well, but it permits brilliant subsequent hematoxylin-eosin staining. It has the additional advantage of dehydrating the tissues as it fixes them.

Fixative:

Picric acid	5 parts
Isopropanol	55 "
Acetone	30 "
Acetic (glacial)	5 "
Formaldehyde (40 per cent. by vol. C.P.)	5 "

The length of fixation depends, as with other fixatives, on the size and nature of the tissues involved. From two hours to four days is recommended. Tissues have been left in this fixative for several days without apparent harm.

The tissues that are not imbedded in paraffin are stored in 70 per cent. isopropanol.

Since this solution fixes and dehydrates at the same time, it permits a direct transfer from the fixative to isopropanol. In general practice, tissues are trimmed and placed in the labeled cheesecloth "tea" bags in which they are transferred from one solution to another and through the paraffins until imbedded.

After fixation the tissues are washed in two changes of isopropanol (nearly absolute), one to two hours in each change. Then they are passed through three changes of dioxane, one to two hours in each change. The tissues are usually left overnight in the third change of dioxane. Infiltration is begun with two hours in a $\frac{1}{3}$ dioxane-$\frac{2}{3}$ paraffin mixture and completed in three changes of pure paraffin, one half to one hour for each, in a vacuum oven.

Tissues are sectioned from 4 to 7 microns thick. The picric acid is removed from the mounted sections with a 1.5 per cent. solution of ammonia hydroxide in 95 per cent. ethanol prior to staining.

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BOOKS RECEIVED

ANDREWS, ALBERT H. *Manual of Oxygen Therapy Techniques.* Pp. 191. The Year Book Publishers, Inc. $1.75.

BOWEN, E. J. *The Chemical Aspects of Light.* Illustrated. Pp. vi + 191. Oxford University Press. $4.00.

Carnegie Endowment for International Peace. Year Book, 1942. Pp. x + 152. Carnegie Endowment.

MABEE, CARLETON. *The American Leonardo, The Life of Samuel F. B. Morse.* Illustrated. Pp. xix + 420. Alfred A. Knopf, Inc. $5.00.

SCHUCHERT, CHARLES. *Stratigraphy of the Eastern and Central United States.* Illustrated. Pp. xvii + 1013. John Wiley. $15.00.

WEISS, EDWARD and O. SPURGEON ENGLISH. *Psychosomatic Medicine.* Pp. xxiii + 687. W. B. Saunders Company. $8.00.