# POPULATION STUDIES IN TURKEY

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## INTRODUCTION

Significant genetic variation in populations can occur as a result of differential gene flow from neighboring populations. In a sociological study of people living in Turkey, 47 different ethnic groups are listed (Andrews, 1989). The present study aims to compare three of them -Sunni Turks, Laz Turks and Hemşinli- with each other.

Although many frequency studies of various genetic marker systems have been carried out on numerous populations throughout the world , there is no representative data for populations living in Turkey.

The only published studies are by Hummel et al.(1980) on a group of people from Turkey, working in Germany, which reports values on AK, PGM1, ACP1 and GC together with our previous studies (Abacı et.al.1990; Atasoy et.al.1990a; 1990b, 1991) where ethnic origin was not taken into consideration.

*I. SUNNI TURKS*

*Designation:* Turks; Ger. Türken; Self-designation: Türk (ler); Secondary self-designations: Yerli, Manav, Pallık (in parts of Artvin province), Dadaş (in Erzurum), Efe ( in the Aegean) etc.

*Numbers:* CENSUS 1965: 28,289,680 persons speaking Turkish as mother tongue, but this includes persons speaking Turkic languages other than Turkish (no distinction being made), and those ethnic groups not listed by mother tongue in the Census. It also allows no distinctions for religious difference, and thus for example, includes Alevi Turks in very large numbers.Later census results give no classification by mother tongue.

*Distribution*: throughout Turkey, but in varying concentrations. In the provinces further east, such as Hakkari and Van, the available figures show the Turkish populations as almost entirely located in the towns and cities (provincial centres). Assimilation in the western and central areas is being accelerated by internal migration.

*Language:* Turkish (Türkçe) in some seven principal dialects. Turkish is a language of the southwestern, or Oğuz group (with Türkmen, Azeri, Gaşgayi etc.) in the Turkic branch of the Altaic family.

*Religion:* Sunni Islam: Hanefi. Some affiliation to dervish orders (Rufa'i, Mevlevi, Kadiri, Halveti, Bektaşi, Nakşbendi etc) still persists, with a tendency to endogamy within these groups, though this affects only a minority.

*Group identity:*

Most Turks are well aware of the smaller ethnic groups in the population, and can often say very precisely where these are to be found, thus defining themselves in contrast to these groups.

*II. LAZ TURKS*

*Designation:* Laz; Ger. Lasen (sing. Lase); Tk. Laz(lar); Georgian: C'an;

*Self-designation:* Lazi.

*Numbers:* CENSUS 1945 46,987 declared persons speaking Laz. CENSUS 1965 26,007 declared persons speaking Laz as mother tongue. 59,101 declared persons speaking Laz as second language. From village population 1975 ca. 90,000 in NE Anatolia, ca. 25,000 in W Anatolia. Feurstein 1983 : 250,000 Laz-speakers (sic).

*Distribution:* originally in extreme northeastern Anatolia, in the provinces of Rize (ca. 57,000 based on village populations in 1975) and Artvin ( ca. 33,000), in villages, town and cities along the Pontic coast; there, in the northern mountain valleys, the proportion of the population speaking Laz ranges from ca. 50% in Pazar sub-province in the west, through ca. 80% in Ardeşen, ca. 45% (?) in Çamlıhemşin, ca. 80% in Fındıklı, ca. 100% in Arhavi, and ca. 45% in Hopa to ca. 5% (?) in Borçka (Andrews, 1989).

*Language:*

Laz (Lazuri nena), classed with Mingrelian in the Zan or Colchian branch of the Kartvelian or South Caucasian languages, and thus related to Georgian and Svan. Laz and Mingrelian are mutually comprehensible.

*Religion:* Sunni islam: Hanefi, to which the formerly Christian Laz were converted after about 1580 (Bryer, 1966).

*Group identity:* In general all the people living on the Black Sea cost anywhere east of Sinop or Samsun , or even as fas west as Zonguldak up to the Soviet border are called "Laz" in Turkey. In this wide concept or category of Laz are included those who really speak the Laz language, that is a language belonging to the southern (Kartvelian) branch of the Caucasian language group, together with the Georgians, Svans and Mingrelians.

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### *III. HEMŞINLI*

*Designation:* Hemshin, Khemshin; Ger. Chemschinli; Tk. Hemşinli; Laz. Armeni
*Self-designation:* Homsetsi (Homsetsi) in east; Hemşinli in west.
*Numbers:* CENSUS : no indication. From village population 1975 ca. 24,000 Armenian-speaking, ca. 15-20,000 Turkish speaking.
*Distribution:* in two well-defined groups. 1. The western group, Baş Hemşin, live in Rize province in villages along Büyükdere, Ortaköy, Fırtına, Piskale and Abiviçe rivers, in compact valley settlements extending well up to the Pontic mountains. 2. The eastern group is found in Artvin province, on the river systems flowing through Hopa and Kemalpaşa, and apparently limited to the east by the Çoruh river.
*Language:* in the eastern group, Armenian, western dialect, and Turkish. In the western group, Turkish only, though Armenian place-names are retained. The Armenian spoken is in at least two dialects, and probably varies from village to village, with astonishing archaisms, changes in the sound system, and many Turkish loans (Dumezil 1964).
*Religion:* Sunni Islam: Hanefi, with some deviant practices: Bryer (1975) reports the recent survival of baptism in at leasts one area.
*Group identity:* inadequately recorded. It appears now to derive primarily from language in the eastern group, though this does not imply acceptance of Armenian origin. Some, at least , are unaware that they are speaking Armenian (Dumezil 1964). The western group, now thoroughly Turkicised, deny Armenian origin for themselves, but are still referred to as Armeni by the neighbouring Laz (Benninghaus, 1989). The Hemşinli were attracted to Islam from the XVth century (Bryer 1975), or converted later, ca. 1700 (Dumezil, 1964) Those who remained Christian left the region of Hemşin (Arm. Hamsen) for Trabzon, or went further west to Samsun or even Adapazarı: these later left for Armenia at the time of World War I( Benninghaus ,1989, Andrews, 1989).

## MATERIAL AND METHODS

### *1. Sunni Turks:*

The samples (n= 1125) were collected from healty Sunni Turk males(nm= 615) and females (nf = 510) between 18-70 years of age. Attention was paid to obtain the samples from people originating from diverse parts of the country. Each sample was classified as to sex and birth place. There is a high incidence of consanguineous (cousin preferred) marriage in the Anatolian population. Therefore extreme care was taken, to collect blood samples from unrelated individuals.

### *2. Laz Turks:*

The blood samples were collected from the province of Artvin:
1) subprovince: Arhavi, district: Merkez, villages: a)Aşağı Hacılar (coordinates: 41.29-41.32) , b) Cumhuriyet ( 41.29-41.31) and c) Musazade (41. 29-41.33); 2) subprovince: Borçka, district: Merkez, villages: a)Demirciler (Mamanat) coordinates 41.23- 41.38, b) Düzköy (41.23-41.37); 3) subprovince: Borçka, district: Muratlı, village: Güreşen (Beglevan, Beylevan) (41.26-41.38); 4) subprovince: Hopa, district: Kemalpaşa, villages: a) Kemalpaşa (41.29-41.32), b) Dereiçi (41.28-41.31), c) Sarp (41.31-41.33); 5) subprovince: Hopa, district: Merkez, villages: a) Camlı köyü (Peronit, Perenit) (41.22-41.23), b) Sugüren (Kise) (41.23-41.26) from healthy males (nm= 112) and females (nf = 99) between 18-70 years of age. The ethnic denomination of the subjects was established by their mother tonque and based on this, the results from different areas were pooled .

### *3. Hemşinli*

The blood samples were collected from the province of Artvin: subprovince: Hopa, district: Merkez, village: Pınarlı (coordinates: 41.23-41.37 from healthy males (nm= 60) and females (nf = 28) between 18-70 years of age. The ethnic denomination of the subjects was established by their mother tonque and their personal claim.

Whole blood was obtained in citrate (3.8g/dL) by venipuncture. Fresh packed erythrocytes were lysed in distilled water in a 1:2 ratio and stored at -20°C until analyzed. The analysis was done within ten days after collection and the samples were typed on cellulose acetate for AK1, GLO, PGM1, ESD, ACP1, GC and TF with the Sartorius Sartophor System and based primarily on methods described by B. Grunbaum (1981), with slight modifications. The gene frequency of each allele was calculated by gene counting . Chi square tests for heterogeneity and comparison between different comunities were carried out on the observed number of genes.

## RESULTS AND DISCUSSION

This study which is part of a general investigation about genetic polymorphism on various ethnic groups living in Turkey, is concentrated on the Sunni Turks, Laz Turks, and Hemşinlis.

I. The phenotypes and the allele frequencies of the red blood cell enzyme systems studied in Sunni Turks appear in Table 1. Regarding the Hardy-Weinberg equilibrium, the frequencies provided a good fit to this statistical parameter. The present study will allow comparison of the Turkish Sunni population with the rest of the world. There is not much in the literature about the polymorphic systems for the Anatolian population except our previous studies and one reported by Hummel (1980) on Turkish people living in Germany. There is no information though, about the ethnic characteristics of the blood donors in these studies. Nevertheless, only a slight

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difference can be seen in a comparison between the values reported and our results. There is also a report for Turkish people in Iran by Amirshaki et.al. 1989, where differences were found . However this is not unexpected in the light of the genetic diversity of this population maintained through geographical, ecological, linguistic and cultural separation from the Anatolian people.

**II.** Laz Turks, form a considerably isolated group on the Black Sea region. The phenotypes and the allele frequencies of the red blood cell enzyme and protein systems studied appear in Table 2. The frequencies seem to be different compared to Sunni Turks ,our previous studies (Abacı et.al 1990, Atasoy et.al. 1990a,1990b, 1991,1993) and the group studied by Hummel et. al (1980). They are far from being in accordance with Hardy-Weinberg equilibrium, an expected consequence of the consanginous marriages that are predominant in the area. The present study will allow comparison of the Laz population with the rest of the world and especially with the different Turcic communities living in SW Caucasia. Possibly, investigation of different enzyme and protein systems among the above stated groups might supply interesting information in this regard.

**3.** Hemşinlis speak the Armenian language (Pastırma, 1970, Benninghaus, 1989), which may be an indication to relate them to todays Armenians, however there is no scientific, historical or sociological supporting evidence for it. . The phenotype distribution and gene frequencies obtained for Hemşinlis are presented in Table 3, wheras the comparison between the results found and the results of Sunni Turks of our previous studies (Abacı et.al 1990, Atasoy et.al. 1990a,1990b, 1991, 1992, Ateş et.al. 1990) and the group studied by Hummel et. al (1980) can be seen in Table 4. Altough the studied number seems to be a small one, there are some quite interesting results seen, like having a monomorphic AK system, and quite an elevated GC*1 frequency compared with the rest of the populations. Regarding the Hardy-Weinberg equilibrium, it is an expected situation to get a deviation, once the subjects were not genetically independent.. The frequencies of the genetic markers found should be compared with the frequencies of other Armenian groups to get a possible relatioship. Prior to such speculations, however, the results should be confirmed in a larger group of subjects.

We believe that the data reported here will also be a reliable tool for the quantitative evaluation of evolutionary divergence between populations and the evolutionary processess affecting each marker (Barbujani and Canella, 1987; Farabegoli and Barbujani, 1990).

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# TABLE 1. Phenotypes and Allele Frequencies of AK1, GLO, PGM1, ESD, ACP1, GC and TF in Sunni Turks (n= 1125)

| Phenotype | Number | | Allele Frequency | $\chi^2$ |
|---|---|---|---|---|
| | Observed | Expected | | |
| **AK1** | | | | |
| 1-1 | 1028 | 1030.33 | *AK1*1* = 0.96 | 0.22 |
| 2-1 | 97 | 92.58 | *AK1*2* = 0.04 | |
| 2-2 | 0 | 0 | | |
| **GLO** | | | | |
| 1-1 | 200 | 208.01 | *GLO*1* =0.43 | 0.72 |
| 2-1 | 565 | 551.47 | *GLO*2* = 0.57 | |
| 2-2 | 360 | 365.51 | | |
| **PGM1** | | | | |
| 1-1 | 555 | 567.1 | *PGM1*1*= 0.71 | 1.083 |
| 2-1 | 480 | 463.2 | *PGM1*1*= 0.29 | |
| 2-2 | 90 | 94.2 | | |
| **ESD** | | | | |
| 1-1 | 935 | 931.61 | *ESD*1* = 0.904 | 0.196 |
| 2-1 | 180 | 184.27 | *ESD*2* = 0.096 | |
| 2-2 | 10 | 9.11 | | |
| **ACP1** | | | | |
| A-A | 104 | 108.11 | | |
| B-B | 401 | 405.00 | *ACP1*A* = 0.31 | |
| C-C | 8 | 9.11 | *ACP1*B* = 0.60 | 1.636 |
| A-B | 426 | 418.50 | *ACP1*C* = 0.09 | |
| A-C | 64 | 63.78 | | |
| B-C | 122 | 121.50 | | |
| **GC** | | | | |
| 1-1 | 595 | 594.59 | *GC*1=0.72* | 0.255 |
| 2-1 | 442 | 446.58 | *GC*2=0.27* | |
| 2-2 | 88 | 83.84 | | |
| **TF** | | | | |
| CC | 1123 | 1102.61 | *TF*C= 0.99* | 3.534 |
| CB | - | - | *TF*D= 0.01* | |
| CD | 2 | 0.11 | | |

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## TABLE 2. Phenotypes and Allele Frequencies of AK1, GLO, PGM1, ESD, ACP1 & GC in Laz Turks(n= 211)

| Phenotype | Number | | Allel Frequency | $\chi^2$ | p |
|---|---|---|---|---|---|
| | Observed | Expected | | | |
| **AK1** | | | | | |
| 1-1 | 166 | 168.37 | *AK1*1 = 0.8933* | 3.00 | <0.05 |
| 2-1 | 45 | 40.18 | *AK1*2 = 0.1066* | | |
| 2-2 | 0 | 2.39 | | | |
| **GLO** | | | | | |
| 1-1 | 52 | 43.98 | *GLO*1* =0.4655 | 5.10 | <0.02 |
| 2-1 | 85 | 100.99 | *GLO*2* = 0.5344 | | |
| 2-2 | 66 | 57.97 | | | |
| **PGM1** | | | | | |
| 1-1 | 20 | 52.25 | *PGM1*1*= 0.500 | 79.62 | <0.0005 |
| 2-1 | 169 | 104.5 | *PGM1*1*= 0.500 | | |
| 2-2 | 20 | 58.25 | | | |
| **ESD** | | | | | |
| 1-1 | 169 | 165.20 | *ESD*1* = 0.9634 | 66.39 | <0.0005 |
| 2-1 | 5 | 12.51 | *ESD*2* = 0.0365 | | |
| 2-2 | 4 | 0.23 | | | |
| **ACP1** | | | | | |
| A-A | 19 | 11.05 | | | |
| B-B | 128 | 120.04 | *ACP1*A* = 0.2323 | | |
| C-C | - | - | *ACP1*B* = 0.7671 | 9.69 | <0.02 |
| A-B | 57 | 72.86 | *ACP1*C* = 0 | | |
| A-C | - | - | | | |
| B-C | - | - | | | |
| **GC** | | | | | |
| 1-1 | 113 | 109.47 | *GC*1= 0.7203* | 1.433 | <0.05 |
| 2-1 | 78 | 84.98 | *GC*2=0.2796* | | |
| 2-2 | 20 | 16.49 | | | |

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# TABLE 3. Phenotypes and Allele Frequencies of AK1, GLO, PGM1, ESD, GC in Hemşinlis (Black Sea) (n=88)

| Phenotype | Number | | Allel Frequency | $\chi^2$ | p |
|---|---|---|---|---|---|
| | Observed | Expected | | | |
| **AK1** | | | | | |
| 1-1 | 88 | 88 | *AK1*1 = 1.000* | | |
| 2-1 | 0 | 0 | *AK1*2 = 0.000* | - | - |
| 2-2 | 0 | 0 | | | |
| **GLO** | | | | | |
| 1-1 | 22 | 17.28 | *GLO*1* =0.4432 | 3.607 | <0.02 |
| 2-1 | 34 | 43.43 | *GLO*2* = 0.5568 | | |
| 2-2 | 30 | 27.28 | | | |
| **PGM1** | | | | | |
| 1-1 | 34 | 32.85 | *PGM1*1*= 0.6111 | 0.932 | <0.05 |
| 2-1 | 38 | 41.82 | *PGM1*1*= 0.3889 | | |
| 2-2 | 16 | 13.31 | | | |
| **ESD** | | | | | |
| 1-1 | 81 | 80.09 | *ESD*1* = 0.9540 | 44.616 | <0.0005 |
| 2-1 | 4 | 7.71 | *ESD*2* = 0.0459 | | |
| 2-2 | 3 | 0.185 | | | |
| **GC** | | | | | |
| 1-1 | 113 | 109.47 | *GC*1= 0.8160* | | |
| 2-1 | 78 | 84.98 | *GC*2=0.18739* | 5.193 | <0.02 |
| 2-2 | 20 | 16.49 | | | |

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# TABLE 4. Comparison of Various Studies in Genetic Marker Polymorphism for Turkish populations

| | Sunni Turks n=1125 | Turkish group in Germany (Hummel,1980) n=274 | Hemşinli Turks (this study) n=88 |
|---|---|---|---|
| **Allele** | **Allele Frequency** | **Allele Frequency** | **Allele Frequency** |
| *AK1*1* | 0.96 | 0.965 | 1.0000 |
| *AK1*2* | 0.04 | 0.035 | 0.0000 |
| *GLO*1* | 0.43 | not studied | 0.4432 |
| *GLO*2* | 0.57 | | 0.5568 |
| *PGM1*1* | 0.71 | 0.677 | 0.6111 |
| *PGM1*1* | 0.29 | 0.323 | 0.3889 |
| *ESD*1* | 0.904 | not studied | 0.9540 |
| *ESD*2* | 0.096 | | 0.0454 |
| *GC*1* | 0.72 | 0.743 | 0.8160 |
| *GC*2* | 0.27 | 0.257 | 0.1839 |

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