

Distribution of Gc-Subtypes in Western Germany (Düsseldorf Region)

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Summary. Gc-subtypes were determined by isoelectric focusing and immunofixation on samples from 1157 unrelated individuals. The frequency of the three genes was found to be Gc^{1S} 0.5476, Gc^{1F} 0.1561, Gc² 0.2963. A rare allele, Gc^{V1}, was observed.

Key words: Gc-subtypes – Gc-polymorphism, rare allele

Zusammenfassung. Bei 1157 nicht verwandten Individuen wurden die Gc-Untergruppen mittels isoelektrischem Fokussieren und anschließender Immunofixation bestimmt. Folgende Genfrequenzen wurden gefunden: Gc^{1S} 0.5476, Gc^{1F} 0.1561, Gc² 0.2963. Ein seltenes Allel Gc^{V1} wurde beobachtet.

Schlüsselwörter: Gc-Untergruppen – Gc-Polymorphismus, seltenes Gc-Allel

Recently, Constans et al. (1978) and Cleve et al. (1978) described subtypes of the classic Gc polymorphism. This paper presents data on the distribution of Gc-subtypes and the gene frequencies in a population of Western Germany (Düsseldorf region).

Material and Methods

Plasma from 1157 apparently healthy and unrelated blood donors (without foreigners) were examined. Samples were stored at -30°C prior to Gc analysis.

Isoelectric focusing was performed with a LKB Multiphor electrofocusing apparatus on PAG plates of 1 mm thickness, pH range 4–6.5 (LKB), as described by Kühnl et al. (1978). Pieces of filter paper (5×10 mm) were placed on the gel surface 1 cm from the cathode and 10 μl of undiluted plasma was added. Cathode-electrode solution: 0.1 M β -alanine; anode-electrode solution: 0.1 M glutamic acid and 0.5 M phosphoric acid. An electric current was applied for 2.5 h; the initial voltage was approx. 320 V, according to approx. 55 mA. The power was stabilized at 18 W. The plate was cooled at 10°C . The immunofixation was performed as

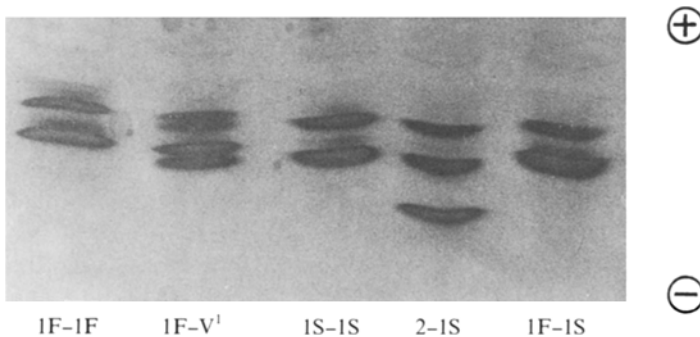
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Table 1. Distribution of Gc-subtypes in Western Germany (Düsseldorf region)

Gc-Phenotypes	1S-1S	1F-1F	2-2	2-1S	2-1F	1F-1S	Total
Observed	348	31	95	383	112	187	1156
Expected	346.6	28.2	101.5	375.1	106.9	197.6	1155.9

$\chi^2 = 1.68, 0.90 < P < 0.80, df 5$

Gene frequencies: Gc^{1S} 0.5476, Gc^{1F} 0.1561, Gc² 0.2963

**Fig. 1.** The rare Gc 1F-V¹ in relation to other Gc-subtypes. (The four fractions of the heterozygotic type 1F-1S could not be resolved by photographic techniques)

described by Ritchie and Smith (1976) with a specific 1:2 diluted anti Gc serum (Behring) for 4 min. The cellulose acetate stripes were washed in tap water for 18 h before staining with Coomassie Blue.

Results and Discussion

Table 1 summarizes the results of the Gc-subtyping. The analyzed population apparently underlies Hardy-Weinberg conditions. The Gc² frequency is higher than that reported for Bavaria and Hesse, as published by Cleve et al. (1978). Compared to these populations, we observed a lower Gc^{1S} frequency than that found for Bavaria (0.5920) and a lower Gc^{1F} frequency than that found for Hesse (0.1781). The Gc^{1F} frequency for Bavaria (0.1443) is more or less in agreement with our data.

In our studies we revealed only one rare heterozygotic genotype from 1157 individuals investigated (Fig. 1). The distance between the bands of the rare allele and the bands of Gc^{1F} is larger than that revealed for the bands of Gc^{1F} and Gc^{1S}. We named this rare allele Gc^{V1} and the genotype observed, Gc 1F-V¹. (This genotype is not included in the calculations of Table 1.) The notation Gc^{V1} was first used provisionally by Cleve et al. (1978), and has now be renamed 1C3 by Constans and Cleve (1979).

References

- Cleve, H., Patutschnick, W., Nevo, S., Wendt, G. G.: Genetic studies on the Gc subtypes. *Hum. Genet.* **44**, 117—122 (1978)
- Constans, J., Cleve, H.: Group-specific component. *Hum. Genet.* **48**, 143—149 (1979)
- Constans, J., Viau, M., Cleve, H., Jaeger, G., Quilici, J. C., Palisson, M. J.: Analysis of the Gc polymorphism in human populations by isoelectrofocusing on polyacrylamide gels. Demonstration of subtypes of the Gc¹ allele and of additional Gc variants. *Hum. Genet.* **41**, 53—60 (1978)
- Kühnl, P., Spielmann, W., Loa, M.: An improved method for the identification on Gc¹ subtypes (group-specific component) by isoelectric focusing. *Vox Sang.* **35**, 401—404 (1978)
- Ritchie, R. F., Smith, R.: Immunofixation. I. General principles and application to agarose gel electrophoresis. *Clin. Chem.* **22**, 497—499 (1976)

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