# Technical Papers

## Curarization by Rectal Suppository

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We have found that the introduction into the rectum of a rabbit of a suppository containing a sufficient quantity of curare or curarelike compounds produces the same effect as that caused by intravenous injection. Curarization of the rabbit follows the same pattern in both cases: first, the ears drop; then there is a softening of the muscles of the neck; the head drops; and finally a complete quadriplegia is observed. In the case of an overdose this is followed by paralysis of the diaphragm with cessation of breathing; and, last, death is caused by heart failure.

Curarization by rectal suppository is less abrupt than by intravenous injection, taking 4–6 min, and it lasts longer. Relaxation continues for 3–5 hr. Physostigmine and eserine keep their effect as antidotes, permitting one to stop the curarization at will or in case of an overdose.

In order to demonstrate more objectively the effect of rectal curarization, we have made a neuromuscular preparation. A rabbit is slightly anesthetized by Nembutal injection. The sciatic nerve is isolated, and the inner branch receives current through the electrodes of a battery-operated excitor and is regularly stimulated to a constant rhythm. The gastrocnemius muscle of the animal is then prepared and a sheaf from the tendon is attached to a myograph which registers the contractions provoked by the excitation of the sciatic nerve. One thus obtains a graph of the muscular contraction, with constant amplitude and rhythm. If one introduces into the rectum of the rabbit a suppository containing 0.025 g/kg of 336 HC (iodoethylate of N,N bis-piperidyl-ethyl-piperazine) or 0.005 g/kg of D-tubocurarine or 0.005 g/kg of Flaxedil, there is a variable delay, constant for a given animal, after which one observes that the amplitude of the contractions decreases until there is no contraction at all, and the animal is completely curarized. Graphs *A* and *B* in Fig. 1 show the difference of effect between the suppository and the intravenous injection; *C* shows the antagonistic action of physostigmine.

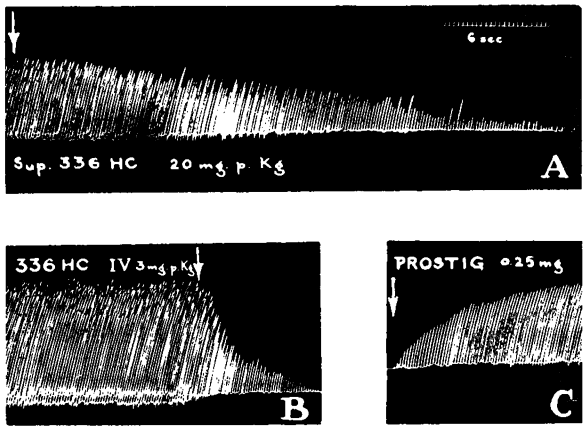


FIG. 1. Rabbit ♂ 3 kg neuromuscular preparation. (*A*) Contractions of the gastrocnemius muscle; curarization by rectal suppository. (*B*) Contractions of the gastrocnemius muscle; curarization by intravenous injection. (*C*) Decurarizing action by intravenous injection of physostigmine.

These differences may be summarized as follows: Rectal administration by suppository permits (*a*) slower curarization; (*b*) a more persistent effect; and (*c*) a slower recuperation of muscular contractility.

This experimental procedure demonstrates for the first time, as far as we know, the use of a rectal suppository for the curarization of an animal. In clinical investigations, we have obtained interesting results in neurological and psychiatric syndromes by this procedure (*1*).

**Reference**

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## Invertase in *Palamnaeus bengalensis*

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As far as the writers are aware, knowledge of the physiology of digestion in scorpions is largely due to the extensive investigations of Pavlovsky and Zarin (*1*) on *Buthus*, but unfortunately these authors had little fresh material at their disposal and based their work on stored glycerin extracts. No invertase was, however, detected by these workers in the scorpion *Buthus*.

Our investigations were conducted on *Palamnaeus bengalensis*, the common large Indian scorpion, which lives in dry, shady, uncultivated high platforms of land and feeds on various types of insects, myriapods, and even on its own kind. Large quantities of fresh extracts of the liver were prepared from a number of well-fed specimens that had been lightly chloroformed and immediately dissected. Weighed quantities of the glands were ground with quartz sand and measured quantities of distilled water and filtered. The solution so obtained gave a pH of 7.1. Estimations of the enzyme were conducted, using the methods of Cole (*2*), Hawk *et al.* (*3*), Sumner and Somers (*4*), and Smith (*5*). All experiments were performed with parallel controls and blank solutions. Toluene was used as an antiseptic in each case.

For the detection of invertase buffered extracts

made in distilled water were allowed to act on 1% sucrose solution at 27° C. After 5 hr, Fehling's test was applied to the solutions, which were boiled for 3 min. The results were positive for invertase activity. In another set of experiments, a small quantity of the sucrose solution was mixed with the gland extract and left overnight at room temperature (20° C). This was tested with Benedict's sugar-reducing method next morning, with marked results. Several experiments were performed in each case, and sufficient evidence was obtained to show that invertase was present in the liver of *P. bengalensis*.

The work on the biochemical nature of the enzymes and their quantitative reactions in this scorpion is, however, being extended by one of us (M.S.K.).


**References**

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## Paper Partition Chromatography in Taxonomic Studies[1]


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Paper partition chromatography, as applied to fresh tissues of several species of fish, yields results that seem to have value for taxonomic studies. The following technique is being used: (1) Approximately 8 mm³ of various tissues, such as muscle, liver, and eye lens of fresh fishes, are placed on Whatman #1 filter paper and squashed with the aid of a glass pestle with a flattened tip, to form a spot about ½ in. in diameter. (Muscle proves to be the most favorable material.) (2) The tissue is allowed to dry at room temperature. (3) The chromatogram is developed in one direction by descending flow of the solvent. Two solvent mixtures are used. One is comprised of 2 parts of *n*-propanol, and 1 part of 1% ammonia; the other is a mixture of 4 parts of *n*-butanol and 1 part of glacial acetic acid, made up with 5 parts of water. (4) After development, the chromatograms are first studied under ultraviolet lamps for the presence of fluorescent spots. (5) The chromatograms are then sprayed with a 0.2% solution of ninhydrin in 95° ethanol, to which 5% 2,4,6-collidine is added before use. Black-and-white or colored photographs of the fluorescent and of the ninhydrin-positive pattern are made and kept for permanent record.

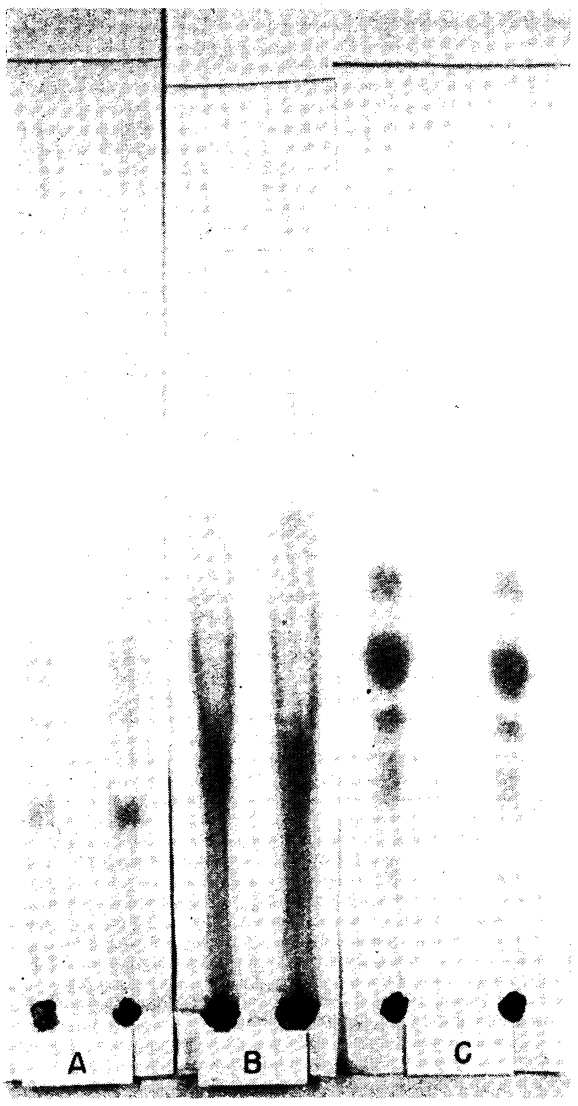


FIG. 1. Ninhydrin-positive patterns of *A, Paralabrax clathratus*; *B, P. maculatofasciatus*; and *C, Hysterocarpus traski*. Two samples of each species are presented.

Fluorescent and ninhydrin-positive patterns of a certain tissue taken from various specimens of the same species are remarkably constant, irrespective of the size or age of the fish. On the other hand, patterns obtained from muscle of different species show constant and easily recognizable differences (Fig. 1). In general, in the preliminary tests, the closer the taxonomic position of any two or more species studied, the greater the similarity of their chromatographic patterns. No extensive attempts have been made to identify the chemical nature of the substances involved, but it can be said that free amino acids do not play an important role. Comparable results have been obtained

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