

effect of the combination of gases is more prolonged than is observed in experiments in which each of the gases alone was used.

Summary. Experiments on unanesthetized rabbits show that although the inhalation of 5.4% CO₂ has practically no effect on the blood sugar when used alone, it greatly increases the effect of the inhalation of 7% O₂ on the blood sugar.

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Effect of Season (Temperature) on Blood Lipids.*

O. B. HOUCHIN AND C. W. TURNER.

From the Department of Dairy Husbandry, University of Missouri, Columbia, Mo.

In a previous paper¹ it was shown that an AP extract injected into New Zealand White female rabbits caused a significant depression of the plasma fat as determined by the Allen² method. Both the normal animals and the normal preinjection samples of blood from experimental animals showed rather large variations in plasma fat. Casual observations indicated that the lipid changes might be due to temperature changes accompanying the various seasons of the year. Further examination of our data indicated a rather definite drop in the plasma fat values during the increasingly cool weather in the fall, whereas the highest values appeared to be obtained during the hottest weather of the summer. On the other hand, previous studies on the seasonal variation in the blood lipids of the cow² and rabbit³ did not indicate significant trends. The animals included in these studies were probably under fairly uniform temperature control in northern summer climate and housed during winter time. Recent study with the guinea pig⁴ indicates an increased use of fat for maintenance under cold environment which condition might be expected to reduce the level of the blood lipids. Yet in the presence of an increased demand for fat, it would be possible for the blood lipids to remain high if the underlying mechanism regulating lipid metabolism was effective.

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¹ Houchin, O. B., and Turner, C. W., *Endocrinology*, 1939, **24**, 638.

² Allen, B. N., *Minn. Agr. Exp. Sta. Bul.*, No. 130, 1938.

³ Boyd, E. M., *Can. J. Res.*, 1938, **16**, 31.

⁴ Kayser, C., *Compt. Rend. Soc. de biol.*, 1939, **126**, 701.

The object of this paper is to present a tabulation of our plasma lipid data according to season, in order to show the influence of temperature change with season upon blood lipids.

In this study as in the previous study, only mature New Zealand White female rabbits were used. Samples of ear blood were centrifuged and the plasma fat determined by Allen's method. During part of the experiment, the animals were kept in a temperature regulated room at between 75° and 80° F. At other times (as indicated) they were housed in outdoor cages subject to the environmental temperature.

When the rabbits were kept in a temperature regulated room at about 80° F the average plasma fat remained rather constant, but as the temperature both indoors and outdoors rose an increase in plasma fat was noted (Table I). As the weather became cooler, especially at night, the average plasma fat fell precipitously, reaching a minimum during the period of freezing temperatures. During the spring, the plasma fat again increased, although not markedly until both the day and night temperatures remained high.

These data are taken to indicate that there is a direct relation between environmental temperature and plasma fat in the rabbit. With high temperatures the blood lipids increase to extraordinarily high levels whereas in a cold environment (freezing), the lipids fall to low levels. On a functional basis it might be thought that the

TABLE I.
Seasonal Variation in Plasma Blood Fat of Rabbit.

Month	Environ- ment	No. of Analyses	Plasma Blood Fat			Remarks on Temperature or weather
			Avg mg%	Range		
				High mg%	Low mg%	
March	Indoors	2	220	240	200	Constant 75°-80° F.
April	"	15	285	410	190	" "
May	"	5	388	540	250	Temp. frequently above 90° F
June	Outdoors	14	384	830	200	Hot, cages not shaded
July	"	9	314	450	260	Very hot, cages shaded
Late August- Early Sept. }	"	5	333	390	285	Warm days, cool nights
October	"	11	208	330	110	Nights cool
November	"	4	109	140	85	Frost at night
December	"	7	74	105	45	Cold—freezing temp. at night
January	"	8	43	70	25	Cold
February	"	14	36	55	22	Cold—temp. to 0° F
March	"	5	52	70	25	Warmer with great variation
April	"	5	71	170	40	Cool at night, changeable
May, early	"	7	71	140	40	" " " "
May, later	"	11	205	400	100	Becoming very warm
June	"	10	250	420	140	Warm with some hot days

explanation of these observations rests upon the increased utilization of blood fat as a source of energy although it is not an uncommon physiological phenomena for increased utilization of a blood constituent to stimulate an increased rate of mobilization.

It is possible that environmental temperature may influence the rate of secretion (or level in pituitary) of the fat metabolism hormone and in turn influence the plasma fat level. It is planned to investigate this possibility.

From these data it is obvious that animals to be used for the assay of the fat metabolism hormone should be kept in a temperature-regulated room to avoid fluctuations in plasma lipid due to temperature.

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Lactogen Content of Pituitary of Pregnant and Lactating Rabbits and Guinea Pigs.*

SKAT HOLST AND C. W. TURNER.

From the Department of Dairy Husbandry, Missouri Agricultural Experiment Station, Columbia.†

Continuing the study of the lactogen content of the pituitary, the present paper presents our observations concerning the amount of lactogenic hormone in the anterior pituitary glands (AP) of female New Zealand White rabbits and guinea pigs in stages of pregnancy and lactation. The pituitaries, thyroids, adrenals and ovaries of normal animals sacrificed at various stages of pregnancy and lactation were removed and weighed. Each group of pituitaries was kept frozen until assayed with 20 pigeons by the Reece-Turner¹ method. Both pituitary gland weight and the assays are based upon the whole gland rather than the anterior lobe.

The pituitaries of the 10- and 20-day pregnant rabbits showed no increase of lactogen over the pituitaries from non-pregnant mature female rabbits whereas the pituitaries from the animals sacrificed 28 days after conception or just before parturition showed a slight increase from about 11 to 14 B.U. per pituitary (Table I).

*This study has been aided in part by a grant from the Committee on Research in Endocrinology of the National Research Council.

† Journal Series No. 628.

¹ Reece, R. P., and Turner, C. W., *Mo. Agr. Exp. Sta. Res. Bul.*, 266, 1937.