A HISTOLOGIC STUDY OF THE EFFECT OF THE CLINICAL USE OF VARIOUS ANESTHETICS ON MOTOR AND SENSORY NERVE-ENDINGS INTO AND AROUND THE ANUS

ROBERT G. GRENELL
New York University

An investigation was undertaken to determine the visible histological changes in the nerve-endings, brought about by the injection of various anesthetics. The first step in the investigation was to study preparations of normal, unanesthetized nerve-endings. Sections were made of the skin and muscle around the anus of cats and mice (and will be shortly prepared from fresh human material), employing various stains in an attempt to determine the best one for the present purpose. Gold chloride failed to show the necessary structures, and subsequently a silver stain was used as described by Dr. J. F. Nonidez of Cornell University. The results of the application of this technique have been satisfactory as far as the investigator has progressed, but no conclusion can be reached until human tissue itself has been employed. As soon as fresh surgically removed material can be obtained, the investigator intends to employ various anesthetics such as Eucuprin, for purposes of injection. Microscopic sections will be prepared of this injected tissue, and the varying effects of the different types of substances applied will be observed and tabulated.

The ultimate aim of the investigation is to aid, if possible, in the surgical and clinical handling of nervous tissue in Proctology, by preventing the occurrence of unnecessary injuries, due to lack of information concerning the proper anesthetics to be employed, and their effects.

The investigation was suggested by Dr. Edward Levy of the Polyclinic Hospital, New York City, and is being carried out in relation to further work by him, of a similar nature.

A STUDY OF THE ACTION OF CERTAIN DRUGS ON THE VESSELS OF THE DOGFISH

J. T. HALSEY AND BENTON MINNICH
Tulane University

Mackay, 1931, using skates, and Wyman and Lutz, 1932, using dogfish, found that adrenalin caused a marked augmentation of the blood pressure. To the latter authors, the results suggested "a vasoconstrictor action of adrenalin, peripheral to the gill capillaries," but, "neither recording the venous outflow from the excised spiral valve (the blood vessels of which were perfused with adrenalin solutions) nor microscopic observation of the minute vessels of the tail, during

perfusion or direct application of adrenalin, gave evidences of vasoconstriction."

In continuation of the study of the action of certain drugs on the circulation of the dogfish *Squalus acanthias* (Halsey and Evans, 1937), an attempt has been made to further elucidate the mechanism of this pressor mechanism of adrenalin by perfusion experiments and to study the vascular actions of some other drugs.

Method.—The perfusion fluid consisted of a fish saline, six to eight parts with one part of dogfish serum (from clotted blood), or plasma (from heparinized blood). Attempts to study the reactions of the gill vessels had to be abandoned, as the unavoidable cessation of the gill movements resulted in irregularity or cessation of the flow. Perfusion of the vascular system supplied by the coeliac artery, however, gave satisfactorily consistent results in a considerable proportion of the experiments. Often, however, there occurred sudden changes in the rate of flow, due to no detectable cause. It was consequently necessary to throw out many experiments and to utilize only those in which satisfactory control periods were followed by consistent changes, or lack of change in the rate of flow under the influence of the drug or drugs, with later return to the rates of the control periods. Perfusion pressures ranged in different experiments between 75 and 125 mm. of water. The rate of flow was determined by recording on a slowly and evenly revolving drum, the period required for the passage of measured amounts of the fluid (one to five c. cm.).

The results obtained are briefly summarized below:

A. In 22 experiments adrenalin chloride in concentration ranging from 1 to 100 millions to 1 to 5 millions caused vasoconstriction as evidenced by retardation of flow varying from 25% to complete cessation.
B. Ergotamine Tartrate (Gynergen) in six experiments, in concentrations of 1 to 100,000 to 1 to 10,000, caused no change in rate of flow nor did they lessen the vasoconstriction from adrenalin perfused after or with ergotamine.
C. Ephedrin in 12 experiments exerted no vasoconstricting action in concentrations ranging from 1 to 100,000 to 1 to 5,000 nor did it augment or decrease the vasoconstricting action of adrenalin.
D. Physostigmin (1 to 200,000 to 1 to 100,000) in 14 experiments produced no constant effects on the rate of perfusion.
E. Acetylcholin (1 to 1 billion to 1 to 100 million) either alone or with physostigmin, never caused any unmistakable increase in the perfusion rate. This may have been due to the vessels being already in a state of maximal dilatation, for with sodium nitrite (1 to 1,000 to 1 to 500) no vasodilation was obtained in some of these experiments. In a few experiments perfusion with acetylcholin in concentration of 1 to 50 millions to 1 to 10 millions, resulted in marked retardation or cessation of the flow. However, repetition of such perfusions later in these experiments or in other experiments failed to do this.

It is proposed to continue this investigation using other vessels for the perfusion.

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THE REGIONS OF THE RETINA RELATED TO THE DIFFERENT CHROMATOPHORIC RESPONSES IN *FUNDULUS HETEROCLITUS*

EARL O. BUTCHER
Biological Laboratory, Hamilton College

In a previous study (Butcher '37) it was found that the upper 70% of the *Fundulus* retina contained rods, and single and double cones, and that the lower region had only rods and double cones. In addition to the difference in cone distribution, a specialized crescentic region, containing more double cones and rods than any other part of the eye, was present only in the lower region.

Since the cone content of the upper and lower regions of the retina of *Fundulus* differed, and knowing that *Fundulus* adapted well to yellow, experiments were made to see if *Fundulus* could adapt equally as well to a yellow background above as to one below.

Female fish were placed in large crystallizing dishes so that they had a yellow background below and white paper above, while the backgrounds for similar fish were reversed in other dishes. All dishes were exposed in the same way to daylight which entered through the sides of the dish. The fish with a yellow background below were very yellow in thirty minutes, but those with yellow paper above showed only slight, if any, adaption after two and a half hours. Fish kept for as long as eleven hours in a dish with a yellow background above and milk glass and a 150 watt bulb below, so that they received an illumination of 450 f.c., failed to show little, if any, adaptation. A 60 watt bulb, giving an illumination of 200 f.c., and a yellow background below caused a very marked yellow coloration of fish in thirty minutes. These experiments indicated that the specialized cones of the upper region were possibly related to the yellow adaptation of the body.

Covering and rotating the eyes of *Fundulus* (Butcher and Adelmann '37), indicated that the upper region of the eye of *Fundulus* was associated with the adaption to light backgrounds and the lower portion to the darkening of the body. Confirmatory evidence of this regional difference was sought during the last summer by various methods.

When fish were securely fastened in glass tubes, and the tubes were rotated so that the fish were upside down, they became lightish in a black container. Dark adaptation occurred as soon as they were returned to their normal position. These experiments definitely indicated that there must be some localization in the eye since fish in verted were light and the fish right side up were dark in the same black container.

In order to eliminate the dorsal region of the eye, the conjunctiva