

and xerosin failed to protect HeLa cell cultures against the *in vitro* cytopathogenic effects of the Lee strain of influenza B virus and the WS and A/England/1/51 strains of influenza A virus. Smaller doses of these materials effectively rendered mice tolerant to the neurotoxic action of influenza viruses. The possible implications of these studies on the mechanisms by which the intact host acquires resistance to virus toxic action are discussed.

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Effect of Epinephrine Upon Level of Plasma Amino Acids in the Eviscerate Rat. (21987)

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Some hormones affect the level of plasma amino acids in the eviscerate animal. The effect of epinephrine upon the level of plasma amino acids has not been studied in the eviscerate preparation although it has an effect in the intact animal(1). In the present study of eviscerate rats, doses of epinephrine which had striking effects upon glucose tolerance did not affect the level of plasma amino acids in either the presence or absence of insulin until large doses of epinephrine were administered with glucose and insulin for 18 hours.

Methods. Male rats of the Sprague-Dawley strain were fed Rockland rat diet. At a weight of 250 ± 5 g non-fasted rats were anesthetized with cyclopal sodium and functionally eviscerated. The intestinal tract was removed but the liver remained *in situ* after its arterial and portal vessels were tied. Continuous intravenous infusions of solutions of glucose with and without insulin and with and without epinephrine (Parke-Davis Adrenalin Chloride) were made by a continuous injection

machine. The fluid was delivered into the saphenous vein of the right hind leg at the rate of 20 cc/24 hours/rat. Six rats were infused at a time so that the control and experimental animals were studied simultaneously. Temperature was constant at $26^\circ \pm 0.50^\circ\text{C}$.

At the end of the infusion period the blood was drained from the abdominal aorta by cannula. Heparin was used as an anticoagulant. The level of plasma amino acids was determined by the method of Hamilton and Van Slyke(2) and that of blood glucose by the method of Miller and Van Slyke(3).

Results. The conditions of each experiment and the results are shown in Table I. In agreement with earlier reports(1) insulin suppresses the rate of rise of plasma amino acids following evisceration in the rat. During a 3-hour period epinephrine failed to affect the level of plasma amino acids in either the presence or absence of insulin although in the presence of insulin and a glucose load of 70 mg/100 g of rat per hour the

TABLE I. Level of Plasma Amino Acids in Functionally Eviscerate Rats. Averages* and standard errors.

Exp.	Condition	Glucose load, mg/100 g/rat/hr	Units insulin per 24 hr	Epinephrine, parts/million in 20 cc/24 hr	Hours	Concentration, mg %			
						Plasma amino acids		Blood glucose	
						Epinephrine	Control	Epinephrine	Control
1	Normal	0	0	0	0	10.08 ± .39	5.46 ± .91	109 ± 4.7	125 ± 4.6
2	Eviscerate	16	0	40	3	8.89 ± .24	9.48 ± .23	164 ± 8.55	179 ± 11.2
3	"	16	0	20	3	8.96 ± .37	9.12 ± .32	180 ± 9.89	160 ± 7.85
4	"	16	0	10	3	3.95 ± .30	3.98 ± .31	58 ± 3.48	167 ± 7.82
5	"	16	16	10	3	3.54 ± .16	3.77 ± .23	230 ± 13.33	48 ± 2.06
6	"	70	16	10	3	4.13 ± .12	4.11 ± .20	203 ± 16.7	79 ± 8.13
7	"	70	16	20	3	3.55 ± .09	3.87 ± .08	232 ± 8.79	86 ± 10.15
8	"	70	16	5	3	37.49 ± 1.34	35.16 ± 1.72	222 ± 27.93	73 ± 3.95
9	"	6	0	5	16	30.09 ± 2.38	30.3 ± 1.41	178 ± 17.09	193 ± 13.46
10	"	6	0	10	16	12.73 ± 1.05	11.67 ± .71	166 ± 24.74	222 ± 19.62
11	"	44	16	5	16	16.03 ± .69	12.88 ± 1.18	256 ± 35.3	145 ± 21.1
12	"	44	16	10	18	17.20 ± .73	11.94 ± .51	389 ± 30.9	137 ± 18.7
13	"	44	16	20	18				118 ± 14.35

* Each average represents 12-15 rats.

addition of epinephrine caused a striking rise in the level of blood glucose (experiments 6, 7, and 8). During a 16-hour period epinephrine failed to affect the level of plasma amino acids in eviscerated rats given glucose without insulin. When insulin was given with an increased glucose load the addition of epinephrine in doses of 10 and 20 parts per million caused a significant increase in the level of plasma amino acids (experiments 12 and 13) during a period of 18 hours.

Discussion. The effects of epinephrine and insulin upon the glucose tolerance of the eviscerate rat are in agreement with published data(4). Although large doses of epinephrine given with glucose and insulin for 18 hours have a positive effect upon the level of plasma amino acids in the eviscerate rat there is no clear relationship between the changes in the level of blood glucose and the changes in the level of plasma amino acids. The possible physiological significance of this extra-hepatic effect of large doses of epinephrine upon the level of plasma amino acids is not known. Adrenodemedullated rats do not differ from normal rats with respect to the release of amino acids after evisceration(5).

Summary. Functionally eviscerated rats were given continuous intravenous injections of glucose with and without insulin, with and without epinephrine for periods of 3, 16, and 18 hours. Large doses of epinephrine given with glucose and insulin for 18 hours caused a significant rise in the level of plasma amino acids.

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