

TABLE I. Frequency Analysis of the Electroencephalograms With Various Gas Tensions.

Conditions	Frequencies in %			
	F waves, 12-25/sec	I waves, 8-12/sec	S ₁ waves, 4-8/sec	S ₂ waves, 0-4/sec
Normal air without valve	26	20	41	10
" " with "	35	19	35	8
100% O ₂	35	24	34	8
95% O ₂ and 5% CO ₂	43	19	29	4
93% " 7%	30	18	43	5
90% " 10%	28	10	49	12

by introducing changes in carbon dioxide tension. If the apparent change in frequency introduced with the 5% carbon dioxide is significant, a safe margin is, nevertheless, present in the use of a normal air supply which contains about a 0.04% concentration of that gas. It must also be recalled that the amount of oxygen administered with the carbon dioxide is many times that found in normal air. Alterations in gaseous content due to air supply and equipment would, therefore, be slight in contrast to proportions used in this experiment, and cortical effects

would be of minimal values.

Summary. In cats curarized with dihydro-beta erythroidin hydrobromide and under artificial respiration, changing from air to mixtures of 3 to 10% CO₂ in oxygen caused no significant change in the percentages of fast, intermediate and slow waves in the electroencephalographic spectrum. It is concluded that artificial respiration as used in experiments with curarizing drugs does not distort the frequency spectrum.

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Blood Sugar Levels and Cataract in Alloxan-Treated, Galactose-Fed and Xylose-Fed Weanling Rats.* (19094)

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Cataract has been produced experimentally in the rat by a number of means. Among them are riboflavin deficiency(1); tryptophan deficiency(2); the feeding of lactose(3), galactose(4), or xylose(5); and treatment with alloxan(6). The cataract of riboflavin deficiency may be distinguished with the aid of the ophthalmoscope from that seen in tryptophan deficiency, and each of these may be distinguished from the cataract re-

sulting from the feeding of lactose, galactose, or xylose. The cataracts resulting from lactose-, galactose-, or xylose-feeding, however, are ophthalmoscopically indistinguishable. Darby and Day(5) found that those carbohydrates were cataractogenic which elevated

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TABLE I. Average Time of Appearance of Cataract, Incidence of Cataract, and Average Blood Sugar Levels in Groups of Weanling Rats.

Group	No. of rats	Appearance of cataracts				Blood sugar	
		Incipient cataract		Gross cataract		No. of determinations	Level, mg/100 ml
		Avg time, days	Incidence, %	Avg time, days	Incidence, %		
I. Control	10	—	0	—	0	70	117.8 ± .4*
II. Galactose-fed	10	4	100	20	90	80	244.5 ± 3.9
III. Xylose-fed	9	3	100	7.5	90	77	301 ± 32.1
IV. Alloxan diabetics (150 mg/kg)†	9	17.6	77.8	—	0	82	292 ± 88
V. Alloxan diabetics (200-250 mg/kg)†	7	9.6	100	56	30	43	522.2 ± 82.9

* Stand. error of the mean. † Size of single injected dose of alloxan.

the blood sugar levels of weanling rats when fed as 35% of the diet; carbohydrates which did not raise the blood sugar level were not cataractogenic. It was not clear from that study, however, whether it was the blood level of sugar or the *specific configuration* of the sugar concerned which was responsible for the cataract production.

By the use of rats made diabetic with alloxan it has been possible to compare the cataractogenic action of a high level of blood glucose with similar levels of blood sugar in galactose- and xylose-fed littermates.

Experimental. Preliminary experiments indicated that diabetes could be produced in the weanling rat by a single injected dose of alloxan of from 150 to 250 mg per kilo of body weight. Weanling albino rats of both sexes were divided into groups of 10 or more animals each, matched as to weight, sex, and litter. They were given diets having the following percentage composition: Labco casein 18, salt mixture(7) 2, cod liver oil 2, vegetable shortening 6, carbohydrate 72, and a suitable vitamin mixture(8). The control group and the alloxan-treated groups received the above diet with D-glucose as the only carbohydrate. Other groups were given similar diets containing 35% of D-galactose and D-xylose respectively, replacing a like amount of D-glucose; these groups are hereafter referred to as galactose-fed and xylose-fed. The eyes of each animal were examined

with an ophthalmoscope daily during the early part of the experiment and at weekly intervals thereafter. The pupils were dilated with atropine sulfate prior to such examinations. Blood sugar analyses were made at weekly intervals or oftener.

Results and discussion. Table I gives a summary of the important data. The term "incipient cataract" refers to the first evidence of lens opacity as seen with the ophthalmoscope. This was usually evident by the appearance of bubbles at the periphery of the lens. The term "gross cataract" refers to the stage of opacity in which the eye appeared milky; an ophthalmoscope was not required to recognize this condition.

The untreated controls receiving D-glucose showed no cataract and their blood sugar levels were in the normal range. Rats receiving either galactose or xylose all developed cataract, and blood sugar levels were greatly elevated. Most of the alloxan-treated rats developed some lens opacities, although in only a few of them did the condition proceed to the condition referred to as gross cataract. The xylose-fed rats showed lens opacities earliest, yet the group of rats given the larger dose of alloxan (200-250 mg/kg) exhibited the highest average blood sugar level. It thus appears evident that there was no simple relation between the average blood sugar level and the rapidity with which cataract developed. If it is assumed that the cataract resulted from elevated blood sugar levels, then it is evident that a sufficiently high level of glucose can be thus injurious to lens tissue. It would appear, however, that either

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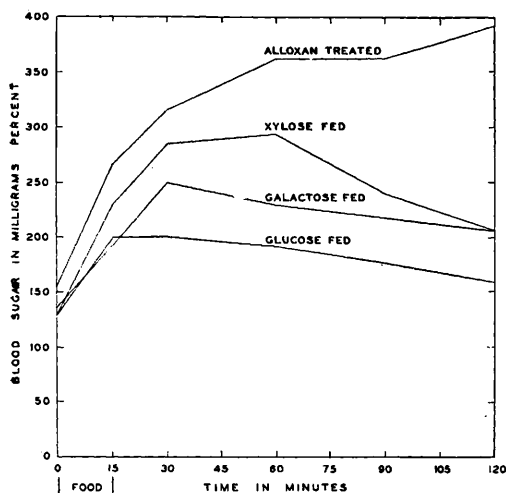


FIG. 1. Tolerance curves of individual rats from each group. Food was withheld for 12 hr. Blood was drawn (zero time), the animals were allowed access to their respective diets for 15 min, the food was again withheld, and blood samples were taken for analysis as shown.

galactose or xylose is injurious to the lens at a lower blood level.

Fig. 1 gives blood sugar tolerance curves for typical rats from each group.

Summary. Cataract was produced experimentally in weanling littermate rats by (1) alloxan treatment, (2) galactose feeding, and (3) xylose feeding. All groups showed greatly elevated blood sugar levels as compared with untreated controls receiving glucose. Cataract was exhibited by all of the xylose- and galactose-fed rats, and by nearly all of the alloxan-treated rats. However, the development of cataract was much slower in the alloxan-treated than in the other groups. It is concluded that not only the level of blood sugar, but also the specific configuration of the sugar concerned is a factor in its cataractogenic action.

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Some Pharmacological Properties of Three New Mercurial Diuretics.* (19095)

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A preliminary appraisal of a new series of mercurial compounds with diuretic activity showed many in the group to have greater potency than diuretics currently employed (1). From stability data and other considerations, 3 of the agents were selected for further investigation. They are 3-chloromercuri-2-methoxypropylurea (1347Ex), 3-carboxymethyl-mercaptomercuri-2-methoxypropylurea (1353Ex), and 3-(α -carboxyethylmercaptomercuri)-2-methoxypropylurea (1431-Ex). The following data compare some of the pharmacological properties of these mercurials with meralluride (Mercurhydrin).

Methods. Diuretic activity and sodium excretion were studied in unanesthetized female

dogs or in dogs lightly anesthetized with sodium pentobarbital (25 mg/kg, I.V.). The animals had not had access to food for 16-18 hours and water for 3-4 hours prior to the experiment. Urine, collected at 20 minute intervals from a retention catheter, was removed from the bladder as completely as possible by introducing air and using compression. Three or 4 control collections were made before the drugs were administered. Meralluride at several dosage levels was used as a standard, and the dosage of the other compounds was adjusted to give approximately equivalent responses. A Perkin-Elmer flame photometer was used for sodium analyses. Electrocardiograms, in dogs anesthetized with 30 mg per kg of pentobarbital sodium, recorded from lead II, were used to investigate the acute cardiac effects. After a control record, amounts of the 3 new mer-

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