BRIEF COMMUNICATION

ORIGIN OF TRANSAMINASE IN HUMAN SEMEN

R. ELIASSON

Department of Physiology, Faculty of Medicine, Karolinska Institutet, Stockholm, Sweden

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Summary. Human seminal plasma contains highly active glutamic oxaloacetic transaminase (aspartate aminotransferase). Using the split-ejaculation method it has been demonstrated that the enzyme is largely concentrated in the first portion of the ejaculate, indicating that it is derived from the prostate gland.

The occurrence of glutamic oxaloacetic transaminase (GOT) (aspartate aminotransferase) in human semen has been demonstrated by Pavao & Villela (1960), Gregoire, Rakoff & Ward (1961) and Searcy, Craig & Bergquist (1962), the activity being about 10 to 20 times higher than in blood plasma. There appeared to be a correlation between enzyme activity and sperm density, but high activity has also been encountered in semen samples which were without spermatozoa.

In order to study the origin of seminal GOT, samples of human semen were collected from eight healthy young men according to the method described by Lundquist (1949) and Eliasson (1959, 1964). Each fraction was analysed for acid phosphatase (which is contributed by the prostate gland), fructose (which is derived from the seminal vesicles) and the transaminase. Sperm density was determined in samples from three of the eight volunteers. Acid phosphatase was determined according to Lundquist (1949), fructose according to Karvonen & Malm (1955) and GOT according to Reitman & Frankel (1957). Some modifications were used as described by Eliasson (1965).

The distribution of fructose, acid phosphatase, GOT and spermatozoa in the semen of the three subjects is given in Table 1. In these experiments, as well as in the five others, the general pattern of distribution for acid phosphatase and GOT was similar, i.e. the highest activity being present in the first fraction. This indicated that GOT is secreted from the prostate. The distribution pattern did not indicate that the secretion from the seminal vesicles contained any significant activity. It could not be excluded that part of the enzyme activity in some of the fractions was due to a leakage of GOT from the spermatozoa, since these also contain transaminase, but gel-electrophoretic studies indicate that the transaminase activity of spermatozoa is mainly due to an iso-enzyme which is different from that of seminal plasma (Eliasson, unpublished observations).

TABLE I

DISTRIBUTION OF ACID PHOSPHATASE, GLUTAMIC OXALOACETIC TRANSAMINASE (GOT), FRUCTOSE AND SPERMATOZOA IN FRACTIONS 1 TO 4 OF HUMAN EJACULATES FROM THREE SUBJECTS A, B AND C

Fraction No.	Fresh weight (g)	Acid phosphatase (units/ml)	GOT (units/ml)	Fructose (mg/100 ml)	Sperm concentration ($\times 10^6$ /ml)
A 1	0.14	15120	270	7.5	1.5
2	0.64	2300	165	228	112
3	1.14	1470	165	384	75.4
4	0.79	830	90	480	20
B 1	0.08	17040	720	50	41
2	0.28	8160	640	110	34
3	0.88	4720	270	300	10
4	0.86	2880	80	470	0
5	1.49	1520	70	590	0
C 1	0.32	5280	430	85	234
2	1.30	3520	235	170	38
3	0.24	2400	210	210	33
4	0.60	3840	145	240	12
5	0.75	3360	175	250	40

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REFERENCES

- ELIASSON, R. (1959) Studies on prostaglandin. *Acta physiol. scand.* **46**, Suppl. 158.
 ELIASSON, R. (1964) Origin of neuraminic acid in human seminal fluid. *Nature, Lond.* **203**, 980.
 ELIASSON, R. (1965) Effect of frequent ejaculations on the composition of the human seminal plasma. *J. Reprod. Fert.* **9**, 331.
 GREGOIRE, A. T., RAKOFF, A. E. & WARD, K. (1961) Glutamic-oxaloacetic transaminase in semen of human, bull, and rabbit seminal plasma. *Int. J. Fert.* **6**, 73.
 KARVONEN, M. J. & MALM, M. (1955) Colorimetric determination of fructose with indol. *Scand. J. clin. Lab. Invest.* **7**, 305.
 LUNDQUIST, F. (1949) Aspects of the biochemistry of human semen. *Acta physiol. scand.* **19**, Suppl. 66.
 PAVOA, H., JR & VILLELA, G. G. (1960) Transaminase in seminal plasma of man. *Experientia*, **16**, 199.
 REITMAN, S. & FRANKEL, S. (1957) Colorimetric method for the determination of serum transaminase activity. *Am. J. clin. Path.* **28**, 56.
 SEARCY, R. L., CRAIG, R. G. & BERGQUIST, L. M. (1962) Levels of transaminases in human seminal plasma. *Lancet*, **i**, 1413.