in part for this finding, if small quantities of pituitary tissue were present in the meal.

The presence in the teleost of a pituitary component capable of producing adrenal cortical stimulation in the mammal suggests that the protein or peptide structure responsible for this activity was of metabolic importance early in the evolutionary development of the species. Whether or not the role of ACTH in the phenomena associated with response to stress in mammals is the same in fish remains to be determined.

Summary. Lyophilized pituitary tissue of the Pacific salmon (*O. keta*) and pituitary fractions, were examined for ACTH activity in hypophysectomized rats. The results indicate the presence of a component in the teleost pituitary gland capable of depleting the stores of adrenal ascorbic acid in the rat. In this respect the preparations are qualitatively identical with corticotropins (ACTH) of mammalian origin.

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Rate of Glycogenesis in the Liver of the Rat After Parenteral Administration of Glucose, Fructose and Invert Sugar.* (22081)

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It is generally considered that fructose forms glycogen in the liver more rapidly than glucose. This assumption is based upon *in vitro* experiments(1) and studies in which the two sugars were given to rats by mouth (2). Since in clinical practice sugars are administered intravenously for supplying calories to patients unable to take food by mouth, it was considered of interest to study the rate of glycogenesis in the liver when glucose, fructose, and invert sugar are given parenterally.

Method. Normal white rats, weighing 200 to 300 g, were fasted for exactly 24 hours, water being allowed *ad lib*. Sugar, in 10% solution, was injected intraperitoneally. A dosage of 2 g per kg of body weight was used. This dosage was selected because it was found by experiment to give a suitable load to the animal and it is below the level at which utilization might be diminished by biological limitations. A carefully measured quantity of sugar solution was injected intraperitoneally into the fasted rat. At different intervals after administration, animals were anaesthetized with nembutal and the whole liver was removed for analysis. Liver glycogen was determined by an anthrone method developed in our laboratory(3). Our procedure was to give sugar solution to 6 rats and the same volume of physiological saline to 2 control animals. Liver glycogen determinations were then carried out upon the group of 8 animals. Groups of animals were sacrificed at approximately hourly intervals for periods

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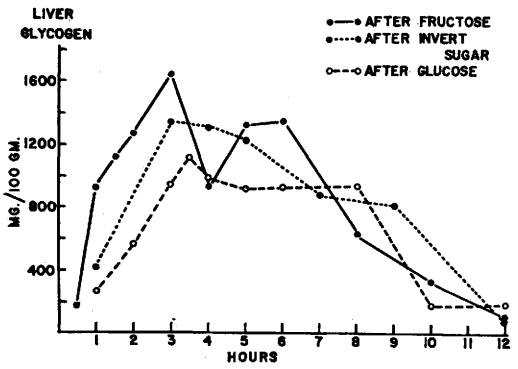

FIG. 1. Rate of glycogenesis in liver in fasted rats after intraperitoneal injection of fructose, invert sugar and glucose. Dosage was 2 g/kg of body wt.

extending up to 12 hours after administration. Observations were made following the administration of glucose, fructose and invert sugar. Comparative results were thus obtained for the 3 sugars using identical experimental procedures.

Results are shown in Fig. 1. Liver glycogen formation after fructose injection was approximately twice as fast as after glucose injection for 3 hours; at the fourth hour the curve after fructose administration dropped sharply but returned to a higher level than the glucose and invert sugar curves at the 5 and 6-hour points and then sloped off at about the same level as for the other two sugars between 7 and 12 hours after administration. The curve showing liver glycogen content after glucose is the lowest level observed for the 3 sugars. The curve showing liver glycogen values after invert sugar injection has a level about midway between the curves for fructose and glucose for 6 hours after administration and then occupies a level about the same as the other 2 sugars until the twelfth hour. The liver glycogen content 12 hours after administration returned to the pre-injection level for each sugar.

At the highest point of the glycogen curve for each sugar the per cent of the administered dose that had been converted into glycogen was 28.8 for fructose, 20.3 for invert sugar and 18.1 for glucose.

The intermediate position of the invert sugar curve is as would be expected of this sugar, since it is an equimolar mixture of glucose and fructose. The sharp dip in the curve after fructose at the 4-hour period is difficult to explain. The blood glucose after fructose injection had reached its highest level, 120 mg%, at the 5-hour point. Since fructose gives rise to increased blood glucose, possibly the effect of the latter caused the upturn of the glycogen curve at this point after fructose administration. This suggestion is supported by the fact that the curve after invert sugar maintained a steady level at the 4-hour point which shows the influence of glucose at this time.

Summary. Rate of glycogenesis in the liver of the rat after intraperitoneal injection of sugar solution was found to be highest after fructose, lowest after glucose, and intermediate between fructose and glucose after invert sugar. During the first 3 hours after injection the rate of glycogen formation was approximately twice as fast after fructose as after glucose, a finding that explains, in part, the more rapid disappearance from the blood of fructose than glucose after parenteral administration.

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