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Rare GPT-Phenotypes in a Random Sample of Southern Germany: Evidence for a Third Allel

St. Gussmann and F. Schwarzfischer

Institut für Anthropologie und Humangenetik der Universität München (BRD)

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Summary. The inheritance of 2 rare variants in a random sample of 837 Bavarians is assumed to be an indication for a third allel GPT^3.

Zusammenfassung. In einer Stichprobe ($N = 837$) werden insgesamt sechsmal 2 seltene Varianten gefunden. Die Beobachtung der Vererbung dieser seltenen Varianten in einer Mutter-Kind-Verbindung gibt Anlaß zur Annahme eines dritten Allels GPT^3. Damit errechnet sich als Genfrequenzverteilung im süddeutschen Raume: $GPT^1 = 0{,}5041$; $GPT^2 = 0{,}4922$, $GPT^3 = 0{,}0035$.

Key words: Glutamic-pyruvic transaminase-Phenotypes — GPT^3.

Glutamic-pyruvic transaminase (GPT) first described as a genetic marker in man by Chen and Giblett in 1971 is known to be a dimer which exists in 3 common phenotypes. The incidence of these phenotypes among Seattle blood donors in 3 ethnic groups was demonstrated by these authors. From these findings they concluded that the genetic basis of these phenotypes are the alleles GPT^1 and GPT^2. The gene frequency of GPT^1 figures up in Caucasians (Seattle) to 0.496, in Orientals to 0.598 and in Afro Americans to 0.814.

The frequency in the German area seems to be also about 0.5, a distribution that makes this system extremely important to human genetics (Kömpf, 1971b; Gußmann, 1972).

In this paper there will be shown two rare phenotypes found in a random sample of 837 blood tests.

Materials and Methods

For estimating the gene frequencies, there have been used the phenotypes of the parents of 430 serological specimens and of 407 nonrelated healthy blood donors. The rare phenotypes were found in a random sample of completely 837 individuals. The method of demonstrating the phenotypes is according to Chen and Giblett (1971) with modifications published elsewhere (Gußmann, 1972).

Results and Discussion

Fig. 1 shows the common phenotypes GPT 2, GPT 2—1 and two rare phenotypes found in a random sample of 837 Bavarians. The distribution of this random test fits well to the Hardy-Weinberg-Theorem (Table 1).

The phenotype 3—1 was found 2 times, 3—2 was found 4 times. Among these rare phenotypes there was one mother-child combination: M 3—2, Ch 3—1, so that we have to assume, that there has been found a new allel GPT^3 in this bavarian population. The phenotype GPT 3 has not been found yet, but should be similar as shown in Fig. 2.

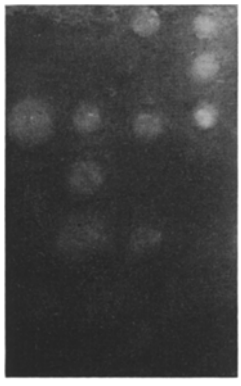

Fig. 1

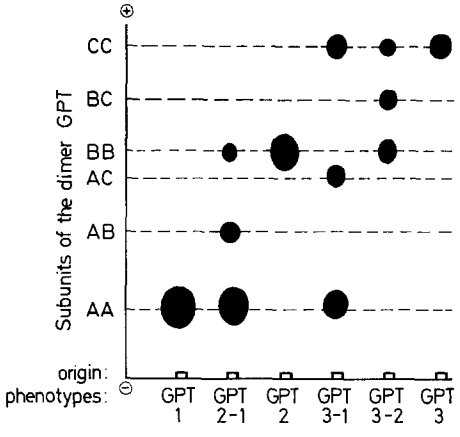

Fig. 2

Fig. 1. Photograph of the phenotypes GPT 2, GPT 2—1, GPT 3—1 and GPT 3—2

Fig. 2. Phenotypes of the allels GPT^1, GPT^2 and GPT^3 found in a bavarian random test. The phenotype GPT 3 has not been found yet, but should be similar as shown here

Table 1. *Phenotypes and gene frequencies in a bavarian population*

GPT	Observed		Expected		χ^2
	n	%	n	%	
1	221	0.2640	212.68	0.2541	0.4405
2—1	400	0.4778	415.31	0.4962	0.5643
2	210	0.2508	202.8	0.2423	0.2556
3—1	2	0.0023	2.92	0.0035	0.2898
3—2	4	0.0047	2.84	0.0034	0.4738
3	—	—	0.008	0.00001	—

Total: $n = 837$ χ^2 emp. $= 2.0240$
$df = 2$, $\alpha = 0.05$ χ^2 crit. $= 5.99$
Gene frequencies: $GPT^1 = 0.5041$; $GPT^2 = 0.4922$; $GPT^3 = 0.0035$.

References

Chen, S. H., Giblett, E. R.: Polymorphism of soluble glutamic-pyruvic transaminase: A new genetic marker in man. Science **173**, 148 (1971).

Gußmann, St.: Die Darstellung des Polymorphismus der Glutamat-Pyruvat-Transaminase (GPT). Z. Rechtsmedizin (in press).

Kömpf, J.: Soluble glutamic-pyruvic transaminase (EC: 2.6.1.2): Formal genetics and linkage relations. Humangenetik **13**, 358 (1971a).

Kömpf, J.: Population genetics of soluble glutamic-pyruvic transaminase (EC: 2.6.1.2): Gene frequencies in Southwestern Germany. Humangenetik **14**, 76 (1971b).

Kömpf, J.: Zytoplasmatische Glutamat-Pyruvat-Transaminase (EC: 2.6.1.2): Bestimmungstechnik. Ärztl. Lab. **1**, 25 (1972).

Dr. St. Gußmann
Institut für Anthropologie und Humangenetik
der Universität
D-8000 München, Richard Wagner-Straße 10
Germany