

with 0.01 cc. and 0.02 cc. were tabulated. From these tabulations the mean cell height of each group and its probable error were determined. (Table I.) It is readily seen that the results of each successive group are of statistical significance.

Conclusion. We have described a micrometric method of representing the thyrotropic effect on the thyroid gland of test animals. Since each increased dosage of the hormone caused a characteristic curve, this procedure affords a quantitative method of determining the effects of the thyrotropic hormone on the thyroid of the guinea pig.

9070

Can Injected Sulfur be Utilized by the Animal Organism?

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Several workers have recently reported increases in the cystine content of fingernails following injection of colloidal sulfur. Lewis and Lewis¹ using rats and Geiling² with adult mice observed no utilization of dietary elemental sulfur for growth. The following experiments were carried out in an attempt to ascertain whether the animal organism could utilize injected colloidal sulfur for growth or for production of cystine. Eleven groups of 3 young rats each were used. The 3 members of each group were of the same age and approximately the same weight, and all 33 rats had identical dietary histories. During these experiments the first rat of each group received a cystine-deficient diet (dextrin 46, casein 9, sucrose 15, lard 19, cod liver oil 5, Osborne-Mendel salt mixture 4, and agar 2%) *ad libitum*. Rat 2 of each group was limited to the amount of stock diet eaten by rat 1 the previous day, and was given an intraperitoneal injection of 12 mg. of colloidal sulfur (Sulfur-diasporal)* every other day. Rat 3 of each group was likewise limited to stock diet equivalent to that eaten by rat 1, but received a daily supplement of 20 mg. of l-cystine. Each of the 33 rats was given a vitamin pill daily which contained 80 mg. of Harris-Vitamin

¹ Lewis, G. T., and Lewis, H. B., *J. Biol. Chem.*, 1927, **74**, 515.

² Geiling, E. M. K., *J. Biol. Chem.*, 1917, **31**, 190.

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powder. Rats 1 and 3 of each group were given intraperitoneal injections of oil every other day that were equivalent volumetrically and calorifically to the oil which made up the vehicle for the colloidal sulfur injected into rat 2. After 3 weeks on the diets as described the animals were killed and their bodies and hides analyzed separately for cystine. The method used was an iodine titration carried out under the conditions described by Virtue and Lewis for determination of disulfide compounds in urine.⁸ Hydrolysates of the hides required no decolorization, but kaolin was employed to decolorize body hydrolysates. Results of a typical group analysis, and the totals for the 33 rats are found in Table I.

TABLE I.
Effect of Injections of Colloidal Sulfur on Cystine Content of Rats.

Rat No.	Intake	Typical Group			Total (11 groups)			
		Original wt., gm.	Final wt., gm.	Cystine content, mg.	Original wt., gm.	Final wt., gm.	Cystine content, mg.	
1	Stock diet	45	44	Hide	66	512	546	Hide 836
				Body	18			Body 298
				Total	84			Total 1134
2	Stock plus colloidal S	46	44	Hide	41	516	508	Hide 773
				Body	16			Body 299
				Total	57			Total 1072
3	Stock plus cystine	45	55	Hide	113	509	621	Hide 1162
				Body	37			Body 345
				Total	150			Total 1507

It will be seen that the rats on the stock diet and those getting colloidal sulfur remained at approximately the same weight throughout the experiment, and that the cystine contents of these groups (both bodies and hides) were nearly equal at its termination. The rats receiving the cystine supplements increased both in weight and cystine content, the latter increase appearing primarily in the hides. Although the increment in growth of the cystine control rats was only about half that observed by other workers, it was nevertheless definite and consistent. The fairly large amount of oil taken care of by the rats may be responsible for these smaller increases in weight.

Conclusion. Under the conditions of this experiment colloidal sulfur was not utilized by rats either for production of cystine or for growth.

⁸ Virtue, R. W., and Lewis, H. B., *J. Biol. Chem.*, 1934, **104**, 415.