ally contract in a stepwise manner that is associated with increased tone when cholecystokinin extracts are introduced. Thus, of a total of 96 trials with 45 longitudinal preparations employing concentrates assaying 0.5 to 24 units/mg (*3*), 81 comprised stepwise or ragged contractions; latent periods often preceded an effect as reported earlier (*4*). Except for relatively few cases with low dosages, histamine caused the usual sharp and rapid longitudinal contractions, but the circular sections were either contracted in a stepwise fashion or displayed increased tonic activity.

Many circular segments proved to be refractory or of a very low order of sensitivity, often requiring massive dosages of potent cholecystokinin concentrates for an effect. Such intestinal strips are greatly affected by initial handling. It should be noted that the longitudinal preparation is able to contract over a greater distance than the circular ileal sections. In the latter, the diameter of the lumen is a limiting factor.

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The Effect of Insulin on the Oxygen Consumption of Mammalian Muscle*

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The first indication that insulin can stimulate the oxidation of carbohydrate was the work of Krebs and Eggleston (*1*) in which insulin was shown to increase the O_2 consumption of pigeon breast muscle brei in the presence of phosphate, citrate, and boiled muscle juice. Shorr and Barker (*2*) repeated and extended these experiments. On the whole, the stimulation was found to be far less—approximately 25 percent; and no effect at all was observed in minced skeletal muscle of the dog, cat, and rabbit, or in diabetic or fasted muscle of the dog. Stare and Baumann (*3*) likewise reported that insulin caused a 20-percent increase in the O_2 consumption of minced pigeon breast muscle, and a 60-percent increase in the O_2 consumption of muscle from depancreatized birds. Stadie, Zapp, and Lukens (*4*) corroborated the findings of Shorr and Barker but, contrary to Stare and Baumann, did not find any stimulation when they used minced muscle from diabetic pigeons and cats. Ricketts and Stare (*5*), however, reported that insulin in some cases stimulated the O_2 consumption of minced human diabetic muscle. Recently Stadie (*6*) has reviewed all aspects of this controversy.

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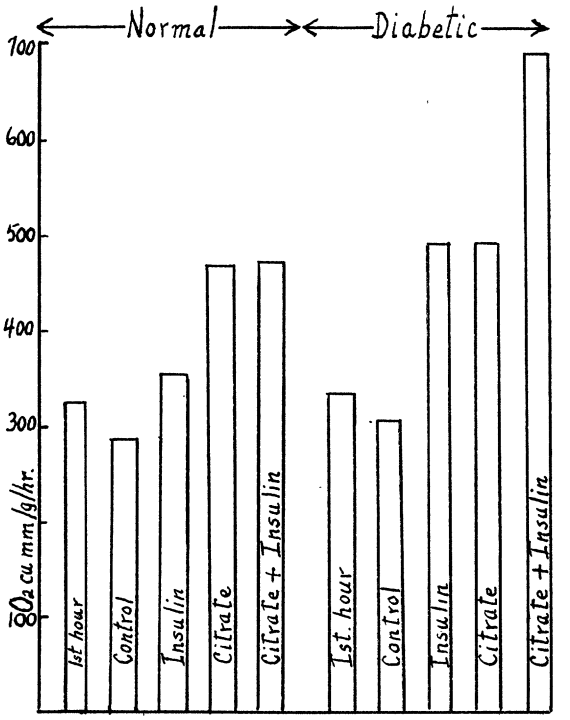

Fig. 1. Oxygen consumption in cubic millimeters per gram, per hour, in normal and diabetic muscle strips.

It is noteworthy that almost all of this work has been done with tissue minces, very little with relatively intact muscle. Moreover, Shorr and Barker (*2*) showed that the respiration of minced tissue differs greatly both quantitatively and qualitatively from that of tissue slices. Fisher, Hall, and Stern (*7*) reported that the O_2 consumption of intact isolated frog muscle was increased under certain conditions by insulin alone, under others when combined with citrate. More recently Villee and Hastings (*8*) have shown that pyruvate utilization and O_2 consumption are sharply reduced in diabetic rat diaphragm and that insulin when added *in vitro* remedies this condition.

Table 1. Data for normal and diabetic animals. All O_2 consumptions are in cubic millimeters per gram wet-weight, per hour.

	1st hour	Average 2nd and 3rd hours after dumping			
	All vessels	Control	Insulin	Citrate	Insulin and citrate
Normal	322 ± 6(24)	284 ± 7(27)	350 ± 5.3(21)	467 ± 7(27)	471 ± 6(23)
Diabetic	340 ± 7.3(29)	302 ± 8.5(34)	491 ± 7(28)	487 + 6.5(26)	685 ± 8.3(33)

Biopsy samples of normal and diabetic muscle were removed from rabbits under dial anesthesia. Thin strips approximately 1/16 in. thick and weighing from 0.2 to 0.4 g were separated from the biceps femoris muscle with as little fiber damage as possible. These were placed in Krebs Ringer phosphate (*9*) in the refrigerator for 1½ to 2 hr in order to insure a resting metabolic rate. Their O_2 consumption was then measured in Warburg vessels under four conditions: control of Krebs Ringer phosphate; insulin (1 IU per milliliter Ringer) (*10*); 0.01*M* sodium citrate; and insulin and citrate combined. The muscle was allowed to respire for 1 hr before and for 3 hr after dumping. To obtain diabetic muscle, rabbits were injected (*11*) with alloxan (300 mg/kg) and used after 1 wk if their blood glucose was then in excess of 300 mg percent.

The data for normal and diabetic animals are summarized in Table 1 and are shown graphically in Fig. 1. All figures are the averages of the results of 15 experiments with the standard deviation in each case appearing in brackets and the standard error quoted as the ± figure. These data indicate several things:

1) There does not seem to be any significant difference between the O_2 consumption of normal and diabetic muscle.

2) The O_2 consumption falls off slightly with time in both cases, but in neither is this fall significant.

3) The effect of insulin varies between normal and diabetic muscle. In the former there is an apparent stimulation of approximately 22 percent, which, however, is not statistically significant. In diabetic muscle, however, the O_2 consumption is increaesd by 63 percent of the control rate, which *is* significant.

4) Citrate has the same effect in both cases—a significant stimulation of the O_2 consumption of better than 60 percent of the control rate in each case.

5) Insulin in the presence of citrate has no effect on normal muscle. It appears, therefore, that in this case citrate and not insulin is the limiting factor. In diabetic muscle, however, the insulin and citrate combination increases the O_2 consumption by 127 percent of the control rate—a further increase of 66 percent over that caused by citrate alone.

The foregoing data indicate a real difference in the response of normal and diabetic muscle to insulin. The O_2 consumption of normal rabbit muscle slices is not affected by insulin. The O_2 consumption of diabetic rabbit muscle slices, on the other hand, is increased more than 60 percent by insulin, either alone or in the presence of citrate. Further investigations of this action of insulin are being carried out.

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Communications

"Myiasis" Resulting from the Use of the Aspirator Method in the Collection of Insects

During the past two summers I have served as research entomologist at the Arctic Research Laboratory, Point Barrow, Alaska. Since the insect fauna is composed largely of small-sized insects, such as gnats, midges, anthomyid flies, rove beetles, Collembola and wasps parasitic upon the flies, considerable use was made of the aspirator method of collecting. Apparently because of the use of the aspirator, a most unique case of "myiasis" (or infestation) occurred.

The aspirator, an apparatus generally designed to collect insects by suction, consists of a vial into which is fitted, by means of a stopper, two pieces of copper tubing, one of which is directed toward the insect and the other is attached to a length of rubber tubing, which during use is placed in the operator's mouth. Across the end of the copper tubing leading to the operator's mouth a fine mesh brass screen is secured. This, of course, is to prevent the aspirated insects from being drawn out of the vial and yet provide a free airway between the insect being aspirated and the operator. This apparatus has been widely used by entomologists, particularly the dipterists, for the collection of insects that are not so readily collected by other means.

Approximately 2 mo after the completion of the past summer's work at Point Barrow I became ill. During the week following the onset of illness four major groups of insects (Coleoptera, Collembola, Diptera, Hymenoptera) were passed alive from the left antrum of the sinus. These insects included three adult rove beetles (Staphylinidae), *Micralymna brevilingue* Schiødte; 13 fungus gnat larvae (Mycetophilidae), *Boletina birulai* (Lundstrom); three egg parasitic wasps (Mymaridae), *Mymar* sp.; and about 50 springtails (Collembola), *Isotoma olivacea* Tullberg. The medical aspects, as well as the specific identification of the insects involved, are to be reported by Donald G. Casterline, M.D. [*Calif. Mo. Medicine,* in press].