TABLE I.
Renal Arterio-venous Oxygen Differences of Normal Dogs and Dogs with Partial Constriction of Renal Artery with and without Hypertension.

	Renal Arterio-venous Oxygen Difference (vol. %)			
	1-2	2-3	3-4	4-5
Normal dogs (70 observations)	12	32	23	3
Dogs with partial constriction of renal artery				
1. Without hypertension (33 observations)	7	15	4	7
2. With hypertension (31 observations)	7	15	5	4
Total	14	30	9	11

renal artery are shown. Thirty-one observations of the latter group were made when the dogs exhibited hypertension, and 33 were made when hypertension was absent in spite of renal artery constriction. It is seen that although a few more rather large arterio-renal venous oxygen differences were encountered in the group with renal artery constriction, the variability in oxygen utilization in this group, with or without attendant hypertension, is not markedly different from that of normal dogs. In both groups the renal A-V(O_2) most frequently encountered was between 2.5 and 3.0 volumes percent.

These results lend no support to the concept that partial constriction of the renal artery is attended by lowered oxygen tension in the kidney, under the conditions specified. Similar observations in circumstances in which the renal excretory work is increased, *e. g.*, a high protein diet, have not as yet been made.

Summary. The variability of renal arterio-venous oxygen difference in fasting dogs with partial constriction of the renal artery with and without hypertension is similar to that of normal dogs.

9411 P

The Active Fraction of Rous Chicken Sarcoma.

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Recent attempts to isolate the active agent of the Rous chicken sarcoma have resulted in conflicting views as to the nature of the causative agent. Jobling and Sproul[1-2] have reported that repeated injections of a lipid fraction obtained from fresh or dried tumor

1 Jobling, J. W., and Sproul, E. E., *Science*, 1936, **84**, 229.
2 Jobling, J. W., and Sproul, E. E., *Science*, 1937, **85**, 270.

tissue, together with nonspecific protein, produce sarcomas which appear in the more responsive birds within 3 to 4 months after the third injection. Fraenkel and Mawson,[3] on the other hand, were unable to obtain tumors by injecting acetone extracts of fresh or dried tumor tissue but were successful with the residue.

In 1936 we attempted to isolate lipid fractions from a very active preparation of Rous chicken tumor No. 1 with pentane and chloroform as solvents. With neither were we successful in producing tumors in young birds. The residue of the pentane extract, however, invariably produced tumors after a single injection in spite of 4 extractions of the powder with 100 volumes of solvent (see Table I). The residue from the chloroform extract was inactive,

TABLE I.
Effects of Injecting Powder, Extracts and Residues of Rous Chicken Sarcoma No. 1 into Barred Plymouth Rock Chicks.

Material	Chick No.	Amt. Inj. mg.	Site	Date of injection	Gain in Wt., gm.	Date Sacrificed	Results
$CHCl_3$ Extd. Pdr.	151	100	RL*	6/11/36	340	7/17/36	Neg.
	155	100	RB	"	385	"	"
$CHCl_3$ and Pentane Extd. Pdr.	171	75	RB	4/2/37	255	4/24/37	Tumor
	171	1	LB	"	"	"	"
	171	3	RL	"	"	"	"
	172	25	RB	"	335	4/27	Tumor
	172	15	LB	"	"	"	"
	172	5	RL	"	"	"	"
$CHCl_3$ Extract	151	from 400	RB	6/11/36	340	7/17/36	Neg.
	155	" 400	RL	"	385	"	"
$CHCl_3$ and Pentane Extract	175	" 400	LL	4/2/37	370	7/30/36	Neg.
Pentane Extd. Pdr.	152	80	RB	6/3/36	260	6/23/36	Tumor
	156	80	RL	"	105	"	"
	173	75	RB	4/2/37	255	4/22/37	"
	173	1	LB	"	"	"	"
	173	3	RL	"	"	"	"
	174	25	RB	"	155	4/19	"
	174	15	LB	"	"	"	"
	174	5	RL	"	"	"	"
Pentane Extract	152	" 250	RL	6/3/36	260	6/23/36	Neg.
	156	" 200	RB	"	105	"	"
	175	" 300	RB	4/2/37	370	7/30	"
Chicken Tumor No. 1 149†	176	75	RB	"	235	4/17/37	Tumor
	176	5	LL	"	"	"	"

*RB—Right breast. LL—Left leg, etc.
†Controls in 10 additional birds are not included in table.

[3] Fraenkel, E. M., and Mawson, C. A., *Nature*, 1937, **139**, 282.

possibly due to denaturing the protein. The whole powder, used as a control, was very active; birds had to be sacrificed 12 days after injection. We then believed that the active fraction was not to be found among the lipids; that it was water soluble and very likely protein in nature.

In view of the recent report of Jobling and Sproul,[2] we repeated our experiments with a portion of the powder previously used. It was kept at about 5°C. for 11 months in a sealed but not evacuated tube. Pentane was used for extraction in one series of experiments; a mixture of equal volumes of chloroform and pentane in another. In each case 0.5 gm. powder was extracted 4 times with 100 volumes of solvent, taking measures that would tend to avoid denaturing the protein. The extractions were made with anhydrous solvents for one-half hour each *in vacuo* at 0°-5°C., shaking every 5 minutes. The powder was centrifuged off each time and after the last extraction dried in a vacuum desiccator. The 4 pentane extracts were combined, filtered clear, the pentane distilled off *in vacuo* and the fat taken up in one cc. of sterile olive oil. The 4 chloroform-pentane extracts were similarly treated. In other experiments the tumor powder fat was partly emulsified with an aqueous solution of egg albumen, gelatin or chicken muscle powder.

The extracts from 200 to 400 mg. of powder were injected into muscles of birds. Daily observations showed the injected fat could no longer be palpated after 6 days. Autopsy 3 months later confirmed these negative results. The extracted powders, rubbed in sterile salt solution, were injected into various muscles of birds in doses equivalent to 75, 25, 15, 5, 3 and one mg. With every dose, the residue from both extracts produced definitely palpable masses within a week. The size of the tumors was proportional to the dose administered. Birds injected with the residue of the pentane extract developed larger tumors more rapidly than those in which the chloroform-pentane residue was used. With pentane residue, the tumors were so large and hemorrhagic that these birds had to be sacrificed from 17 to 25 days after injection.

Our observations of last year are thus confirmed and extended. Typical Rous chicken sarcomas have been produced with as little as one mg. of pentane or chloroform-pentane extracted chicken tumor No. 1 powder. Tumors may probably be produced with considerably smaller amounts of these residues.

Additional indication that the activity lies in the protein fraction was obtained by heating the tumor powder, one portion dry and another with 50 volumes of water, for 30 minutes in evacuated flasks in a bath kept at 60°C. Both flasks were evacuated and then

filled with nitrogen 4 times and finally evacuated before heating. The dry heated powder when rubbed up with saline and injected into the breast and leg muscles in doses of 40 and 10 mg. respectively in each of 2 chicks produced 4 tumors, whereas the powder subjected to the same conditions of heating in the presence of water, when similarly injected in 2 birds gave negative results. In other words, when the protein was coagulated the activity was lost while when denaturing of the protein was limited by dry heat, activity was retained.

This preliminary work would seem to indicate that the active agent is water soluble and probably resides in the protein fraction.

9412 P

Effects of Androgenic Substances in the Female Rat.*

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Butenandt[1] and others (see Koch[2]) have reported that some of the unsaturated androgens, notably androstene-dione and dehydroandrosterone, will induce estrus in the normal infantile rat. Browman[3] reported the cessation of estrous cycles in adult normal rats injected with androsterone and testosterone. In spayed rats Nelson and Gallagher[4] found that androstane-diol and androstene-dione failed to produce vaginal cornification, but did induce uterine and mammary hypertrophy and prevented castration changes in the hypophysis.

The administration of testosterone† (0.5 and 1.0 mg. daily), androsterone (1.5 mg. daily), dehydroandrosterone (1.0 mg. daily) and androstane-dione (1.0 mg. daily) to groups of 2 to 4 spayed female rats for 30 days failed in every case to produce vaginal cornification (as determined by daily smears and histological sec-

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1 Butenandt, A., *Die Naturwiss.*, 1936, **24**, 15.

2 Koch, F. C., *Physiol. Rev.*, 1937, **17**, 153.

3 Browman, L., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 205.

4 Nelson, W. O., and Gallagher, T. F., *Science*, 1936, **84**, 230.

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