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## Linguistic, Cultural and Morphological Characteristics of Mongolian Populations

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## **Linguistic, Cultural and Morphological Characteristics of Mongolian Populations**

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Sandwiched between Russia and China, Mongolia is a landlocked country of 1.5 million km<sup>2</sup>. Mongolia has a complex geography with four major zones: the famous Gobi Desert located in the South, the Steppe in the East, mountainous regions in the west and north central parts of the country and the taiga zone in the northwest of the country, with an average altitude of 1,500 m above sea level. The Population of Mongolia is 2.6 million. More than 20 ethnic or cultural groups live in Mongolia. Administratively Mongolia is divided into 21 *aimags* (provinces) and each *aimag* is divided into more than 15 districts.

This paper is made up of two parts, the first concentrates on the prehistoric population and the second on the contemporary population of Mongolia. This paper presents physical anthropological information on the ancient and contemporary populations of Mongolia which are the main results of anthropological studies carried out by the author.

### **PREHISTORIC POPULATIONS OF MONGOLIA**

According to archaeological data, the territory of Mongolia was inhabited 700,000 years ago, the Lower Paleolithic period (Derevyan'ko et al. 1998; 2000a; 2000b). At present, over 500 Paleolithic sites have been discovered in Mongolia, most of them belonging to the Middle and the Upper Paleolithic and located in the Mongolian Altai and Gobi-Altai mountain ranges, and the Gobi desert and Southeast steppe zone (Derevyan'ko and et al. 1991). Based on the wide distribution of the so-called "Gobi pebble" or "Gobi core" artifacts in Mongolia, Siberia, Russian Far East, Southeast Asia and Middle Asia as well, it has been hypothesized that nomadic hunter-gatherer groups migrated across this region throughout this period. These Paleolithic population migrations were probably associated with changing environments during the Pleistocene (Okladnikov 1964; Derevyan'ko and et al. 1991; 2000).

In Mongolia, the Neolithic is known from abundant surface finds associated with present or former water-courses and lakes, and characterized by microblades and associated small tools with pottery, and divided into three chronological stages. The first stage belongs to the fourth millennium BC; the second to the third millennium BC; and the third to the end of the second millennium BC. The Mongolian Neolithic population was semi-nomadic and nomadic hunters (Dorj 1971; Okladnikov 1964).

Archaeological studies show that in the Bronze Age and early Iron Age culture there were significant differences between the western and eastern parts of Mongolia (Volkov 1968; 1981; Novgorodova 1987). In Western Mongolia, a culture associated with the stone

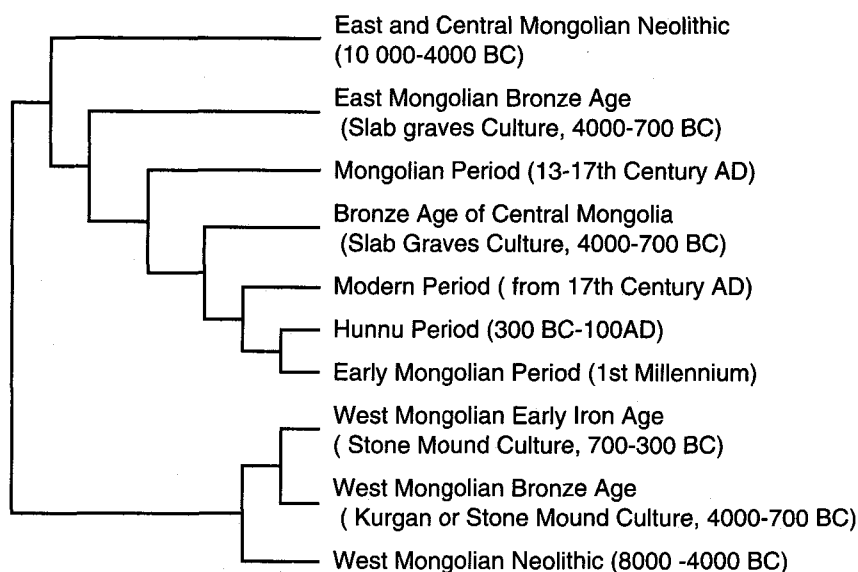
kurgans, the deerstone monument and rock art was widely distributed. The authors pointed out that the West Mongolian Bronze and Early Iron Age culture belongs to the Altai-Sayan variant of the South Siberian Bronze and Iron Age culture. At the same time, there was intensive cultural intermingling between western and eastern parts of Mongolia. In eastern and central Mongolia there was the so-called slab grave culture: rectangular enclosures of stone slabs set on edge, some times grouped in cemeteries. The slab-grave culture was widely distributed not only all over the territory of eastern and central Mongolia, but also in neighboring areas, from the Lake Baikal region in the North to the Ordos in the South, and from the Khangai mountain region in the west to Manchuria in the east. In spite of its wide distribution, the slab grave culture was homogeneous (Navaan 1975; Tsybekhtarov 1998). Mongolian archaeologists believe that the population of the slab grave culture were the closest ancestors of the Hsiung-nu (Sukhbaatar 1980).

Human remains belonging to different historical periods of Mongolia have been studied by Tumen (1978; 1985; 1987; 1992). Based on the results obtained from craniofacial studies of prehistoric remains in Mongolia, the author concluded that prehistoric populations of Mongolia reveal great heterogeneity of morphological traits. People with Caucasoid morphological features inhabited Western Mongolia while populations with developed Mongoloid traits occupied central and eastern Mongolia. However, the western Mongolian population of the Bronze Age exhibited more pronounced Mongoloid morphological features than seen in earlier times. It can be hypothesized that the Early Bronze Age was characterized by movements from eastern Mongolia to western Mongolia where intensive intermingling between local Caucasoid and Mongoloid populations took place.

Using the Euclidean distance method, we carried out a comparative study of Neolithic, Bronze and Early Iron Age populations of Mongolia and Northeast Asia to clarify the



**Figure 1** Main sites with human remains during the Neolithic and Bronze Age of Mongolia



**Figure 2** Dendrogram showing phylogenetic relationships of ancient and contemporary populations in Mongolia (Penrose's shape distance)

historical and biological relationships between those populations in Asia. For the Euclidean distance analysis we used the following eleven cranial and facial measurements: maximum cranial length, maximum cranial breadth, basion-bregma height, minimum frontal breadth, facial or bizygomatic breadth, upper facial height, nasal breadth, orbital height, facial profile angle, nazomalar angle, zygomaxillar angle. The approximate location of the crania samples from Mongolia is shown in Figure 1. The results of the comparative Euclidean distance analysis are shown in Figures 2, 3 and 4.

So the dendrogram shows that the ancient and contemporary populations of Mongolia are divided into two clusters. The first cluster includes all historical populations from east and central Mongolia, and it may indicate the genetic relations of those populations of Mongolia. However, the second cluster includes Neolithic, Bronze and Iron Age populations from western Mongolia (Fig.2).

Comparative morphological analysis shows that the Neolithic populations in Asia are divided into two major clusters. The first cluster includes all populations from the Lake Baikal region, Eastern Siberia, the Amur River basin and Japan. However, the populations from western Mongolia and Altai occupy a separate position in this cluster. The second cluster includes populations from China and Korea. Surprisingly, the Neolithic populations from East Mongolia and Primor'e are distinct from other Asians (Fig.3).

Comparison of Asian Bronze and Early Iron Age populations shows that these populations are divided into five major clusters except for the population from Manchuria, which occupies a separate position in this dendrogram (Fig.4). The first cluster combines most of the populations from West Mongolia, the Altai mountain region, South Siberia,

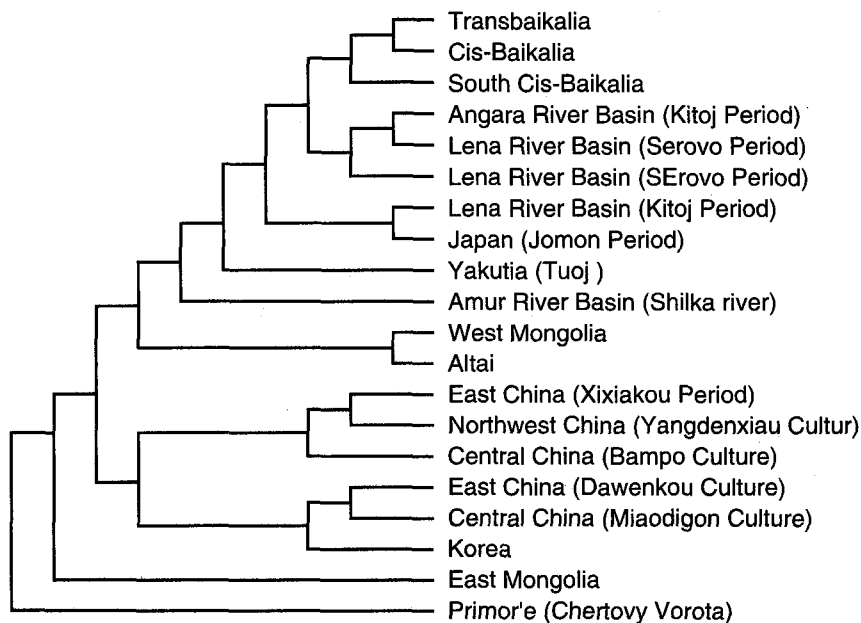
Korea and Japan (Yayoi Period), but in turn the first cluster divides into three subclusters. The second cluster includes populations from Inner Mongolia, Central and Northwest China. The populations from Altai (Afanasevo culture), North Kazakhstan (Usunian culture) and South Siberia (Minusinsk, Andronovo culture) belong to the third cluster. The populations of the slab grave culture from East Mongolia and Karasuk culture from Central Tuva belong to the fourth cluster. The fifth cluster combines the populations from Cis-Baikalia (slab grave culture), Minusinsk (Okunevo culture) and West Mongolia (culture of graves with no inventory). The separation of Bronze Age populations from Northeast Asia into several clusters and subclusters may show intensive intermingling of the Caucasoid and Mongoloid populations during this historical period.

### CONTEMPORARY POPULATION OF MONGOLIA

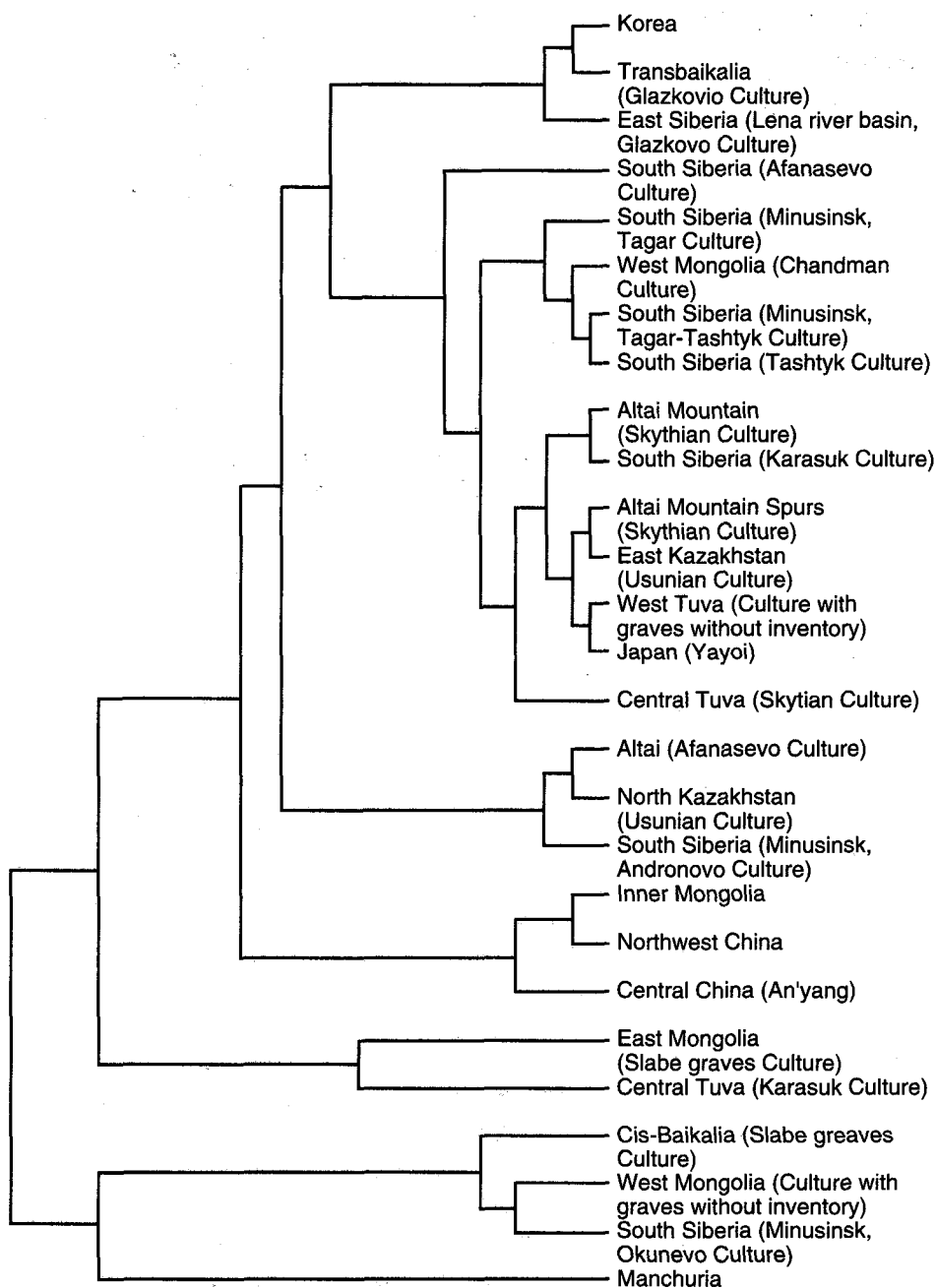
More than 20 ethnic groups speaking Mongolian and Turkic languages of the Altaic linguistic family inhabit contemporary Mongolia (Fig.5).

#### Demography

The population size and age structure of the ethnic groups of Mongolia are given in Figure 6. According to the 1989 census, the Khalkha comprised approximately 80%, the Myangad 2.6%, the Bayad 2.0%, the Khoton 0.3%, the Olet 0.5%, the Uriankhai 1.1%, the



**Figure 3** Dendrogram showing relationships of Neolithic populations in Asia (Euclidean distance)



**Figure 4** Dendrogram showing relationships among Bronze and Early Iron Age populations in Asia (Euclidean distance based on 6 cranial measurements)

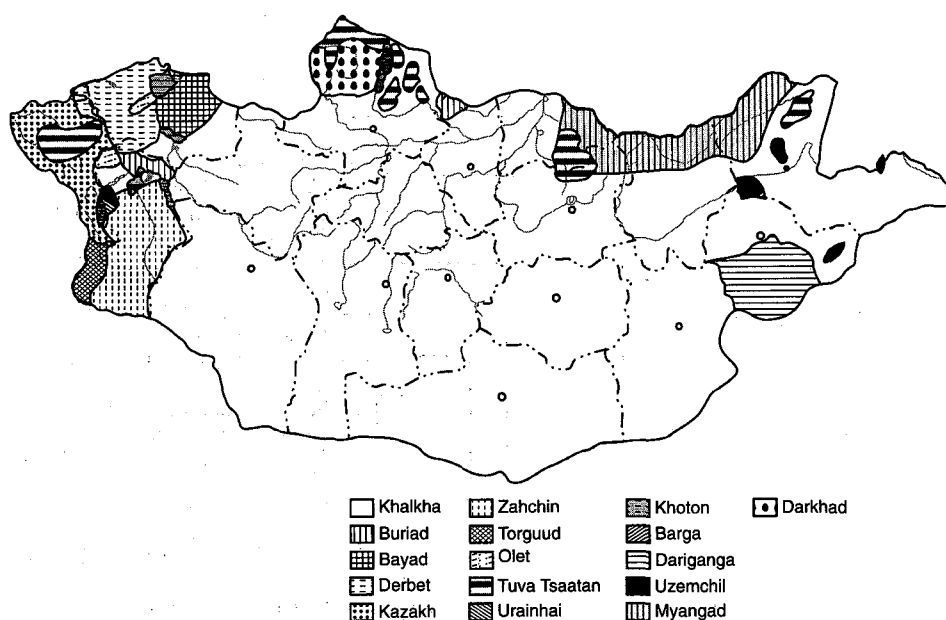


Figure 5 Geographic location of ethnic groups of Mongolia

Zakhchin 1.2%, the Torguud 1.5%, the Kazakh 6.1%, the Buriad 1.2%, the Uzemchin 1.1%, the Dariganga 1.5% and the Tuva 0.2% of the total population.

Figure 6 shows that from 1969 to 1989 the population size of each ethnic group increased 15 to 28.1 percent, and that the populations of all ethnic groups in Mongolia are very young, so that more than 50 percent of the total population of each ethnic group is under 30 years of age and more than 60 percent are under 40 years of age. One reason for the immense population increase was the improvement in living standards, especially, health care and urbanization.

### Language

Linguistically, the ethnic groups of Mongolia are divided into two language subfamilies (Mongolian and Turkic) of the Altaic language family. Among Mongolian ethnic groups, the Kazakh, the Khoton, the Tuvans and Tsaatan speak a language belonging to the Turkic subdivision of the Altaic language family. But the spoken language of the Tuvans, Tsaatan and Khoton are greatly influenced by Mongolian. The others speak different dialects of the Mongolian branch of the Altaic language family. For example, the Torguud, the Myangad, the Zakhchin, the Urainhai, the Derbet and the Olet speak an Oirad dialect; all tribes in the Khalkha ethnic groups (Sartuul, Eljigen, Khotgoid, Borjigon and Central Khalkha) speak a Central Mongolian dialect. The language of the Barga, Dariganga and Uzemchin belongs to the Eastern Mongolian dialect (Fig.7).

There are three main hypotheses (Poppe 1960; Ramstedt 1912; Street 1962) on the origin of the Mongolian language and its relationship with other branches of the Altaic language family.

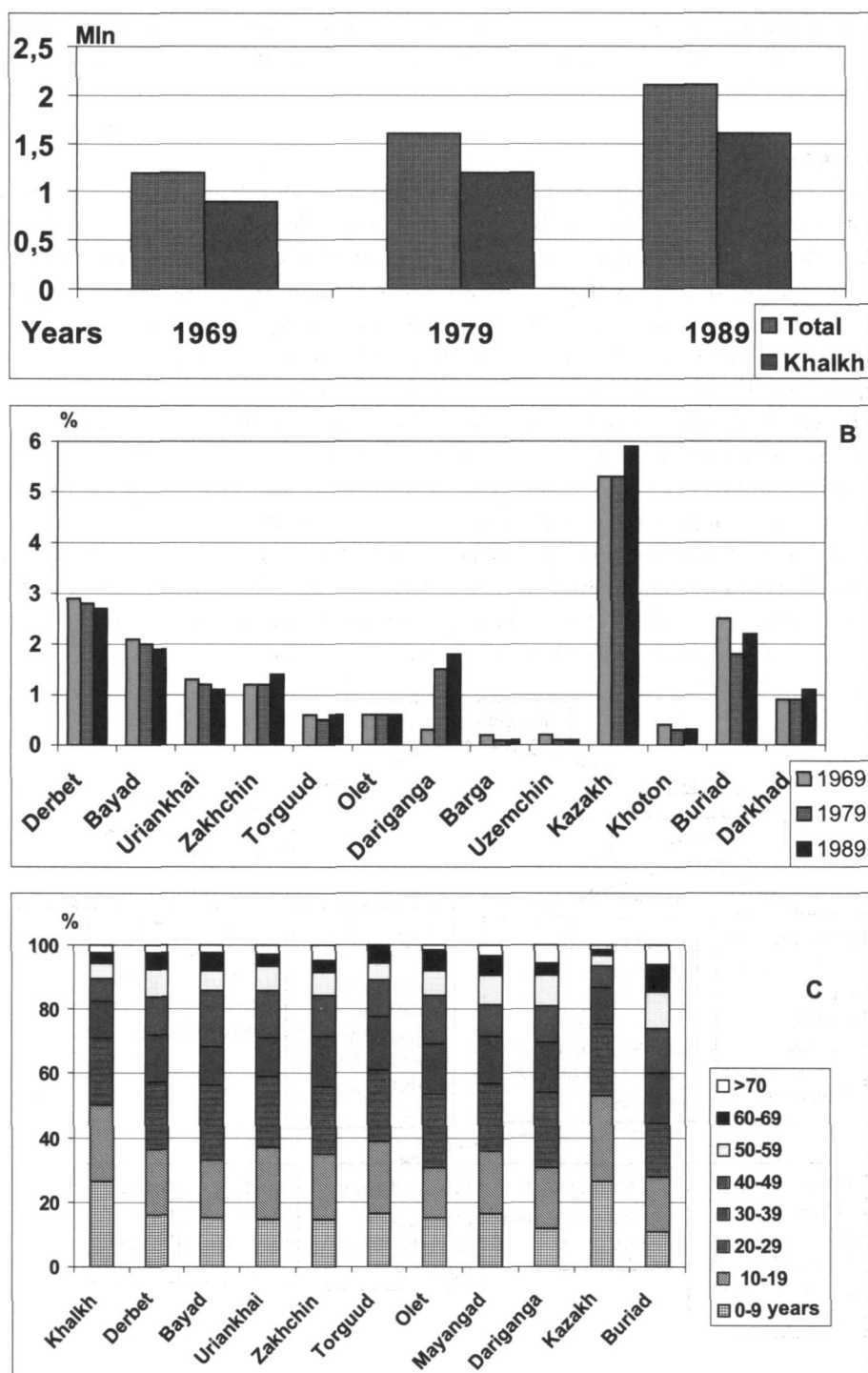


Figure 6 Population size and age distribution of Mongolian ethnic groups

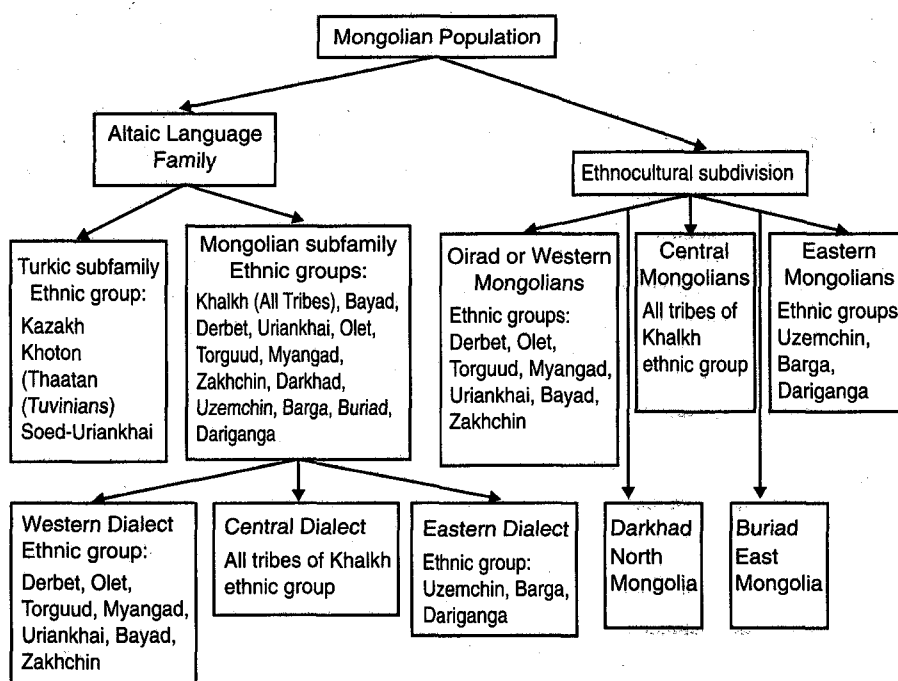


Schematically all the three proposals of the Altaic language family are shown in Figure 8, 9, 10. Most Mongolian linguist believe Poppe's proposal for the classification of the Altaic languages (Fig. 8).

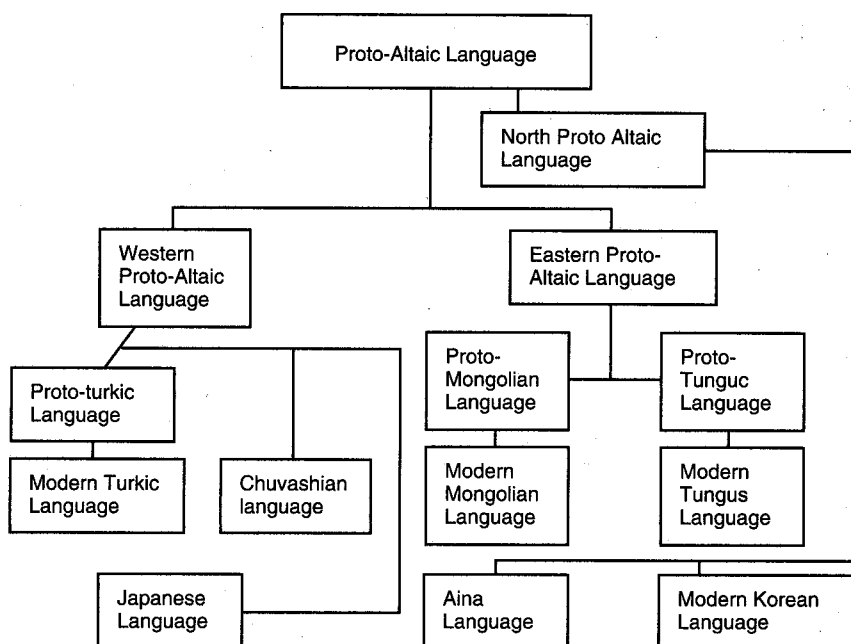
### Ethnohistory

The ethnohistory of some ethnic groups (Uriankhai, Torguud and Derbet) was described in historical sources such as "The Secret History of the Mongols" written in the thirteenth century. Based on Mongolian, Chinese, Arabian, and Persian historical sources and the traditional culture of some contemporary Mongolian ethnic groups, historian Gongor (1970), ethnologist Badamkhtan (1962; 1987; 1996) and other Mongolian ethnologists published numerous articles on the traditional culture, language, economy, kinship and origin of ethnic groups such as Khalkh, Darkhad, Tsaatan, Olet, and Uriankhai.

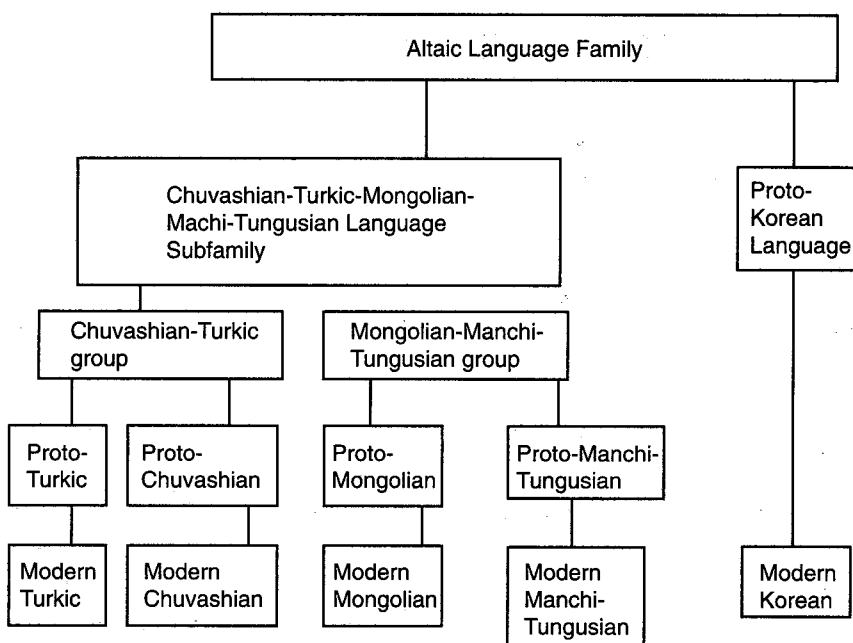
Based on ethnohistorical data, all ethnic groups speaking Mongolian could be divided into three cultural subdivisions such as Oirad-Mongolians or Western Mongolians, Central Mongolians and Eastern Mongolians (Fig.7). During the historical periods, Mongolians developed a typical pastoral nomadic civilization. In the modern period, there are classical pastoral nomadic, semi-nomadic and urban aspects of civilization in Mongolia. The main religion of the Mongolians is Buddhism which was adopted from Tibet in the seventeenth century and theologically is closely linked to Tibetan Lamaism. Shamanism is practiced among such ethnic groups as the Darkhad, Tsaatan, and Buryat.



**Figure 7** Linguistic and ethnohistoric characteristics of contemporary populations of Mongolia



**Figure 8** The scheme of the origin of the Altaic language family (Poppe 1960)



**Figure 9** The scheme of the origin of the Altaic language family (Ramstedt 1912)

## MORPHOLOGICAL CHARACTERISTICS OF MONGOLIAN POPULATION

### Dermatoglyphic Characteristics.

The Russian anthropologist Heet (1975; 1983a; 1983b) has studied the dermatoglyphic traits of several groups (four geographic groups of the Khalkha ethnic group and the Dariganga). She concluded that the dermatoglyphic variation among Mongolian populations is similar to that found among neighboring Central Asian populations such as the Buryat and Yakut. Heet also noted that among the Mongolian groups studied, the Dariganga differed by the highest frequency of Hypothenar pattern and the lowest frequency of axial triradius compared to the others. Tumen (1988; 1990; 1992; 1994) has investigated dermatoglyphic traits of major ethnic groups of Mongolia. According to her conclusions, ethnic groups of Mongolia, when dermatoglyphically studied, are extremely heterogeneous. Thus, within all the Mongolian ethnic groups, some dermatoglyphic features support a tendency of increasing the Caucasoid dermatoglyphic traits. This is manifested by the variation of the frequency of the hypothenar (Hy) and of the frequency of accessory interdigital triradius (AIT).

We studied more than 7,000 dermatoglyphic samples (finger and palm prints) belonging to 24 ethnic and cultural groups of Mongolia. All the dermatoglyphic samples used in the present study were collected between 1983 and 1992 by the author. The samples represent, from a population genetics approach, the descendants of the most stable groups of the native peoples, which were formed at the turn of the twelfth and seventeenth centuries AD.

In order to determine the relationships among the 24 investigated ethnic and cultural

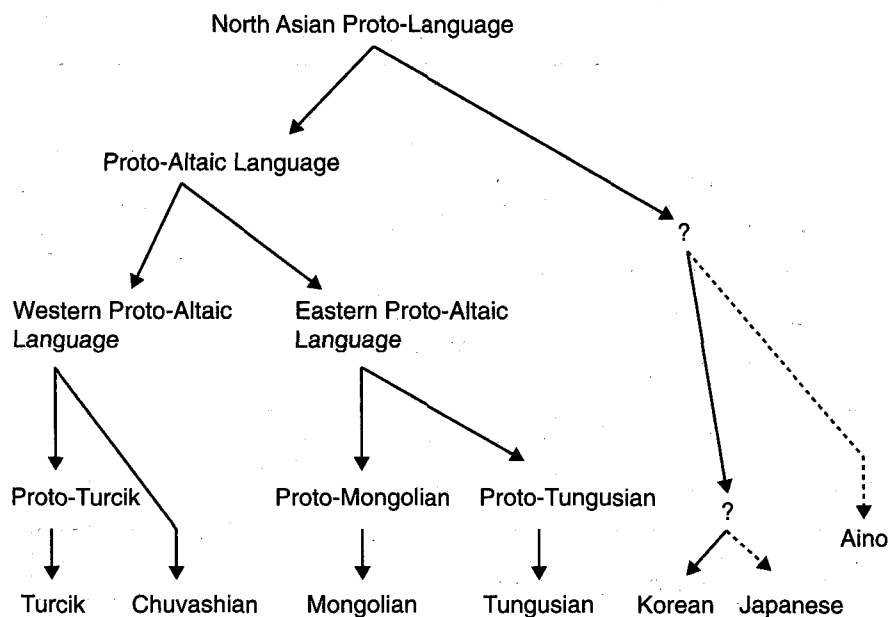


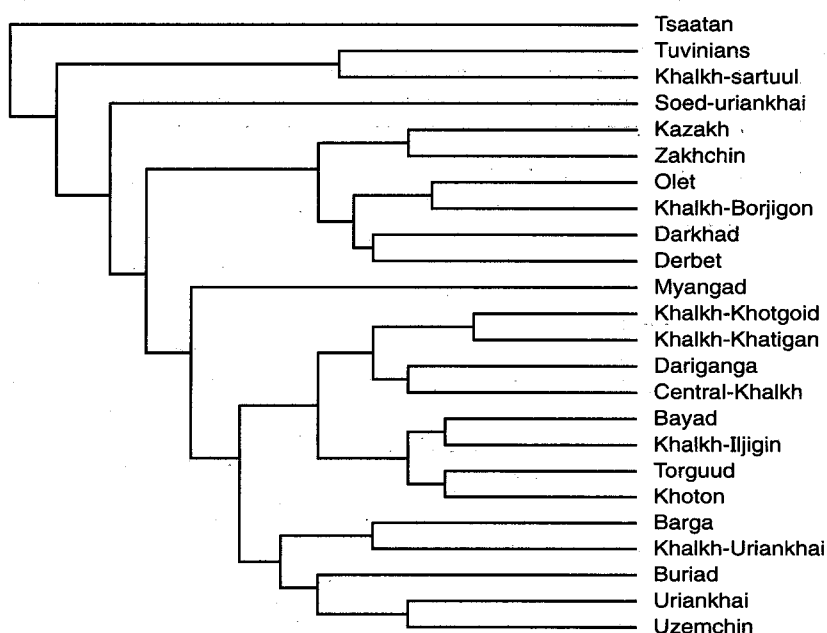
Figure 10 The scheme of the origin of the Altaic language family (Street 1962)

groups of Mongolia, we have calculated the generalized dermatoglyphic distance suggested by Heet (1983b) using five dermatoglyphic traits: 1) pattern intensity index (*PII*); 2) main line index (*MLI*); 3) frequency of the axial triradius (*t*); 4) frequency of the hypothenar pattern (*Hy*); 5) frequency of accessory interdigital triradii (*AIT*). The generalized dermatoglyphic distance matrix was used for cluster analysis, from which a dendrogram was constructed (Fig.11).

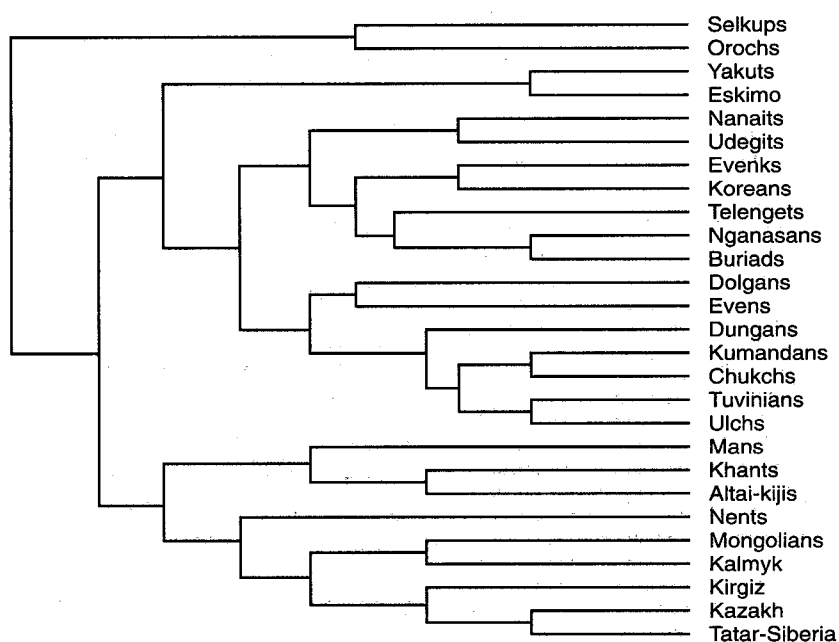
In the dendrogram, most of the Turkic speaking ethnic groups from Western Mongolia form a separate cluster. As can be seen, all Mongolian speaking ethnic groups form a large cluster, which is divided into three subcultures. The first subculture contains most of the ethnic groups from Eastern Mongolia. The other two subcultures include all the ethnic groups of Western and central parts of Mongolia. However, the seven studied tribes of the Khalkha ethnic group are included in different subcultures. In spite of that fact, all Mongolian speaking ethnic groups have great affinities for each other (Fig.10). The comparison of the several Asian populations shows that Mongolians, Kalmyk, Kirgiz, Kazakh, and Tatar-Siberia belong to one cluster (Fig.12).

### Dental Characteristics.

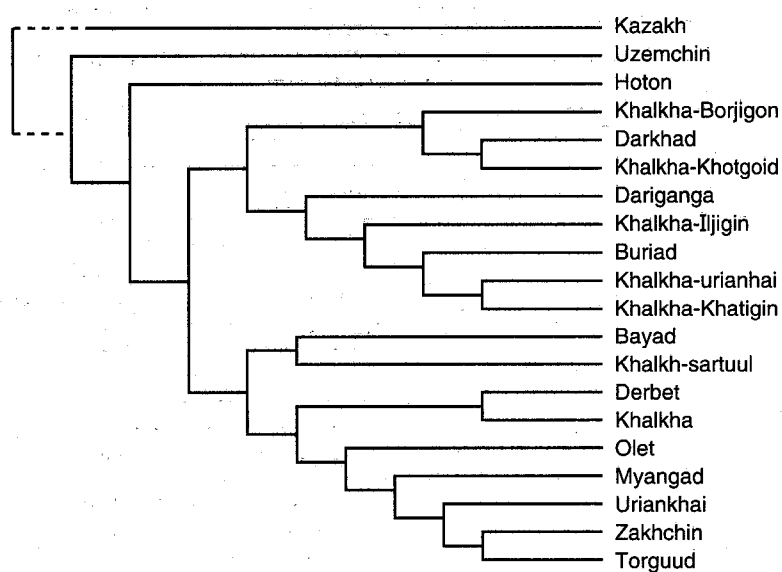
Dental samples belonging to 19 ethnic or cultural groups of Mongolia have been studied by Tumen (1992; 1994). The author pointed out that the geographic variation of dental traits shows that the frequencies of traits with "eastern" orientation (*shoveling U1*, *the distal trigonid crest (dte) LM1* and *the deflecting wrinkle (dw) LM1*) increase from the west to the



**Figure 11** Dendrogram showing relationships of ethnic groups of based on cluster analysis of generalized dermatoglyphic distance using 5 dermatoglyphic traits



**Figure 12** Cluster analysis of 27 Asian populations based on the Heet's generalized dermatoglyphic distance (male)



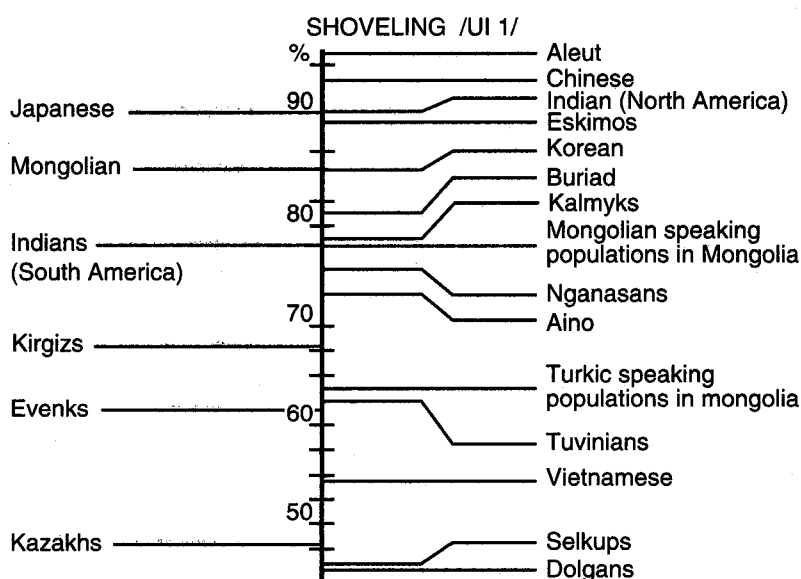
**Figure 13** Dendrogram depicting relationships among 20 ethnic and cultural groups from Mongolia based on cluster analysis results of 8 dental traits

east of Mongolia. At the same time, the frequencies of traits with “Western” orientation such as the *Carabelli trait UM1*, *4ML2*, *2MedII* decrease from the west to the east of Mongolia.

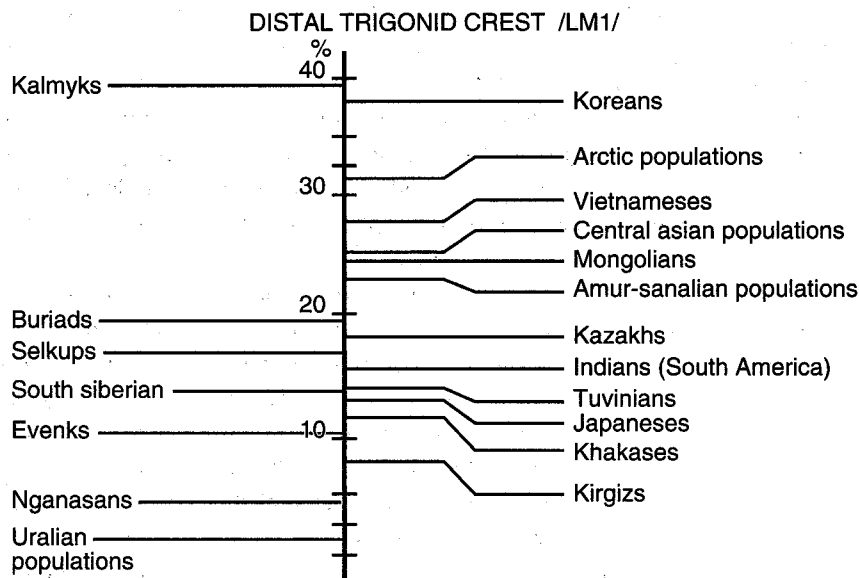
Based on the geographic variations of dental traits frequencies among Mongolian populations, the author concluded that the studied ethnic groups of Mongolia have significant heterogeneity of some dental traits and this high level heterogeneity within the population diversity of Mongolian ethnic groups can be explained by ethnohistorical factors and their nomadic way of life. The hypothesis that the identified dental features in the Mongolian population were derived from ancient populations is supported by the data. Paleoanthropological studies show the same results.

In addition, approximately fifty human skulls dating to the Bronze and early Iron Age discovered from the Chandman site were studied from dental and facial morphological perspectives, by Japanese investigator Matsumura (1998). The authors concluded that in dental and facial morphology, the Chandman people show closer resemblance to the Caucasoids, including the West Asians, than to Mongolians, although they have some similarity to the latter. The appearance of the Caucasoid features in the Chandman crania and dentation indicates an invasion of Caucasians into Western Mongolia, probably during the Bronze Age.

We investigated 2,669 dental samples belonging to 18 ethnic groups of Mongolia. Using Zubov’s generalized dental distance method (Zubov; 1989), we carried out comparative analysis based on nine dental traits (*shoveling UI1*, *the distal trigonid crest (drc) LM*, *the deflecting wrinkle (dw) LM1*, *Carabelli trait UM1*, *4ML2*, *2MedII*) to define relationships among Mongolian ethnic groups. Based on the generalized dental distance, a dendrogram



**Figure 14** Percentage of shovel-shaped upper first incisors among Asian populations



**Figure 15** Percentage of distal trigonid crest on the lower first molar among Asian populations

was created showing relationships of the studied Mongolian groups (Fig.13).

The Kazakh, Uzemchin and Hoton ethnic groups speaking Turkic languages, occupy a separate position in the dendrogram, and others belong to one cluster, but this cluster divides into three subclusters. The first subcluster includes all ethnic groups from west Mongolia, and the second subcluster combines all ethnic groups from east Mongolia, and the Khalkh-Khatigan and Khalkh-Iljigen tribes of the Khalkh ethnic groups. The third subcluster includes Darkhad from north Mongolia, and the Khalkh-Borjigon and Khalkh-Hotgoid tribes of the Khalkh ethnic groups (Fig.13). The separate position of the Kazakh and Hoton in the dendrogram indicates their different origin. The high level of diversity of the dental traits can be explained by ethnohistorical factors and its nomadic way of life.

We compared frequency results of shoveling on the first incisors and distal trigonid crest on the first molar among the Mongolians with those found in other Asian populations (Fig.14 and 15). The comparison showed that Mongolians had close similarities in dental morphology to Korean, Buryat, Japanese and Native Americans. This finding can support the hypothesis that those populations had common ancestors who inhabited somewhere in Central Asia.

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