Table 2. COMPARATIVE DATA ON CYTOCHROME OXIDASE ACTIVITY IN ENZYME PREPARATIONS FROM *Ox psoas major* AND *Ox sternocephalicus* MUSCLES

Source of enzyme preparation	Cytochrome oxidase* QO_2 mean and S.E.	Mgm. dry fat-free solids/ml. mean and S.E.	Calculated oxygen uptake on whole-tissue basis (μ l./gm./hr.)	Ultimate pH of muscle
<i>Psoas major</i>	1,146 $\pm$ 51 (5)	37.0 $\pm$ 6.0 (5)	4,770	5.51 $\pm$ 0.04 (5)
<i>Sternocephalicus</i>	1,554 $\pm$ 222 (5)	48.6 $\pm$ 6.8 (5)	8,400	5.91 $\pm$ 0.08 (5)

* Cytochrome oxidase: QO_2 max. = μ l. oxygen/mgm. dry fat-free enzyme solids/hr. at infinite cytochrome *c* concentration. Experimental conditions of Slater (ref. 9).

intrinsic activity, were greater in the *sternocephalicus* preparations than in those from the *psoas major*. As a result the potential rate of respiration due to cytochrome oxidase in the former was found to be about twice as high as that in *psoas major*, when calculated on a whole-tissue basis. There tends to be an inverse relationship in muscle between respiratory capacity and the magnitude of the initial glycogen store^{1,8,11}. (Initial glycogen is an approximation to the *in vivo* resting value. It refers to the quantity at a hypothetical initial pH of 7.2, calculated from the pH, glycogen content and buffering power of a muscle sample.) Since the *sternocephalicus* has a markedly greater initial store of glycogen than *psoas major*³, its greater cytochrome oxidase activity is unexpected. This finding does suggest, however, that the glycogen store in a muscle such as *sternocephalicus* may serve other purposes than the production of energy by glycolysis or respiration solely from a quantitative aspect. The resistance of part of this glycogen to post-mortem glycolysis, its relative resistance to phosphorylase *b* *in vitro* and its unusual branching characteristics lead to a similar conclusion.

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Prostatic Cytochromes

THE endogenous respiration of adenomatous human prostatic tissue is known to be low¹. In the present work the respiratory activity and lactic acid production of normal rat prostate and adenomatous human prostate have been compared.

The rate of oxygen uptake of the human gland was about one-third that of the dorsolateral lobe or the ventral lobe of the rat. It was considerably increased by 10^{-3} M succinate and to a lesser extent by 10^{-3} M fructose. Except for pyruvate, which had a slight stimulatory effect on the ventral lobe, the oxygen

Table 1. EFFECT OF EXOGENOUS SUBSTRATES ON THE RATE OF OXYGEN UPTAKE OF PROSTATIC TISSUE

Substrate	Oxygen uptake μ moles/gm. dry weight/hr.		
	Tissue		
	Rat dorsolateral lobe	Rat ventral lobe	Human gland
Nil	80 $\pm$ 10 (4)	96 $\pm$ 5 (12)	33 $\pm$ 7 (8)
Succinate	82 $\pm$ 8 (3)	119 (2)	59 $\pm$ 5 (5)
Fructose	87 $\pm$ 13 (3)	101 $\pm$ 21 (3)	53 $\pm$ 5 (6)
Pyruvate	84 $\pm$ 8 (4)	126 $\pm$ 9 (8)	42 $\pm$ 6 (6)
Glucose	79 $\pm$ 7 (3)	99 $\pm$ 12 (3)	32 $\pm$ 2 (18)

Slices of tissue were incubated in a calcium-free Krebs-Ringer-phosphate buffer at pH 7.4 with 10^{-3} M substrate. Equilibrated with air at 37°.

Results are given as means $\pm$ S.E. with the number of experiments shown in parentheses.

uptake of either lobe of the rat was uninfluenced by 10^{-3} M succinate, pyruvate, glucose or fructose (Table 1).

The rate of lactic acid production, which was greater in the human gland than in either lobe of the rat prostate, was increased by added fructose. All the substrates tested on the rat glands except fructose (which was without effect) slightly raised the rate of lactic acid production. These findings might be due to qualitative or quantitative differences in the cytochrome systems of the tissues (Table 2).

Table 2. EFFECT OF EXOGENOUS SUBSTRATES ON THE RATE OF LACTIC ACID PRODUCTION OF PROSTATIC TISSUE

Substrate	Lactic acid production μ moles/gm. dry weight/hr.		
	Tissue		
	Rat dorsolateral lobe	Rat ventral lobe	Human gland
Nil	23 $\pm$ 4 (3)	17 $\pm$ 1 (5)	90 $\pm$ 19 (9)
Succinate	—	24 (2)	65 $\pm$ 14 (5)
Fructose	19 (2)	15 (2)	120 $\pm$ 10 (6)
Pyruvate	39 $\pm$ 6 (4)	27 $\pm$ 3 (6)	86 $\pm$ 25 (7)
Glucose	31 $\pm$ 3 (3)	24 $\pm$ 4 (3)	80 $\pm$ 10 (18)

Conditions were as shown in Table 1.

Homogenates in phosphate-saline buffer at pH 7.4 were prepared from the glandular portions of human adenomatous prostate, and from the separated dorsolateral and ventral lobes of the rat prostate, reduced with sodium dithionite and examined by the Beck-Hartree microspectroscope. Both lobes of the rat gland showed absorption bands with maxima at 550 m μ , 562 m μ and 600 m μ , corresponding to the maxima of cytochromes *c*, *b* and *a*. The bands were also produced by the addition of succinate to cyanide-treated preparations, suggesting enzymic reduction of cytochromes. Homogenates from human glands chemically or enzymically reduced showed strong bands of cytochrome *b* and weaker bands of cytochrome *a*. Cytochrome *c* was not detected with certainty, and, if present, its concentration was considerably less than those of cytochromes *b* and *a*. The cytochrome *b* bands in all preparations disappeared on heating in a boiling water-bath for 5 min.

Fresh normal human prostates have not been available for examination, but the absence or relatively low concentration of cytochrome *c* in the human adenomatous tissue might either be related to the mechanism of adenomatous change, or an adaptive response to hypoxia in the poorly vascularized hypertrophied gland (cf. the decrease in the concentration of cytochrome *c* in diaphragm during hypoxia²).

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