Table. 1. Percentage of Larval Surface Darkened

Treatment	Replicate 1	2	3	4
Methanol	35	40		
Ethanol	50	50		
n-Propanol	90	65	60	65
n-Butanol	75	65	60	60
n-Pentanol	75	90	80	65
n-Hexanol	25	15		
n-Heptanol	5	0		
n-Octanol	5	0		
n-Nonanol	0	0		
n-Decanol	20	5		
n-Undecanol	0	0		
n-Dodecanol	0	0		

Propyl, butyl and amyl alcohols were the most active and the first signs of darkening appeared within 30 min of injection : there was no contraction comparable with that of natural pupation. Fraenkel and Rudall found that these three alcohols, during immersion, darkened the hypodermis and other tissues of *Sarcophaga*, but not the cuticle and that the reverse of this occurred with methanol. The present *Calliphora* larvæ were not examined internally, but those injected with methanol outwardly resembled those treated with propanol, etc., and, more important, none of the treated larvæ looked different from those injected with a solvent-free ecdysone extract. Some of the active alcohols listed in Table 1 may be used in the extraction of ecdysone, but it is essential that they are completely removed before the preparation is assayed by the *Calliphora* method. It should also be noted that other solvents (acetone 25 per cent ; xylene 30 per cent) have darkening activity, but when 19 esters of propyl, butyl and amyl alcohols were tested in the foregoing manner, all were shown to be inactive.

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PHYSIOLOGY

Influence of Sexual Development on the Uptake of Oxygen and Production of Carbon Dioxide in the Aorta of Male Rats

Gonadal regulation of aerobic and anaerobic metabolism in arterial vessels has already been reported[1,2]. Castration increases the uptake of oxygen both in male and in female rats[3], and sex hormones which normally depress the oxidative enzymes of the vessels[4] return these high values to normal. Furthermore, cyclic changes in the uptake of oxygen of the aorta have also been described in female rats. The oxidative activity was lower during œstrus and higher during dioestrus[5]; these findings may be correlated with opposite circulating levels of sex hormones.

This communication describes the aerobic and anaerobic metabolisms in the aorta of male rats, starting before puberty up to late adulthood.

Male Long–Evans rats were given a standard pellet diet and water *ad lib*. Light pattern, temperature and feeding schedules were controlled and kept constant. The determinations were carried out during the morning. The animals were killed by decapitation at 12, 30, 60, 90, 180 and 300 days of age. The aorta was excised and the adventitia rapidly stripped, gently blotted on filter paper, weighed in a torsion balance, rapidly transferred to Warburg vessels and placed in the bath within 5–10 min after death of the animals. Uptake of oxygen was determined in Warburg vessels of 13–15 ml. capacity; Krebs–Ringer phosphate solution without subtrate (*p*H 7·4) was used[6]; the gas phase was air and the temperature 37° C; 0·2 ml. of saturated sodium hydroxide solution was placed in the central well. Carbon dioxide production was determined in a Krebs–Ringer bicarbonate medium (*p*H 7·4) in 5 per cent carbon dioxide, 95 per cent nitrogen. The manometers were gassed for 15 min. Equilibration was performed for 15 min; the observation period took 60 min. Results were expressed as µl. gas/mg wet tissue/h (Qo_2 and Qco_2) and have been compared with the Student's *t* test according to Fisher and Yates[7]. Other organs examined in these animals are reported elsewhere[8].

Table 1. Oxygen Uptake (Qo_2) and Carbon Dioxide Production (Qco_2) in Aorta of Male Rats at Different Ages

Age*	Body-wt. (g)	Qo_2 (µl. O_2/mg wet tissue/h)	Qco_2 (µl. CO_2/mg wet tissue/h)
12 days	26 ± 1†	1·59 ± 0·23 (< 0·01)‡	1·26 ± 0·10 (< 0·01(
1 month	99 ± 2	0·74 ± 0·03	0·68 ± 0·10
2 months	247 ± 8	0·50 ± 0·07	0·64 ± 0·05
3 months	340 ± 12	0·44 ± 0·06	0·86 ± 0·07 (< 0·05)
6 months	398 ± 13	0·38 ± 0·05	0·61 ± 0·06
10 months	564 ± 24	0·25 ± 0·02 (< 0·01)	0·34 ± 0·04 (< 0·01)

* Nine rats per group.
† Mean ± *S.E.*
‡ Figures in parentheses are the *P* values for differences between adult (2-month-old) rats and rats of other ages.

As shown on Table 1, the uptake of oxygen and production of carbon dioxide is higher during early life and starts to decrease during the time of sexual maturation (in rats of this strain 50–60 days of age); in 10-month old rats it reached a value which was one-sixth that of those at 12 days of age.

These results confirm previous work[3,4] in which evidence of the regulatory influence of the sex hormones on the respiratory rate of aorta was reported.

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An Electrical Correlate to the Process of Learning. Experiments in *Blatta orientalis*

This communication deals with the question of differences between the electrical reaction of the nervous system of normal cockroaches compared with cockroaches forced to learn a new motor performance.

The cockroach normally holds one antenna with the opposite fore-leg during the process of cleaning. From the first or second day after amputation of both fore-legs, the cockroach attempts to hold the antenna with one of the middle legs; the insect is then unable to stand on the remaining three legs. Later on, about the fourth or the fifth day the operated insect learns to use three legs as a tripod which sustains the body, and usually at the end of the first week it holds the antenna with one of the middle legs without losing its balance. Indeed, this complex motor performance may be established, though only exceptionally, within the first or second day after opera-