quently show a reappearance of horse serum precipitin when subsequently given injections of chicken serum. Immunization later with egg albumin sometimes caused not only the appearance of precipitin for egg albumin but also in some cases the reappearance of both horse and chicken precipitin. A later immunization with *B. typhosus* caused the appearance in the circulation of *B. typhosus* precipitin, and precipitin for one or more of the antigens which had previously been injected. If, after immunization with the fourth antigen, only one heterologous precipitin reappeared, it was always the one for the last antigen used; if two heterologous antibodies appeared, they corresponded always to the last two antigens used. In a few instances heterologous antibodies for all three of the antigens previously used reappeared in the circulation when the fourth antigen was injected. Efforts to cause this anamnestic appearance of antibodies by the injection of such non-antigenic substances as 10 per cent NaCl solution, peptone, and turpentine (subcutaneously) yielded only negative results.

The anamnestic reaction is not satisfactorily explained on the basis of heterogenetic antigens; nor does it harmonize with the Ehrlich theory. This is a preliminary report.

---

[1] Cole, R., *Z. Hyg.*, 1904, xlvi, 371.

[2] Weil, E., and Felix, A., *Wien. Kl. Woch.*, 1916, xxix, 974.

[3] Bieling, R., *Z. Immunol.*, 1919, xxviii, 246.

3397

Effect of Ligation of the Pancreatico-Duodenal Artery on the Blood Sugar and Urine.

ALBERT A. EPSTEIN.

From the Laboratory of Physiological Chemistry, Pathological Department, Mt. Sinai Hospital, New York City.

In previous papers[1, 2] the author and co-workers presented experimental evidence which seemed to indicate that changes in the permeability of the capillary vessels of the pancreas, produced by perfusions of its arterial supply, resulted in a mobilization of trypsin into the blood stream, via the portal circulation, with the production of a hyperglycemia and glycosuria. It was also suggested that the presence of trypsin in the blood stream may be part of the mechan-

ism regulating the secretion and activity of insulin under normal and pathological conditions.

In part our work has received confirmation by the histological findings of Horning,[3] Collens,[4] however, reaches certain conclusions which are not in accord with our own. This investigator employed a technic totally different from ours, and failed to ascertain what differences in results his procedures would cause.

The purpose of this communication is to record additional data which throws considerable light on the subject.

We perfused the pancreatico-duodenal artery *without the application of ligatures to adjacent vessels,* whereas Collens perfused the hepatic artery *after ligating* the pancreatico-duodenal. Then he perfused the pancreatico-duodenal artery *after ligating* the hepatic. No mention is made of control experiments on the effect of ligation of these respective vessels without the perfusion of any others.

The result of ligation of the hepatic arteries upon carbohydrate metabolism is known to be comparable in its effect to complete ablation of the liver.[5, 6] It has been termed "Bloodless hepatectomy,"

PROTOCOL 1. Female cat, weight 3.4 kgm. Amytal anesthesia.* Laparotomy; ligation of pancreatico-duodenal artery. Abdomen closed in two layers.

Observations.

Date	Time	Blood Sugar†	Remarks.
2/18/26	11:30 a. m.	0.142%	
	11:45		Pancreatico-duodenal artery ligated.
	12:25 p. m.	0.294%	
	4:00 p. m.	0.186%	
	10:00 p. m.	0.164%	
2/19/26	12:15 p. m.	0.210%	Urine removed from bladder contained 1.25% sugar.

* In view of the existing controversy as to the effect of amytal upon the blood sugar, control experiments were made and no hyperglycemia was observed.

† Blood sugar estimations were made by the Folin-Wu method.

PROTOCOL 2. Male cat, weight 3 kgm. Amytal anesthesia. Laparotomy; Temporary ligation of the pancreatico-duodenal artery; ligature left in place 9 minutes, released and abdomen closed in two layers.

Observations.

Date	Time	Blood Sugar	Remarks.
3/30/26	11:54 a. m.	0.140%	
	11:02		Ligature applied to pancreatico-duodenal artery.
	11:11		Ligature released.
	11:50	0.276%	
	3:26 p. m.	0.154%	
4/1/26			Urine contained 0.25% sugar.

and is accompanied by a rapid disappearance of glycogen from the liver and a hypoglycemia. In view of the profound effects upon the carbohydrate metabolism produced by the ligation of the hepatic arteries, such a procedure cannot be employed with safety for the purpose of studying the effects of perfusion of the pancreas.

On the other hand, the effect of the ligation of the pancreatico-duodenal vessel is not so well known. I therefore wish to record the influence of such a procedure upon carbohydrate metabolism.

These protocols are typical of the reaction which follows the ligation of the pancreatico-duodenal artery, as determined on 8 cats. Constriction of the vessels for a few minutes causes a hyperglycemia which in most instances is accompanied by a glycosuria.

It is clear, therefore, that the effect which Collens ascribes to the perfusion of the hepatic artery after ligation of the pancreatico-duodenal artery, can at present be interpreted only as the result of the ligation of the pancreatico-duodenal artery.

Summary. 1. Application of a ligature to the pancreatico-duodenal artery produces *per se* a marked hyperglycemia and glycosuria. 2. The hyperglycemia and glycosuria following ligation of the pancreatico-duodenal artery and perfusion of the hepatic cannot be interpreted as resulting from the latter procedure alone. This is a preliminary report.

[1] Epstein, Albert A., Rosenthal, Nathan, and others, *Am. J. Physiol.*, 1924, lxx, 225.

[2] Epstein, Albert A., Rosenthal, Nathan, and others, *Am. J. Physiol.*, 1925, lxxi, 316.

[3] Horning, E. S., *Aus. J. Exp. Biol. and Med. Sci.*, 1925, ii, 135.

[4] Collens, W. S., *J. Biol. Chem.*, 1925, lxiv, 461.

[5] Naunyn, B., *Diabetes Mellitus*, A. Hölder, Wien, 1906, 114.

[6] Allen, Frederick M., *Glycosuria and Diabetes*, Harvard Univ. Press, 891.

3398

Acetylation.

BENJAMIN HARROW, F. W. POWER AND C. P. SHERWIN.

From the Chemical Research Laboratory of Fordham University, New York.

Acetylation is a process sometimes used by the body as a method of detoxication. When, for example, *p*-amino-benzoic acid is fed either to man or to rabbit, it is partly excreted as *p*-acetyl-amino-benzoic acid. It has seemed to us that this reaction might find an