Serum Glyco and Mucoproteins in Rats Treated with Thiourea. (22950)

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Abreu, Abreu and Villela(1) found that a significant decrease in serum glycoprotein concentration of thyroidectomized rats was probably related to hypoproteinemia. Lack of reports in the literature on effects of antithyroid drugs on serum protein bound carbohydrates led to the present investigation of the effect of thiourea in rat serum glyco and mucoproteins.

Materials and methods. Male Wistar rats weighing 50-60 g were fed *ad libitum* the standard laboratory diet with thiourea added to the milk. The average daily intake of the drug was 20 mg per rat throughout the period of experimentation. A control group of rats was fed the same diet without thiourea. After 60 days of feeding, thiourea treated and control animals were bled by heart puncture under light ether anesthesia and sera separated. Serum glycoproteins and mucoproteins (seromucoid) were determined as protein-bound hexose according to methods described by Winzler(2), and total serum proteins by Weichselbaum's technic(3).

Results. Table I summarizes the data obtained showing average values and standard deviations. The glycoprotein/protein (Gp/p) and mucoprotein/protein (Mp/p) ratios were expressed in mg of glycoprotein or mucoprotein respectively per g of total protein. Table I also includes significances of differences between the averages, calculated according Student's t test(4).

TABLE I. Effect of Feeding Thiourea on Serum Glyco- and Mucoproteins in the Rat.

	Controls	Thiourea	P
No. of rats	8	11†	—
Wt (g)	222 ±33*	111 ±11	<.001
Glycoprotein (mg/100 ml)	117.4 ±17.9	104.0 ±17.0	<.2
Mucoprotein (mg/100 ml)	9.6 ± 1.9	6.7 ± 1.6	<.01
Total protein (g/100 ml)	6.92± .48	7.14± 1.24	>.5
Gp/p	16.9 ± 2.2	14.6 ± 1.7	<.05
Mp/p	1.4 ± .2	.9 ± .2	<.001

* Mean ± stand. dev.
† In this group, only 10 animals were used in mucoprotein determinations.

Highly significant inhibition of growth was noted in the thiourea group. However, statistically significant differences in concentrations of glycoproteins, total proteins, and Gp/p relation between normal and thiourea treated rats were not observed. On the other hand, serum mucoprotein levels in this group of animals were significantly lower than those of the control group, and the decrease in Mp/p ratio of goitrogen treated rats was highly significant.

Discussion. Our results obtained with rats fed thiourea have shown that the decrease in seromucoid was not relative but absolute, since the Mp/p ratio was lowered in the absence of significant variations on total serum protein level. This decrease in serum mucoprotein fraction was independent of the total serum glycoprotein concentration, a fact also verified in various conditions(2). However, we found no significant variation in serum glycoproteins and seromucoid in intact rats receiving daily subcutaneous injections of dl-thyroxine or 2,4-dinitrophenol in doses up to 50 μg or 1 mg per 100 g respectively, during 10 days(5).

Summary. Total proteins, glycoproteins and mucoproteins were determined in sera of normal and thiourea treated rats. Statistically significant decreases were observed only in mucoprotein concentration. Animals fed thiourea showed significantly lower Mp/p ratio without variations in proteinemia and total glycoproteins. Thus the decrease in the mucoprotein fraction was not relative but absolute and independent of total serum glycoprotein level.

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Cardiovascular Evaluation of a Pressor Amine (Tetrahydrozoline) Showing Hypotensive Properties in Man.*† (22951)

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Hutcheon and his colleagues(1) found that in animals, tetrahydrozoline (2-(1.2.3.4-tetrahydro-1-naphthyl) imidazoline hydrochloride) caused an increase in arterial pressure similar to that produced by epinephrine. However, it differed qualitatively from the epinephrine effect in that onset of hypertension was slower and its duration was more prolonged. Increase in blood pressure caused by tetrahydrozoline was diminished, but was never reversed by adrenolytic agents such as phentolamine. The sympathomimetic effect of tetrahydrozoline in animals was so striking that these investigators suggested evaluation of this drug as a pressor agent in certain hypotensive states.

Despite this report(1), preliminary studies in our laboratory indicated that tetrahydrozoline *reduces* blood pressure in man. The present study was undertaken to clarify the hypotensive effect of this sympathomimetic amine.

Methods and materials. The patients in this study were from the medical wards and the hypertensive clinic of the District of Columbia General Hospital. All ward patients who received the drug by injection underwent complete clinical and laboratory studies. In the clinic, where the patients received tetrahydrozoline by mouth, they were examined at least at weekly intervals and more commonly twice a week for the first month. It was possible to follow 30 of the 42 patients over a 2 to 3 week period on placebo therapy. The hemodynamic studies were carried out on hospitalized patients who were in the fasting basal state. Cardiac output was measured with indicator-dilution curves using Evans Blue dye(2). Serial studies were performed at least 20 minutes apart to assure complete mixing of the dye. Arterial pressure was recorded by the auscultatory method. The average of systolic and diastolic pressures was taken as mean arterial pressure. Total peripheral resistance was calculated by dividing mean arterial pressure by cardiac output (ml/min). Venous pressure was measured using a saline manometer in an antecubital vein at the level of the right auricle.

Results. Blood pressure changes following tetrahydrozoline given intravenously. Forty-two patients received tetrahydrozoline intravenously (0.5 mg to 2 mg, average 1.5 mg). In 17 patients, a pressor response was noted (average 35%), beginning less than 30 seconds after injection, reaching its peak within 3 minutes. (Early in this investigation, an immediate pressor response was not specifically looked for, so the actual frequency of this transitory phenomenon cannot be determined accurately. More recent experience indicates that an immediate pressor response consistently follows tetrahydrozoline given intravenously.) A 32% fall in heart rate ac-

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