

TABLE V.
Comparative Tumor and Organ Weight of Compound A Treated and Control C3H Lymphosarcoma Mice Treated for 6 Days Starting the 3rd Day; Autopsy the 9th Day. Body wt in g, tumor wt in mg.

	Treated tumor	Non-treated tumor	Non-treated non-tumor
No. of animals	3	3	3
Mean body wt at start	19.3	19.	—
" body wt at autopsy	20.0	23.7	19.3
" wt tumor mass	.0	1350	.0
Mean organ wt as % of body wt less tumor wt			
Spleen	.24	.74	.59
Mesenteric lymph nodes	.011	.030	.29
Thymus	.016	.093	.111
Adrenal	.007	.009	.011

and evidence of modification of the local lymphatic lesion was observed. Growth of the tumor mass of lymphosarcoma 6C3HED

was prevented for a short experimental period.

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Role of the Pituitary in Growth of a Transplanted Rat Tumor.* (17879)

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The purpose of the present investigation is the study of the hypophyseal influence on the rate of growth of a transplanted rat tumor. This subject has received only a limited amount of attention in recent years, and as some of the earlier work is open to criticism regarding the completeness of hypophysectomy, we refer only to a more recent paper by Chamorro and Dobrovolskaia-Zavadskaia (1) for a bibliography on this subject.

Materials. Male rats of the Sprague-Dawley[†] strain were used throughout this investigation. The hypophysectomized animals were of the same weight range (80-90 g) as the controls at the time of the operation. The tumor used was the Walker Carcinosarcoma 256[‡]; Anterior Pituitary Powder,

Parke-Davis & Co., No. H 1684E and whole dried Anterior Pituitary Lobes, Massone Institute, Buenos Aires.

Exp. I. Tumor implantation was made into the hypophysectomized rats 3 days after the hypophysectomy; the intact control animals were implanted at the same time. The animals were given a diet of Purina Laboratory Chow with tap water *ad libitum*. They were weighed twice weekly. The animals were sacrificed on the 14th day after tumor implantation, and the tumors removed and weighed immediately.

Exp. II. The conditions of this experiment were the same as for Exp. I with the exception that tumor implantation was delayed until 11 days after the surgical intervention, and that the animals were sacrificed on the 15th day following tumor implants.

Exp. III. Tumor implantation was made

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1. Chamorro, A., and Dobrovolskaia-Zavadskaia, N., *C. r. soc. biol.*, 1945, v139, 614.

† Supplied via air freight by Hormone Research Laboratories, Inc., Chicago, Ill.

‡ We wish to thank Dr. K. Sugiura of the Sloan-Kettering Institute for making this tumor available to us.

TABLE I. (Exp. I).

Group	No. of animals	Surviving animals	Initial body wt (avg g)	Avg change body wt, %	Median tumor wt (g)
Hypo	10	10	78.1	— 5.6	0.895
Controls	11	11	91.3	+51.5	6.33

TABLE II. (Exp. II).

Group	No. of animals	Surviving animals	Initial body wt (avg g)	Avg change body wt, %	Median tumor wt (g)
Hypo	24	11	77.3	— 4.3	0.72
Controls	20	20	124.1	+45.0	3.30

TABLE III. (Exp. III).

Group	No. of animals	Surviving animals	Initial body wt (avg g)	Avg change body wt, %	Median tumor wt (g)
H	21	16	76.4	+13.5	2.905
A	21	13	77.9	+28.9	4.145
B	21	9	79.0	+28.6	3.69
Controls	20	20	93.2	+80.5	9.71

TABLE IIIa. (Exp. III).
Average Weight of Endocrine Glands (mg).

Group	Testes	Seminal vesicles	Adrenals	Thymus
H	217	7.5	20	248
A	710	28.0	23	285
B	666	21.0	18	241
Controls	2065	113.0	44	440

into the hypophysectomized rat 3 days after the operation, the intact controls being implanted at the same time. The animals were given a diet of Purina Laboratory Chow supplemented with canned dog food, whole milk powder, and whole wheat bread. They were given tap water containing 1% of sucrose *ad libitum*.

The hypophysectomized animals were divided into 3 groups: Group H received no injections, Group A received daily (5 inj. per week) subcutaneous injections of freshly dissolved Anterior Pituitary Extract A, Group B the same treatment as Group A, only with extract B. A total of 90 mg of each extract was given for the whole experimental period. The animals were weighed bi-weekly, and were sacrificed 15 days following the tumor implantation and the tumors, testes, seminal vesicles, adrenals, and thymus of each animal were removed and weighed immediately.

Ant. Pituitary Extract A. Ant. pituitary powder was extracted with 0.4 N NH_4OH in 60% ethanol (40 ml per g of powder). The

soluble portion was diluted with 10 vol. of acetone, and acetic (glacial) acid was added to the point of flocculation. After standing overnight at room temperature, the precipitate was centrifuged off, washed with acetone and ether and dried *in vacuo*.

Extract B. The dried anterior pituitary lobes were extracted with 0.5 N NH_4OH (40 ml per g of lobes), with subsequent treatment as for extract A.

Discussion. Two criteria were used to determine the completeness of hypophysectomy in our test animals, namely, growth curves and testicular size. Cortis-Jones and Alt(2) report that when the testes of the operated rats (90-110 g weight) weighed over 500 mg 10-14 days after hypophysectomy, the removal of the gland was regarded as incomplete. In our experiments, the maximum weight of testes in untreated animals was 310 mg, which is satisfactory.

2. Cortis-Jones, B., Crooke, A. C., Henley, A. A., Morris, P., and Morris, C. J. O. R., *Biochem. J.*, 1950, v46, 173.

The results (Table I) of Exp. I show that hypophysectomy causes a very definite reduction in tumor growth, but does not completely suppress the growth of an implanted tumor. The tumors, apparently, grow to some extent independently of the pituitary gland; in this, we corroborate the results of the majority of the earlier workers on this subject. In Exp. II, tumor implantation was delayed until 11 days after the pituitary removal, in an effort to diminish the amounts of residual circulating hormones. This delay does not materially alter the picture (Table II).

Exp. III (Table III) confirms the results of Experiments I and II insofar as the growth-suppressing action of the pituitary is concerned. In addition, it may be stated that the enriched diet employed in this experiment exerted a growth-stimulating effect on the tumors. Comparing Group H of Exp. III with the operated animals of Experiments I and II, the body growth and tumor growth-promoting properties of an enhanced diet are

quite evident. However, comparing Groups H, A, and B of Exp. III, the additional body and tumor growth of Groups A and B, over Group H, can only be due to the pituitary extracts administered. The tumor growth-inhibiting action of the pituitary removal may, therefore, be partially counteracted by injection of anterior pituitary extracts.

The only hormonal principle clearly demonstrable in our anterior pituitary extracts was the gonadotrophic hormone, as is evident from Table IIIa. In this connection, the relation between testes size and tumor size may be of significance.

Summary. Hypophysectomy in rats definitely, but incompletely, suppresses the growth of a transplanted tumor. It appears possible that a hormone, or hormones, of the pituitary are required for stimulation of tumor growth as evidenced by the effects of pituitary gland removal and the partial results of the administration of certain anterior pituitary extracts.

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Blood Flow Determinations and Cardiodynamic Effects of a Venous Shunt in Pulmonary Hypertension.* (17880)

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The following study was prompted by the recent report of Bland and Sweet(1) in which a surgical anastomoses of the azygous vein and a branch of the right pulmonary vein was established for relief of pulmonary venous hypertension in certain instances of mitral stenosis. Marked clinical improvement was noted in 3 of the 5 patients operated, indicating that such a venous shunt was presumably capable of relieving the high pressure in the pulmonary area. It was our purpose to test the capacity of this type of shunt with var-

ious acute procedures designed to increase pulmonary pressure and if possible, note the effects of the venous shunt on the cardiodynamics of such animals.

Method. The 10 dogs used in these experiments were anesthetized with sodium barbitol I.V., 300 mg/kg. The chest was opened in the mid-sternal line, the pericardial sac was incised, and its edges were sewn to the thoracic walls in such a manner as to form a cradle for the heart. Respiration was maintained by use of alternating positive air pressure. The azygous vein was ligated 2 to 3 cm from the superior *vena cava*; and cannulae were inserted, one in the azygous vein proximal to its ligation and one in a large

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1. Bland, E. F., Sweet, R. H., *J.A.M.A.*, 1949, v140, 1259.