control of regeneration is central rather than peripheral. It would seem unlikely that a nerve would regenerate as rapidly and to the same degree into foreign tissue as into its own if it were dependent upon a chemotactic influence exerted by the peripheral end organs.

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Failure of Atropine to Produce Pupillary Dilatation

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In a recent series of experiments the authors (*1*) had occasion to administer atropine sulfate to anesthetized dogs and observed that under the conditions of the experiments, atropine did not produce the usual pupillary dilatation. This finding seemed so unusual that it was deemed worthy of recording in the literature.

The experiments in question involved the measurement of intraocular pressure by use of the Hamilton optical manometer (*2*). This was accomplished by anesthetizing the dogs with 30 mg of pentobarbital sodium/kg of body weight intravenously and passing a sharp, short 24-gage needle through the cornea near the limbus. The needle was attached to a length of lead tubing which was connected in turn to the manometer for photographic recording. Within a few minutes after passing the needle through the cornea, the pupil became tightly constricted in all the dogs used and failed to respond to rather large doses of atropine.

The presence of miosis in these experiments may be attributed to a reflex originating in the cornea, since it is well known that injury to the eye will produce pupillary constriction. In general, sensory stimuli to the eye and iritis will produce constriction of the pupil (*3*). Additional evidence in this direction is offered by the fact that pupillary constriction occurred only in the experimental eye and not in the opposite eye. Thus, after the administration of atropine, the control pupil was fully dilated while the experimental pupil was tightly constricted. Therefore, it is postulated that passing a needle through the corneal membranes sets off impulses that activate the constrictor fibers of the pupil either via the central reflex route or by an axon reflex. That this constriction was not due to other procedures used in these experiments was shown by the fact that miosis refractory to atropine was obtained in animals where cannulation was the only procedure.

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[2] This paper is a portion of a dissertation submitted in partial fulfillment of the requirements for the degree of Master of Science, University of Tennessee.

The effect of electrical stimulation of the cornea was tested in the pentobarbitalized, atropinized dog by applying a mild electrical stimulation (Harvard inductorium, 3 v input, coil setting 9) to the cornea for 2 sec. No change in the pupil size developed. However, stronger, more prolonged stimulation (duration 30 sec, coil setting 2), which caused a small burn of the cornea, did cause miosis. This miosis, however, did not appear until 15–20 min after discontinuing the electrical stimulation. This type of injury, as well as needle puncture, cause a delayed miosis in the atropinized eye.

In an effort to overcome this miosis various drugs were tried. A 1% atropine sulfate solution was instilled in the eye, 2 drops every 10 min, for a period of 1 hr without producing any appreciable effect on the pupillary constriction. Atropine sulfate was then administered intravenously beginning with a dose of 1 mg and continuing to a total dose of 5 mg/kg of body weight with the same negative results. As further check 0.25 ml of a 1% solution of atropine was injected directly into the anterior chamber. Since none of these procedures produced dilatation, it is obvious that atropine was of no value in overcoming this miosis.

Other drugs that were tested included tetraethylammonium chloride, a ganglionic blocking agent, in a dose of 10 mg/kg body weight; Mytolon, a muscle relaxant, in gradually increasing amounts until complete respiratory paralysis occurred; and Regitine, an adrenergic blocking agent, in a dose of 5 mg/kg. All these drugs, given intravenously, were found to be ineffective in the doses used in preventing the above described miosis.

Since ganglionic blockade was without effect, it seemed likely that the miosis was due to an axon reflex. The only group of autonomic drugs that was found to be effective was the sympathomimetics. By intravenous administration, epinephrine hydrochloride, 10 μg, or ephedrine sulfate, 3 mg/kg of body weight, gave a prompt mydriatic action.

On the assumption that the constriction was due to a reflex originating in the cornea, a local anesthetic, tetracaine hydrochloride, was instilled in a concentration of 0.5%, using 2 drops every 30 min, and beginning 30 min prior to cannulation of the cornea. Thirty to 45 min after this procedure atropine would produce near maximal pupillary dilatation. This dilatation, however, was limited in duration. In spite of continued use of tetracaine, within 1.5–2 hr after the first appearance of mydriasis, the pupil began to constrict again, and a few minutes later a state of maximal constriction was obtained. When this point was reached, further doses of atropine or tetracaine were without avail.

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