

SHORT COMMUNICATION

B. Vural · M. Poda · E. Atlioglu · Ö. Kolusayin
A. Cenani · N. Morling · Z. Tümer

Turkish population data on the short tandem repeat locus TPOX

Received: 29 April 1997 / Received in revised form: 11 July 1997

Abstract Allele and genotype frequencies were determined for the STR (short tandem repeat) locus TPOX in a random Turkish population sample of 200 individuals.

Key words Forensic science · STR · TPOX · Turkish population

Introduction

The TPOX system is based on a tetrameric STR polymorphism (AATG) found within intron 10 of the human thyroid peroxidase gene (hTPO) and nine alleles have been recognized (Anker et al. 1992).

Materials and methods

The donors were 200 healthy, unrelated students from the Istanbul University or subjects involved in randomly selected paternity

cases. Informed consent was obtained from all individuals. DNA from peripheral blood was extracted according to standard procedures (Sambrook et al. 1989) and the TPOX polymorphism was analysed by PCR using the GenePrint STR Systems kit (Promega) according to the recommendations of the manufacturer. The PCR products were separated on 4–6% denaturing polyacrylamide gels (10 W, 1–2 h), visualized by silver staining, and typed by comparison with an allelic ladder supplied with the kit. Allele designations were made according to the DNA recommendations (1994).

Results and discussion

The observed/expected genotypes (Table 1) and the allele frequencies (Table 2) have been determined. A total of seven alleles was observed and no deviation from Hardy-Weinberg equilibrium was found. The frequency distribution of the alleles differed significantly from those in an African American and a Hispanic American population,

Table 1 Observed and expected TPOX genotypes in 200 individuals from the Turkish population

Genotype	Observed	Expected
7;11	1	0.2
8;8	62	61.1
8;9	21	21.0
8;10	21	20.4
8;11	49	51.4
8;12	6	5.0
9;9	1	1.8
9;10	3	3.5
9;11	11	8.8
9;13	1	0.1
10;10	1	1.7
10;11	9	8.6
10;12	2	0.8
11;11	11	10.8
11;12	1	2.1

Test for Hardy-Weinberg equilibrium: $\chi^2 = 17.62$ (21 d.f.), $0.5 < p < 0.6$

B. Vural · M. Poda · A. Cenani
Department of Genetics, Institute for Experimental Medicine,
Istanbul University, Istanbul, Turkey

E. Atlioglu · Ö. Kolusayin
Council for Forensic Medicine, Ministry of Justice,
Istanbul, Turkey

A. Cenani
Genetic and Teratology Application and Research Center,
Istanbul University, Istanbul, Turkey

N. Morling (✉)
Department of Forensic Genetics, Institute of Forensic Medicine,
University of Copenhagen, 11 Frederik V's Vej,
DK-2100 Copenhagen Ø, Denmark
Fax: +45/35 32 61 20
e-mail: niels.morling@forensic.ku.dk

Z. Tümer¹
John F Kennedy Institute, Glostrup, Denmark

Present address:

¹ Department of Medical Genetics, IMBG, Panum Institute,
University of Copenhagen, Denmark

Table 2 Frequencies of the TPOX alleles on chromosome 2p23-pter in the Turkish and other populations

Allele	Turkish (<i>n</i> = 200)	Chinese ^a (<i>n</i> = 166)	Swiss ^b (<i>n</i> = 200)	Spanish ^c (<i>n</i> = 209)	Caucasian Americans ^d (<i>n</i> = 204)	African Americans ^{d*} (<i>n</i> = 216)	Hispanic Americans ^{d*} (<i>n</i> = 216)
6	–	–	–	0.002	0.002	0.051	0.005
7	0.0025	–	–	–	–	0.037	0.002
8	0.5525	0.534	0.575	0.546	0.524	0.350	0.498
9	0.0950	0.099	0.060	0.096	0.096	0.186	0.090
10	0.0925	0.013	0.065	0.060	0.055	0.108	0.053
11	0.2325	0.332	0.265	0.268	0.285	0.216	0.248
12	0.0225	0.009	0.035	0.028	0.038	0.051	0.104
13	0.0025	–	–	–	–	–	–
14	–	0.004	–	–	–	–	–

^aHuang et al. (1995); ^bHochmeister et al. (1995); ^cMartin et al. (1995); ^dPromega technical manual

n: number of subjects examined. *: Comparison of frequencies (likelihood ratio test): *P* < 0.05

but not from those in a Chinese, a Spanish, a Swiss, and a Caucasian American population (Table 2). Statistical values determined were the power of discrimination 0.81, power of exclusion 0.39, allelic diversity 0.63 and heterozygosity 0.62. The results demonstrate that TPOX can be used for DNA-based paternity testing and personal identification in the Turkish population.

Acknowledgements ZT was supported by the United Nations Programmes TOKTEN (Transfer of Knowledge through Expatriate Nations) and UNISTAR (United Nations International Short-Term Advisory Resources) Umbrella Project (TUR/99/007/A/01/99).

References

1. Anker RL, Steinbrueck T, Donis-Keller H (1992) Tetranucleotide repeat polymorphism at human thyroid peroxidase (hTPO) locus. *Hum Mol Genet* 1: 137
2. DNA recommendations (1994) Report concerning further recommendations of the DNA commission of the ISFH regarding PCR-based polymorphisms in STR (short tandem repeat) systems. *Int J Legal Med* 107: 159–160
3. Hochmeister MN, Budowle B, Schumm JW, Sprecher CJ, Borer UV, Dirnhofer R (1995) Swiss population data and forensic efficiency values on 3 tetrameric short tandem repeat loci HUMTHO1, TPOX, and CSF1PO-derived using a STR multiplex system. *Int J Legal Med* 107: 246–249
4. Huang NE, Schumm J, Budowle B (1995) Chinese population data on three tetrameric short tandem repeat loci – HUMTHO1, TPOX, and CSF1PO – derived using a STR multiplex PCR and manual typing. *Forensic Sci Int* 71: 131–136
5. Martin P, Alonso A, Budowle B, Albarrán C, García O, Sancho M (1995) Spanish population data on 7 tetrameric short tandem repeat loci. *Int J Legal Med* 108: 145–149
6. Sambrook J, Fritsch EF, Maniatis T (1989) *Molecular cloning: a laboratory manual*, 2nd edn. Cold Spring Harbor Laboratory Press, Cold Spring Harbor