

demonstrated in the precipitates of the α_1 -lipoprotein, α_1 -seromucoid, and a component designed as the ' α_1 -globulin I' which hitherto are the only components found in the near neighbourhood of the α_1 -glycoprotein under the present experimental conditions¹². It is of interest to note that precipitate formation does take place even in the presence of an excess of thyroxine.

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Zusammenfassung

Radioautographien menschlichen Plasmas, dem kleine Mengen von radioaktivem Thyroxin zugesetzt worden war, zeigten ein Präzipitat bei der Immunelektrophorese mit Charakteristika, die denen des α_1 -Glykoproteins entsprechen. Grosse Mengen des Thyroxins verbanden sich auch mit der Albuminfraktion.

¹² J. HIRSCHFELD, *Acta path. microbiol. scand.*, in press.

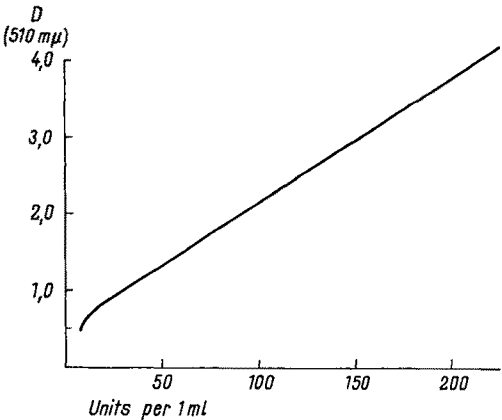
Transaminase in Seminal Plasma of Man

Several enzymes have been detected in the tissues of male accessory organs of reproduction (phosphatases, 5-nucleotidase, ATP-ase, aldolase) (MANN¹). As far as transaminases are concerned, the prostatic gland and seminal vesicles are shown to be rich in these enzymes (BARRON and HUGGINS², AWAPARA³). However, the glutamic oxaloacetic transaminase (GO-T) has not yet been reported in the whole semen or in the seminal plasma.

Studying the GO-T activity of several human secretions and body fluids, we were impressed by the high values obtained in seminal plasma (POVOA and VILLELA⁴).

The high content of certain free amino acids and of citric acid in this fluid is possibly due to the transamination of glutamic acid and production of oxaloacetic acid. AWAPARA³ pointed out that, in the prostatic gland, transamination is the only way of desamination.

Materials and methods: The GO-T was determined by an adaptation of the method of REITMAN and FRANKEL⁵ used for blood serum. A calibration curve was constructed



according to these authors, employing 0.05 ml instead of 0.2 ml. The readings in optical densities at 510 mμ were plotted against units per 1 ml of seminal plasma as seen in the Figure.

Whole semen was centrifuged and the clear seminal plasma pipetted off. All the semens were previously submitted to standard tests so as to establish a criterium for normality (volume, shape, number, vitality, and motility of the spermatozoa).

Plasma in the volume of 0.05 ml was incubated 60 min at 37°C with 0.5 ml of the substrate (aspartate - α -ketoglutarate, pH 7.5) added with 0.5 ml of 2,4-dinitrophenylhydrazine hydrochloride 10^{-3} M and the colour developed after 20 min by adding 5 ml of 0.4 N NaOH. The optical density was read at 510 mμ in a spectrophotometer after 30 min against a blank. The values using this method are in accordance with those obtained with the method of KARMEN, WROBLEWSKI, and LADUE⁶.

Results: The results obtained with the seminal plasma of normal, oligospermic, and azoospermic cases are presented in the Table.

Human seminal plasma Glutamic-oxaloacetic transaminase

Condition	No. of cases	No. spermatozoa 10^6 /1ml	GO-T ^a		<i>t</i>	<i>P</i>
			Range	Average and S.D.		
Normal . . .	10	41-131	150-600	365 ± 170	—	—
Oligospermia	10	2-25	130-460	271 ± 110	1.4	< 0.05
Azoospermia .	5	0	80-260	172 ± 78	3.0	< 0.01

^a Values expressed in Reitman-Frankel units/ml

Normal seminal plasma showed values (average 365 ± 170 units) twenty times the normal blood serum (average 18 units). A marked decrease was observed in oligospermia and chiefly in azoospermia. The decrease for azoospermia was statistically significant ($t = 3.0$; $P < 0.01$) and for oligospermia less significant ($P < 0.1$).

Since the enzyme activity is still elevated in the absence of spermatozoa, it seems that the conditions of the prostatic and seminal glands must be responsible for the low values found.

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Résumé

La transaminase glutamo-oxaloacétique (GO-T) a été déterminée dans le liquide spermatique de l'homme après la séparation des spermatozoïdes. On a trouvé des valeurs élevées pour la GO-T dans le sperme normal et une diminution accentuée dans les cas d'oligospermie et surtout d'azoospermie. Les conditions de la prostate et des vésicules séminales semblent être responsables de cet abaissement de l'activité enzymatique puisque le liquide sans spermatozoïdes (azoospermie) présente encore une activité bien marquée.

¹ T. MANN, *Biochemistry of Semen* (Methuen and Co., London 1954).
² E. S. G. BARRON and C. HUGGINS, *J. Urol.* 55, 385 (1946).
³ J. AWAPARA, *Endocrinology* 51, 75 (1952).
⁴ H. POVOA, JR. and G. G. VILLELA, Abstracts and Communications, XXI International Congress of Physiology, Buenos Aires, 219 (1959).
⁵ S. REITMAN and S. FRANKEL, *Amer. J. clin. Path.* 28, 56 (1957).
⁶ A. KARMEN, F. WRÓBLEWSKI, and J. S. LADUE, *J. clin. Invest.* 34, 126 (1955).