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BRANCHES OF THE ACADEMY OF SCIENCES OF THE USSR

By Dr. P. KOLESNIKOV

VICE-CHAIRMAN OF THE COMMITTEE OF BRANCHES AND BASES OF THE ACADEMY OF SCIENCES OF THE USSR

IN the Soviet Union the Academy of Sciences has become the greatest scientific center of the country, embracing scores of institutes and hundreds of laboratories.

The time has long since passed when science and art were the domain only of the capital and of a few of the larger cities. To-day science is making swift progress and scientific personnel are quickly growing in the most distant national regions of the USSR.

The Academy of Sciences of the USSR comprises several republican branches and scientific bases. Article 48 of the Statutes of the Academy of Sciences reads:

Branches of the Academy of Sciences in the locality constitute incorporated research institutes, while the local bases of the Academy of Sciences represent complexes of research institutes, these branches and bases studying the natural wealth, the economy and the culture of the respective individual Republic, Territory and Region.

Branches and bases of the Academy of Sciences of the USSR are located all over the country—from the Kola Peninsula to the foothills of the Pamir Mountains. There are also the following major scientific centers—the Academy of Sciences of the Georgian SSR, those of the Ukrainian SSR and the Byelorussian SSR and the USSR Academy branches in the Azerbaijan and the Uzbek Republics.

biuret reaction, the intensity of which closely paralleled its hormonal activity, the amount of active substance was expressed in equivalents of protein as determined by photoelectric colorimetry. The amount of protein equivalents relative to the solids obtained by the above procedures and the activity in units, as defined, are given in Table 1. The yield of corticotropin obtained by ultrafiltration of a glacial acetic acid extract for six days, with change of the membrane every 24 hours, is expressed in Table 2 in percentage of the activity of the extract. Nearly half of the solids of the extract passed through the membrane and contained 38 per cent. of the total activity of the extract. The part remaining within the dialysis bag contained 28 per cent. of total activity. The powders obtained from the ultrafiltrates showed a better solubility in water than the original material or the residue after ultrafiltration. The solutions also contained less color. The biuret, Hopkins-Cole, Millon and Sakaguchi reactions were positive. A 0.1 per cent. solution of the material showed immediate precipitation upon addition of phosphotungstic or phosphomolybdic acid, but not with trichloracetic or picric acid. The activity was not destroyed by boiling the solution for ten minutes. The ultrafiltrates of glacial acetic acid extracts were free from gonadotropic and thyrotropic hormones.

TABLE 1

CORTICOTROPIN OBTAINED BY SALTING OUT OR BY FREEZING AND DRYING ULTRAFILTRATES OF EXTRACTS OF HOG PITUITARY

Number of animals	Material obtained from ultrafiltrates	Mgm. protein* equivalents per 1 gm of solids	Units† per 1 gm of protein equivalents	Units† per 1 gm of solids
8	(a) 4.5 M NaCl precipitate	484	120	58
5	(b) 1.5 M $(NH_4)_2SO_4$ precipitate from supernatant of (a)	255	102	26
9	(c) Total solids obtained by freezing and drying	286	125	36

* Amount equivalent to protein as measured photoelectrically by the biuret reaction.

† 1 unit is equivalent to the activity of 12 mgm of acetone-dried hog pituitary powder which elicits a 100 per cent. increase of the adrenal weight in the hypophysectomized rat over a five-day injection period.[2]

TABLE 2

YIELD OF CORTICOTROPIN OBTAINED BY FREEZING AND DRYING AFTER ULTRAFILTRATION FOR 6 DAYS OF A GLACIAL ACETIC ACID EXTRACT OF ACETONE-DRIED HOG PITUITARY POWDER. CHANGE OF THE MEMBRANE EVERY 24 HOURS

	Solids gm	Activity units	Percentage of total activity
Glacial acetic acid extract; 2 M NaCl precipitate	4.00*	205	100
Material obtained by ultrafiltration; frozen and dried	2.18	79	38
Residue after ultrafiltration; 2 M NaCl precipitate	2.69	58	28

* As calculated from the weight of the precipitate of one ninth of the extract.

The fact that a corticotropic substance passes through a Cellophane membrane indicates the probability that its molecular size is smaller than has been assumed. In order to determine whether the extraction with glacial acetic acid resulted in the splitting of an active group from a larger molecule or whether there were active groups of smaller molecular size in the original acetone-dried powder, the following experiments were performed. The acetone-dried powders of sheep and beef pituitaries were suspended in water and adjusted to pH 3.0 with hydrochloric acid. Suspensions of hog pituitary powder were similarly adjusted to pH 3.0 and to pH 9.0 and 10.0, respectively, with sodium hydroxide. Corticotropic activity was demonstrated in the ultrafiltrates of all five of these solutions, showing that the unextracted acetone-dried powder of the pituitary contained under those conditions a corticotropic substance of a relatively smaller molecular size.

Summary: A substance with corticotropic activity has been obtained by dialysis and by ultrafiltration of pituitary extracts.

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R. TYSLOWITZ

THE DEPARTMENTS OF PHARMACOLOGY AND MEDICINE, HARVARD MEDICAL SCHOOL, AND THE MEDICAL CLINIC OF THE PETER BENT BRIGHAM HOSPITAL, BOSTON, MASS.

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DE KRUIF, PAUL. *Kaiser Wakes the Doctors.* Pp. 158. Harcourt, Brace and Company. $2.00.

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