to a verification of Faxén's formula. The function used by Prof. Jauncey in arriving at (1) has the same property.

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Influence of Œstrogens and Androgens on Glycogen Storage in the Fasting Rat

Janes and Nelson[1] have observed that glycogen storage in rats treated daily with diethyl-stilbœstrol for five days or more is at an abnormally high level. We have investigated the influence of œstrogens and other sex hormones on glycogen storage; and also on the insulin content of the pancreas (*cf.* Griffiths and Young[2]). Data are given in Table 1, including the liver and muscle glycogen contents, after a fast of approximately 18 hr., of rats carrying subcutaneous tablets of various substances for two weeks. These results show that œstriol and œstradiol resemble diethyl-stilbœstrol in promoting glycogen storage under these conditions, although œstrone and testosterone do not. It appears that the influence of these substances on liver glycogen under such conditions is to some extent paralleled by their action in causing enlargement of the liver and an increase in pancreatic insulin; it seems possible that the latter phenomenon is secondary to the increase in glycogen storage.

When rats were fed on cellulose for 30 hours in order to deplete the glycogen stores, and were then given a single subcutaneous injection of various substances in nut-oil, an increase in liver glycogen was found to occur, in some instances, during a subsequent 30-hour fast. The results with different doses of diethyl-stilbœstrol in experiments of this type are shown in Table 2, and indicate that a single injection of 0·1 mgm. of this substance is capable of increasing the liver glycogen content of the fasting rat under such conditions. No obvious change in muscle glycogen content or in blood sugar level was observed in these experiments, with the possible exception of those in which 10 mgm. of diethyl-stilbœstrol was used. Again the increase in liver glycogen content was accompanied by an increase in liver size; it should be mentioned that the treated rats lost little, if any, more body-weight during the fasting period than did the control animals. Œstradiol and œstriol were found also to induce an increase in the liver glycogen content of the fasting rat under similar conditions, a property in which they resemble hormones of the adrenal cortex[3,4].

These experiments show that some œstrogens can exert a profound influence on carbohydrate metabolism, inducing an increase of pancreatic insulin and a positive increase, not merely diminished loss, of liver glycogen in the fasting rat, the latter being apparently not due to a transfer of glycogen from the muscles to the liver (Table 2).

TABLE 1.

INFLUENCE OF ŒSTROGENS AND OF TESTOSTERONE ON THE STORAGE OF GLYCOGEN AND OF INSULIN IN THE RAT.

Substance implanted	Number of rats in group	Blood sugar mgm./100 c.c.	Liver weight gm./100 gm. body weight	Liver glycogen gm./100 gm.	Muscle glycogen gm./100 gm.	Pancreatic insulin	
						u./100 gm. body weight	Percentage increment above control
Cholesterol (control)	30	108	3·82	1·13	0·37	0·70	—
Diethyl-stilbœstrol	30	109	5·79	2·27	0·41	0·95	36
Œstriol	10	115	5·13	2·32	0·39	0·93	33
Œstradiol	10	113	4·48	1·67	0·43	1·05	50
Œstrone	20	105	4·40	0·77	0·42	0·68	nil
Testosterone	10	99	3·68	0·69	0·44	0·68	nil

TABLE 2.

INFLUENCE OF DIETHYL-STILBŒSTROL ON GLYCOGEN STORAGE IN THE FASTING RAT.

Treatment of rats	Amount injected	Number of rats in group	Blood sugar mgm./100 c.c.	Liver weight gm./100 gm. body weight	Liver glycogen gm./100 gm.	Muscle glycogen gm./100 gm.
Killed initially	—	30	97	2·86	0·85	0·31
Injected and fasted 30 hours ..	Nut oil only	35	95	2·87	0·57	0·31
,, ,, ,, ,, ,, ...	0·10 mgm.	20	93	2·94	1·04	0·32
,, ,, ,, ,, ,, ..	1·00 mgm.	25	99	3·01	1·96	0·34
,, ,, ,, ,, ,, ..	10·00 mgm.	20	109	3·98	2·04	0·30

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