

mutant to grow in the absence of an essential factor without producing this factor.

References

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An Antidiuretic Substance Obtained by Digestion of Globulin with Pepsin¹

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Croxatto and Croxatto (1) obtained a hypertensive principle (pepsitensin) by treating with pepsin the globulin fraction of plasma that contains hypertensinogen. Also, under these conditions, another substance was formed, with a marked oxytocic effect (2). A third substance, which produces an intense antidiuretic action, can be obtained if the extracts containing pepsitensin are digested again with pepsin. This last substance was detected and titrated, using a method described by Burn (3).

Rats were used under a water load (5% of body weight), and the different extracts were injected intraperitoneally. Each dose was injected in 4 animals, and the volume of urine measured every 15 min during a period ranging from 2 to 3 hr. Diverse fractions of plasma obtained by precipitation of mammalian blood (human, horse, and ox blood) with $(\text{NH}_4)_2\text{SO}_4$ were used. These fractions were dialyzed, acidified to pH 3.5, and treated with pepsin (10 mg/100 ml) for 4 hr at 37° C. The fractions were added to 2 volumes of boiling alcohol. The precipitate was then separated, the solvent evaporated, and the final aqueous extracts were reduced to a third of the original volume.

Typical pressor action of pepsitensin was observed in cats and rats, especially after the injection of extracts prepared from fractions that contained hypertensinogen. These extracts also caused an intense oxytocic effect on the isolated uterus of guinea pigs. No antidiuretic effects, or very slight ones, were observed if the extracts were injected intraperitoneally in the rat. An intense antidiuretic action was observed after the injection of the extracts if they were submitted to a second digestion with pepsin (pH 2.5–3.5) for 24 hr, filtrated, and neutralized. It is interesting to notice that these extracts lost their pressor action, maintaining or increasing the oxytocic effect (Figs. 1, 2).

It is possible to assume that the antidiuretic action may be caused by a peptide. It dialyzes slowly through

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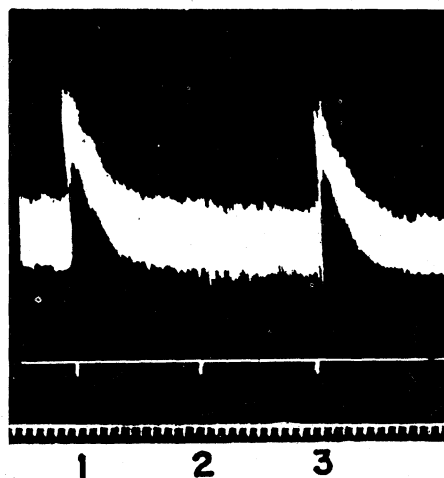


FIG. 1. Blood pressure recording: (1) 1 ml of extract obtained from 7 ml of horse hypertensinogen, plus 0.8 mg of pepsin incubated 4 hr at 37° C; (2) 1 ml of the same extract, following injection after a second digestion with 3 mg pepsin; (3) same as (1).

cellophane membranes and is unstable at an alkaline pH.

In spite of the fact that it was not established whether some antidiuretic substance preexists linked to globulins, we believe that most of it is originated by enzymatic hydrolysis from a globulin precursor, as it occurs with hypertensin. If hypertensinogen is treated with HCl (adding no pepsin), no antidiuretic substance is formed. Small yields of antidiuretic substance were obtained from either albumin or fibrinogen.

Our findings indicate that some of the antidiuretic substance obtained from body fluids may have an extrapituitary origin, as has been pointed out by Walker (4). Furthermore, these results would also suggest a close relationship among pepsitensin, hypertensin, vasopressin, and oxytocin. Other studies have shown important links between the mechanisms that inactivate neurohypophysis hormones and hypertensin (5). Such observations are of interest, especially after the results

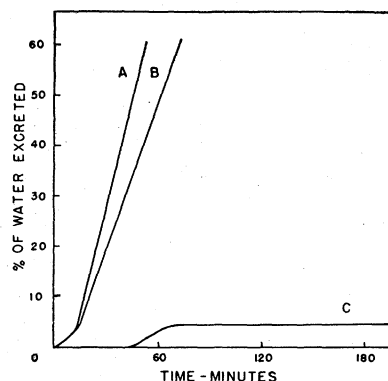


FIG. 2. Urinary excretion curve obtained from 3 groups of rats under a water load (5% body wt). A, control group; each rat was injected at 0 with 1 ml of 0.9% NaCl. B, group that received 1 ml of the extract injected at 1, Fig. 1. C, corresponds to the group that received the extract injected at 2, Fig. 1.

obtained by Ellis and Grollman (6) in hypertensive patients and in animals with renal hypertension. They showed in both cases an increase in urinary excretion of an antidiuretic substance, most striking in eclamptic women (7). Marked alterations in water metabolism were also observed by Braun-Menendez (8) in hypertensive rats.

Experiments are in progress to disclose whether an antidiuretic substance might originate through the action of other enzymes, including renin, which is related to hypertensin formation.

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An Internally, Electrically Heated, Sintered Glass Filtration Disk¹

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A new technique for carrying out filtration at elevated temperatures has been developed, employing a sintered glass disk prepared according to the method previously described by the author (1). By the simple expedient of embedding a resistance wire in this disk, the sintered glass filter bed can be uniformly electrically heated. The resistance wire is first threaded into a thin-walled glass tube, bent as shown in Fig. 1.

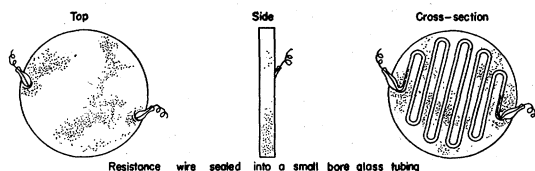


FIG. 1. Internal electrically heated sintered glass disk.

This unit is then embedded in the glass granules and fused in the annealing oven at 600° C. In this way, the heating wires are insulated from contact with the filtering media.

These filtration disks may be constructed in any size or shape, either as independent units, or for incorporation into funnels, tubes, or crucibles (Fig. 2). A glass ring around the periphery of the sintered disk is pro-

¹ Reference may be made to this report noting author, title, source, date, and project and report numbers. The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Department of the Navy.

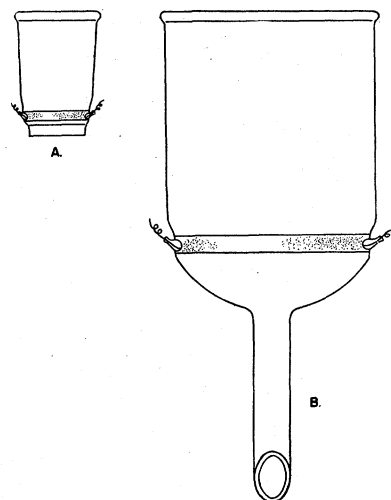


FIG. 2. Electrically heated sintered glass disks mounted in a Gooch crucible (A) and a Büchner-type funnel (B).

vided when it is to be used as an independent unit. When the disk is to be incorporated into a funnel or tube, it is first prepared and fused in a carbon mold, which is subsequently removed when the fusion is completed. The disk with its contained heating element is then sealed into the appropriate glass tube or funnel.

Since the filter is constructed of Pyrex glass granules, the element will withstand temperatures up to 600° C. With rheostatic control of the heating wire, and adequate stirring in the filtering media, proper control of the filtering process can be accomplished. The quantity of material that can be filtered will depend entirely on the area of the filtering disk, and the type of container in which the disk is mounted.

An effective method for the removal of most chemicals that become impregnated on the disk with heating has been found to be the simple procedure of oxidative removal in the annealing oven at temperatures up to 600° C.

The disk described has a number of advantages over other high-temperature filtration units. These consist of (a) unobstructed observation of the material during filtration; (b) efficient, convenient, and less bulky arrangement for heating and controlling the temperature of the filtering medium; (c) relative ease in filtering large or small volumes; (d) general versatility, in that the disk can be sealed into any type of apparatus or used in almost any kind of arrangement; (e) portability; (f) construction of soft glass, Pyrex, quartz, Vycor, etc., to suit the particular needs or the materials available; and (g) elimination of the difficulties, so often caused by precipitation resulting from evaporative cooling, where suction is applied to facilitate filtration.

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