## 1962 #13

STUDIES ON THE RELATIONSHIP OF THE THYROID TO BLOOD SUGAR LEVELS IN THE SKATE

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Blood sugar was determined in 0.1 ml samples of whole blood by the glucose oxidase method. Forty-nine females of the little skate, <u>Raja erinacea</u>, averaged 56.25 mg% glucose with a range from 85 to 39 mg%. Values for freshly caught skates were higher at 75.28 mg% with an average drop of about 30 mg% during the first three days following capture. Recovery was usually good and in individuals starved for six weeks blood sugar levels remained relatively constant. Average values of 62.9 mg% and 48.2 mg% glucose were recorded for a few speciments of the big skate, Raja diaphanes and the barn door skate, Raja stabuliforis respectively.

Thyroidectomized skates showed an average rise in blood sugar levels of 81% over an 8 day period following operation and remained in a much healthier condition than sham-operated controls which showed a post-operative raise in blood sugar of over 100% in some cases. Intramuscular injection of 3.7 to 5 U.S.P. units of ovine TSH (NIH-TSH-S-1) produced a slight rise then an average drop of 24.3 mg% glucose in 48 hours. However, repeated injections over a five day period had no additional effect. Injections of L-thyroxin (400  $\mu$ g/kilo/day for five days) and thiourea (80 mg/kilo/day for two weeks) failed to produce any significant shift in running blood sugar levels over those of controls. Although histological studies may yield further information of endogenous activity it appears that the thyroid-pituitary axis of the skate has little direct effect on carbohydrate metabolism. This is in general agreemtn with the work of Matty (1954) and Olivereau (1954) on the dogfish.

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## 1962 #14

## THE ELECTRICAL CHARACTERISTICS OF THE DOGFISH STOMACH

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The absence of a transmucosal potential difference across the isolated dogfish gastric mucosa provided a unique opportunity to evaluate the interdependence of active transport of  $H^+$  and  $Cl^-$ . Augmentation of  $H^+$  secretion by carbachol shifted the potential difference from -1.2 to -3.0 mV (mucosal surface considered zero) and the resistance from 303 to 236 ohm.cm<sup>-2</sup>. After  $H^+$  inhibition by SCN, these values changed to +1.9 mV and 260 ohm.cm<sup>-2</sup>.

An apparent driving potential for  $H^{\dagger}$  transport of more than 75 mV was indicated by continued  $H^{\dagger}$  secretion against an adverse potential difference of -75 mV. The Cl<sup>-</sup> secretory potential (assuming a reversible process) calculated from the Cl<sup>-</sup> flux ratio, after correction for exchange diffusion, is about 40 mV.

Given these values and the very small changes in the transmucosal potential differences after carbachol and SCN, the active transport of  $H^+$  and  $Cl^-$  must be tightly coupled and they are not appreciably independent as might be predicted by a hypothesis of two separate transport mechanisms.