LETTERS TO THE EDITOR

The Actions of Drugs on the Isolated Trachea

SIR.—The isolated tracheal preparation has been much used recently.[1] Instead of simply tying the rings together, we have opened each ring and recorded only the movement of the circular muscle, thereby increasing the magnification at least three times. In the table are shown the minimal concentrations of histamine and acetylcholine necessary to produce constriction of various mammalian preparations. It will be noted that tracheæ of the dog are extremely sensitive to acetylcholine; those of the cat, rabbit and rat are insensitive to histamine. In these latter preparations, histamine reduces the acetylcholine response and that due to potassium chloride; a trachea contracted by acetylcholine, however, is partly relaxed by histamine whereas one contracted by potassium chloride is unaffected. It is suggested that permeability of the cell is affected.

SENSITIVITY OF TRACHEAL PREPARATIONS

Constrictor	Guinea-pig	Human	Dog	Cat	Rabbit	Rat
Acetylcholine ..	10^{-7}	10^{-5}	10^{-9}	10^{-8}	10^{-6}	10^{-6}
Histamine ..	10^{-7}	10^{-5}	10^{-6}	—	—	—

In all the species studied, calcium chloride potentiates the acetylcholine response but blocks the potassium stimulation. Magnesium chloride is much more effective in blocking the potassium stimulation than it is in reducing the acetylcholine response.

If only one tracheal ring is used, rhythmical activity may sometimes be seen. We have confirmed that this type of activity is present in the dog,[2] especially if small doses of histamine, acetylcholine or potassium chloride are introduced into the bath. It is present also in the rabbit and cat when the muscle is affected by small doses of acetylcholine or potassium chloride.

This smooth muscle preparation may be of value in assessing the activity of parasympathetic blocking agents, detecting the presence of minute quantities of acetylcholine in biological fluids, and studying the penetration of drugs through cell membranes.

A. AKCASU.

Department of Pharmacology and Therapeutics,
University of St. Andrews Medical School,
Dundee.

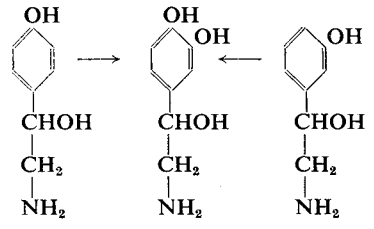
July 11, 1952.

REFERENCES

1. Castillo and de Beer. *J. Pharmacol.* 1947, **90**, 104.
2. Wick, *Arch. exp. Path. Pharmakol.*, 1950, **212**, 133.

The Formation of Noradrenaline Using Ultra-violet Irradiation

SIR.—Extracts of posterior salivary glands of *Octopus vulgaris* contain a material named "octopamine" which has been identified as *p*-hydroxyphenylethanolamine (norsynephrine).[1] When this substance is irradiated with ultra-violet radiation in the presence of air, "hydroxyoctopamine" (i.e., noradrenaline) is formed.[1]



p-Norsynephrine Noradrenaline *m*-Norsynephrine

We have now shown that both the *p*- and the *m*-norsynephrine can form noradrenaline under such conditions. The irradiation was carried out using a Hanovia Fluorescence Lamp, Model 11, and the best yields were obtained after two hours irradiation at *p*H 5 with a 1 in 10,000 solution of the amine. Proof that noradrenaline was in fact the material formed was obtained by running concurrently chromatograms of the irradiated solutions and of noradrenaline. Further chromatograms allowed of elution of the corresponding areas and biological examination of the eluates on the blood pressure of a spinal cat and the isolated rabbit intestine.[2]

In the biosynthesis of noradrenaline, therefore, *p*- or *m*-norsynephrine may be formed at an intermediate stage, and it may be possible to identify one or other of these substances in extracts of mammalian suprarenal glands. Their formation from tyrosine or tyramine is conceivable, a step not requiring the production of dihydroxyphenylalanine or hydroxytyramine. Further work on this approach to the synthesis of adrenaline is in progress.

D. M. SHEPHERD.
G. B. WEST.

Department of Pharmacology and Therapeutics,
University of St. Andrews Medical School,
Dundee.

July 11, 1952.

REFERENCES

1. Erspamer, *Nature, Lond.*, 1952, **169**, 375.
2. Shepherd and West, *Brit. J. Pharmacol.*, 1951, **6**, 665.

ABSTRACTS (*Continued from page* 670)

inactivation. Of the three alkaloids, sanguinarine was the most toxic to the bacteria studied, and physostigmine the least. Berberine at a dilution of 1 in 10,000 showed some stimulation of growth. In media containing berberine and sanguinarine, gas was produced in a number of experiments after an inactive period of as much as 10 days, confirming evidence of bacteriostasis. Experiments designed to test the germicidal activity of the alkaloids in relation to that of phenol showed that media saturated with salts of the alkaloids did not inhibit the growth of *E. typhi* and *Staph. aureus* after 15 minutes exposure, and that *Staph. aureus* was not inhibited by the following concentrations until after the times stated: berberine hydrochloride (saturated), 43 minutes; physostigmine hydrochloride (1 in 11), 10 minutes; and sanguinarine sulphate (1 in 40), 24 minutes. G. R. K.