

take place spontaneously in acid or very strongly alkaline solution, the present series of experiments does not indicate. If fatty acids undergo oxidation in human serum at acid reaction, as it seems likely that they do in alkaline rabbit serum in the presence of ferri-cyanide (Wright and Arthur⁶), they must be dialyzable.

Summary. An O₂ uptake is observed when the pH of normal human blood serum or its dialysate is lowered. Heated dialysate shows the same O₂ uptake as unheated dialysate. All of the material oxidized at acid reaction is dialyzable.

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Survival Time of Pregnant and Nonpregnant Rats after Bilateral Nephrectomy.*

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With total anuria, the duration of life is dependent upon the rate of development of a toxic factor which, in animals otherwise normal, has been shown by Hoff, Smith and Winkler¹ to be potassium. The cause of death after bilateral nephrectomy is not the same as the cause of death in uremia of nephritic origin, for in the latter state, in the absence of total anuria, the terminal potassium ion concentration does not reach fatal levels.

Bergman and Drury,² studying the survival time of normal fasting rats after bilateral nephrectomy state: "The low variability in the survival time of the standard nephrectomized rat under any well defined set of conditions makes it easy to determine whether any given factor or procedure is harmful or beneficial in renal insufficiency." They show that the survival time is shortened by such extraneous procedures as the administration of water or protein. In such experiments death is due to the accumulation of potassium, and the toxicity of meat was shown to be due to its high potassium content.^{1, 2, 3}

Any factor which increases the rate of accumulation of potassium or causes the production of some other more toxic product which

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¹ Hoff, Hebbel E., Smith, Paul K., and Winkler, Alexander W., *J. Clin. Invest.*, 1941, **20**, 607.

² Bergman, Hyman C., and Drury, D. R., *J. Clin. Invest.*, 1939, **18**, 777.

³ Addis, T., and Lew, W., *J. Clin. Invest.*, 1939, **18**, 773.

would normally be excreted into the urine might be expected to shorten the life of nephrectomized animals. The present work was undertaken to investigate the possibility that pregnancy constitutes such a factor. A shortening of survival time would offer support and elucidation to the commonly expressed view that impaired kidneys cannot carry the extra "load" imposed by pregnancy.

Procedure. Twenty-nine normal nonpregnant female rats weighing between 130 and 181 g were subjected to a fast of 24 hours, as recommended by Bergman and Drury, and both kidneys were removed through small lumbar incisions under ether anesthesia. No further food or water was given. After nephrectomy, each animal was placed in a suspended cage connected with a lever which recorded any movements on a continuous kymographic record. During the

TABLE I.
Survival Time of Nephrectomized Rats.

Group I			Group II		
Stage of pregnancy, days	Pregnant N-19 Survival time, hr	Nonpregnant N-19 Survival time, hr	Stage of pregnancy, days	Pregnant N-20 Survival time, hr	Nonpregnant N-10 Survival time, hr
14	34	86	14	50.50	78.50
"	51.5	49	"	50.00	51.75
"	71.5	40	"	62.50	74.00
"	72	36	"	84.00	99.00
"	42.5	60	"	81.25	80.00
"	72	70	"	108.00	71.50
"	30	70	"	67.00	61.00
"	54	76	15	60.00	67.75
"	48	72	"	57.25	103.25
"	36	75.5	"	69.00	73.50
"	54	60	"	70.50	
"	41.5	45	"	80.00	
"	55	62	"	66.00	
"	87	77	17	62.00	
"	64	55	18	72.00	
"	33	69	"	65.50	
"	72	58	"	72.00	
"	72	54	19	67.00	
"	76	78	"	69.00	
			"	57.00	
Median	55.00	62.00		67.00	73.75
Mean	56.10	62.76		68.50	76.00
σ dist.	16.25	13.86		12.71	16.37
S.E. mean	3.72	3.17		2.84	5.18
Mn. diff.		6.66			7.5
σ diff.		5.03			6.2
Critical ratio:					
Mn. diff.					
σ diff.		1.32			1.2

night, or while not under direct observation, the rat received a mild faradic stimulus at intervals of 15 minutes; so that if it was alive the resultant body movements were recorded. In this way the time of death could be ascertained to within 15 minutes.

Thirty-nine rats of the same age and weight were subjected to the identical procedure during pregnancy. Of these, 32 were at the 14th or 15th day of pregnancy when nephrectomized and 7 at the 17th, 18th and 19th days.

Observations. The results of the experiment are presented in Table I. It will be noted that the data are subdivided into two groups. After the completion of the work on Group I minor modifications in technic were introduced to facilitate the collection of further data. Group II experiments were then performed. The analysis presented shows that although this technical change prolonged the survival time, it did not produce a significant difference between the observations on pregnant and nonpregnant animals.

The average survival times for the nonpregnant control rats were: Group I, 62.76 ± 3.17 ; Group II, 76.00 ± 5.18 hours, and for the pregnant rats: Group I, 56.1 ± 3.72 ; Group II, 68.50 ± 2.84 hours. The median values are shown on the table. The standard errors of the differences between the two means were 5.03 and 6.20 respectively. Since the observed differences of 6.66 and 7.50 hours between the means are scarcely greater than the standard errors of the differences, these differences may well be chance occurrences quite independent of pregnancy. It will be noted by way of comparison that the administration of water² results in a shortening of survival time from 81 to 67 hours.

Differences between the survival times of the animals at different stages of pregnancy were not evident in this experiment. None of the animals here reported went into labor.

There were no observed differences in the clinical behavior of the pregnant and nonpregnant rats after bilateral nephrectomy. Autopsies led us to believe that the fetuses survived as long as the mother, although it was noted that fetal body growth had apparently ceased soon after the maternal kidneys were removed.

Conclusions. In this series we find no statistically significant difference between survival time of pregnant and nonpregnant rats after bilateral nephrectomy in these groups of animals. These observations, therefore, lend no support to the concept that pregnancy is a burden on the kidneys. Even if the observed differences of survival time of 7 hours are in fact not due to chance, their magnitude is very small.