TABLE I.
Studies on Sodium Loss.

March, 1935	Temp. C	Serum Na m. eq.	Serum Cl m. eq.	Serum Solids gm./1 cc.	Blood Urea mg./100 cc.	Fluid withdrawn from Peritoneal Cavity: Na m. eq. per kilo Body Wt.	Fluid withdrawn from Peritoneal Cavity: Cl m. eq. per kilo Body Wt.
11		137.7	109.2	—	8.1	—	—
12		141.8	111.4	.0738	13.5	4.0	4.7
13	38.6	137.5	100.2	.0801	9.6	5.0	5.9
14	38.2	125.8	88.4	.0935	28.7	2.0	2.4
15	38.2	113.5	82.8	.0910	51.0	2.0	2.2
16	38.1	105.2	74.2	.0916	72.0	2.4	2.7
					Total	15.4	17.9

Weight, March 11—14.1 Kg.
March 16—11.8 ''
Urine, 24 hr. sample, March 15
Total Creatinine 699 mg.
Preformed Creatinine 219 ''
Creatin 480 ''

Summary and Conclusion. The effects of sodium deprivation were observed in 5 dogs over periods varying from 4 to 7 days. Sodium loss produces a condition similar to that of adrenal insufficiency, namely, increased concentration of the blood and a retention of blood urea, loss of serum chlorides and a creatinuria. Sodium loss, however, does not reproduce exactly the same picture as insufficiency of the cortex of the adrenal gland. The present experiments disclose a rise in blood urea concomitant with the depletion of the sodium reserves. In adrenal insufficiency, on the other hand, the increase of blood urea may precede the loss of sodium.[6] Furthermore, in adrenal insufficiency, the animals usually succumb with a higher level of serum sodium.

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Antigenic Individuality of Certain Papilloma Viruses.

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Papillomas of the skin and mucous membranes are frequent in man and many of the lower animals. That certain of these

[6] Loeb, R. F., Atchley, D. W., Stahl, J., *J. Am. Med. Assn.*, 1935, **104**, 2149.

growths are caused by filterable viruses has been demonstrated, notably verruca vulgaris in man,[1] oral papillomatosis of dogs,[2] cattle warts[3] and the papillomatosis of American cottontail rabbits.[4] All these growths are readily induced in susceptible hosts by inoculation with the respective viruses. In general, animals of other species than that furnishing the virus prove resistant on inoculation, though some problematic transfers have been reported. The virus of the Shope papilloma of cottontails is undoubtedly effective in other kinds of rabbits,[5] but guinea pigs, dogs, cats, rats and mice have proved insusceptible. Despite the limitations thus illustrated in the pathogenic range of the viruses, the strikingly similar characters of the growth produced by those deriving from various animals suggest that they may be related, like the viruses causing the pox diseases and the swine and human influenza viruses. We have tested this possibility immunologically, seeking for evidence of cross neutralization between the virus of rabbit papillomatosis and the sera of dogs, rabbits, cattle, and men bearing virus-induced papillomas or recently recovered from them. It is known that these growths induce neutralizing antibodies for the homologous agents with fair regularity. It was impracticable for us to test most of the sera against the homologous agents; and hence we have assumed that they were actively neutralizing.

Serum was procured from a cottontail rabbit trapped in Texas and carrying many cutaneous papillomas, as also from 2 cows of the same Texas neighborhood,—one a yearling heifer bearing characteristic papillomas of the kind due to virus, the other a cow about 2 years old in which similar growths had retrogressed about 4 months previously. As controls, specimens of cattle serum were available from 2 animals in New Jersey, both less than 2 years old, of a herd in which papillomas had never occurred. Two mixtures were made in different proportions of each of the various sera with a freshly prepared Berkefeld V filtrate of an extract of glycerolated warts from a Kansas cottontail rabbit. After incubation for 3 hours at 37° the mixtures, with appropriate con-

1 Ciuffo, G., *Gior. ital. d. mal. vener.*, 1907, **48**, 12.

2 Findlay, G. M., in *A System of Bacteriology in Relation to Medicine*, Great Britain Medical Research Council, London, His Majesty's Stationery Office, 1930, **7**, 252.

3 Magalhaes, O., *Brazil-med.*, 1920, **34**, 430; Creech, G. T., *J. Agric. Research*, 1929, **39**, 723.

4 Shope, R. E., *J. Exp. Med.*, 1933, **58**, 607.

5 Beard, J. W., and Rous, Peyton, PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 191.

trols of Tyrode and virus, were rubbed into small scarified squares on the skin of 3 domestic rabbits, and the squares were kept individually covered until healing had taken place. None of the cow sera had any effect on the virus, the papillomas appearing and growing as well where mixtures containing such sera had been introduced as where the virus-Tyrode mixtures had been inoculated. The serum of the cottontail rabbit on the other hand completely neutralized the virus.

Serum specimens from 2 puppies recently recovered from oral papillomatosis were generously given us by Dr. W. A. DeMonbreun and Dr. E. W. Goodpasture, and specimens were taken from 4 normal puppies, from 2 normal domestic rabbits and 2 carrying large, virus-induced papillomas. Mixtures were made of all with an extract of glycerolated cottontail papilloma which had been cleared by centrifugation; and after incubation, these were inoculated with the appropriate virus-Tyrode control into 8 domestic rabbits in the same way as in the previous experiment. Vigorous growths resulted from every mixture save those containing serum from one or the other of the papillomatous rabbits. The virus had been wholly neutralized by these.

Three persons working in our laboratory and frequently handling rabbit papillomas without the protection of gloves were noted to have multiple small cutaneous papillomas, to all appearance ordinary small warts, on the palms, and in one instance on both ankles as well. It seemed worth while to ascertain whether the blood of these individuals was capable of neutralizing the rabbit virus. Accordingly serum specimens were procured, as also from 2 other workers free from warts and never in contact with the rabbit material. Mixtures were made with rabbit virus and tested as in the experiments already described, by inoculation into 3 rabbits. None of the sera had any neutralizing effect on the virus.

Findlay[2] has reported that human serum which neutralizes the virus of human warts has no action on that causing oral papillomas in dogs and *vice versa*. His results and ours would appear to demonstrate that there is no antigenic relationship between the viruses responsible for the papillomas of man, dogs and rabbits, nor between those causing papillomas in cattle and rabbits.