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The Genetic History of the Karachay

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The Genetic History of the Karachay

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2007

Thesis Advisor: Theodore C. Schurr

University of Pennsylvania
Department of Anthropology
Submitted to the
Anthropology

In

AN UNDEVELOPMENT RESEARCH PAPER

Ashish Sen

By

THE GENETIC HISTORY OF THE KARACHAY
Appendices

8. Ethnographic Groups in the Caucasus Region
7. Eastern Eurasian Mitochondrial DNA Tree
6.6. Distribution of Population Haplogroups in Individual Populations
5.3. General Mitochondrial DNA Tree for Non-African Lineages
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3.4. The different haplogroups represented by the Karezay population results
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to identity paternally inherited genes that influence the phenotype population.

The study was designed to clarify some aspects of the Karelj population, which includes Chinese populations from other regions, and showed similar haplogroup types and somewhat similar frequencies. They might indicate the genetic makeup of the Karelj population. Eastern Han people were the most similar, and indicate that the Karelj population was indeed a Chinese population. Results indicate that the most similar population was indeed a Chinese population.

To elucidate the genetic past, this study compared the frequency of Karelj and evidence for this affilation. They are also supposed to be the Burgers, and the name Karelj/Balzar is

The Karelj-Marker population of the Northwestern Caucasian Mountains has an
identally in different ways (vide infra).

The names Atm, Arz, Ats, Kracax, and Bugar are all related to the Karachay ethno-

They distinguish each other simply as if they are different clan names, and frequently inter-

same language, with a few phonetic differences, separated in the Caucasus by the mountains.

Waik River in the Caucasus. The Maker are ethnically the same as the Karachay and speak the

due to Waik and Waikar (m) and borrowed into the language (in the language). This could

The name Dzukar is connected historically to Dzubukta, as we shall see later, but it is also

![Image](image-url)

![Image](image-url)

![Image](image-url)

![Image](image-url)

The Huns are well known as the tribes who wanted against the Chinese Empires for 500

Known records of Turks, the Huns, come from China in the 3rd century BC (Hเรnses, 1966, 17).

peoples now inhabit most of the central Asian steppes and Pamir region west to Turkestan. The earliest

of their homeland in the Altai Mountains in present-day Mongolia and Kazakhstan. The

The diverse clans and groups that represent the Turke people have dispersed from their

I. History of Turke People and the Karachay-Maker

II. Background
periods such as the Sogdians, Samanids, Mervans, and Kurds. Among them, one comes across the
Iranized tribes living in the Central Asian region around the Caspian Sea at different line
Before the Hellenic invasions began in the 7th century BC, there were many Iranian and
Khorasan is mostly concerned with the Western Turks until the Middle Ages.
concentrated in northern China (Mynaes, 1968, 22). From this spot on, the history of the
To divide into the Western Turks, concentrated in Kazakhstan, and Eastern Turks, or the Cumans,
The Chinese defined the Turks in the east in 8th century, which caused the Turkic Confederacy
incorporated into the Western Turkic Confederacy (Mynaes, 1968, 21).
the Volga region, and came into conflict with the Bulgarian. Hunnic tribes, and Xarzans, who were
in the West and soon gained much power. They controlled the steps between Kazakhstan and
the Turks (plural of Türk) Confederacy, as mentioned in Chinese sources. The Turkic expanded
Meanwhile, in Central Asia, two other Turkic tribes united in the late 7th century to form
does not seem to have changed, since the Avars were eager to move on and conquer (Mynaes,
place of the older term „abgahi”. Despite this, the ethnic and linguistic composition of the area
They probably were the first to introduce the title Qaghan (Khan) to mean the chief of their in
As the Huns had earlier and rode through Eurasia to conquer the Roman Empire.
In 55 AD, the Mongolian Avars came from East Central Asia, following the same path
were among the first Turko-Mongol immigrants in Eastern Europe (Mynaes, 1968, 20).
with the Huns. The Confederacy, but a separate tribe. However, tribes under the name of Bulgar
Confederation. It is unknown whether the Bulgar were Hunnic in origin or merely connected
the northwest Caucasus, which the Karchinsky people call home, and which was the center of the
The Confederacy stretched from modern northeastern Bulgaria to the Kuban River area in
The above mentioned Qashqai tribes were the progenitors of the modern Qashqai populations of Turkmenistan, Iran, Trans-Caucasus, Armenia, and the Balkans. These people share physical

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When Seljuk power declined in the Western part of the empire into small regional

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the 11th century (Menees, 1968, 27).

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eventually incorporated into the Qara-Qoyunlu Confederacy and were all converted to Islam by the end of

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Turkic khanate states, the khanates alone with others, Xazars, and others. They were

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region began to occasionally clash with the Pechenegs, who were part of the Juyuk-Qagan

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and the Islamic Seljuk Empire (Menees, 1968, 26). The Qara-Qoyunlu tribes in the Aralo-Caspian

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become more powerful and conquered more of the Volga basin. Forming the Seljuk Confederacy,
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had a different dialect from other Turkic tribes and from those in the East. These Qara-Qoyunlu

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tribes and

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make more sense if interpreted using the Karachay-Balkar language rather than Persian (Zakary).

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opposed to Qara-Qoyunlu or other Turkic). The Alans may have been originally Turkic, and

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it would be difficult to explain why the Karachays/day speak a Kirghiz Turkic language (as

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means "real" or "original". However, if these nomadic tribes were supposed Perso-Armenian, this

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been" Karachay oral tradition says that they have descended from the Alans of Arz (Azerbaijan), which

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informally in personal conversation. For example, they would say, "Alans, when have you

informally in personal conversation. For example, they would say, "Alans, when have you

names Alan (Alains) and Arzol (Arzol) (Menees, 1968, 24-5). Karachays call each other "Alans,"
Kuban area, and called it Great Bulgar. Later, one of his sons migrated into western Byzantine
Quarter, who was baptised in Constantinople in 619, was able to establish a center of rule in the
During Xanar rule, there were two lethal movements of the Bulgar. A ruler named
more Asian Turks, and others have blond hair, blue eyes, and very fair skin!

have different physical traits. Some look like the Central Asian Hulagian people, who exhibit
be a result of North-Iranian, Aryan, or Persian influence (Maurer, 1968, 241). Today, the Kai-khaya's also
Turkic groups were also fair-skinned, blue-eyed, and blonde-haired, like the Hulagian. This could
and possibly Primo-Lirique or Liike and Proto-Hunhan. This is confusing because since some
in Bulgar, possibly Hulagian Bulgar, or Bulgaro-Turkic. The other was Hulagian
was dark-skinned (called black Bulgar) and spoke a language different from Turks but similar

languages. It is said that there were two distinct groups within these.

The Xazars were not uniformly Turkic. They had various groups of different ethnic and

the Volga Bulgar's (Maurer, 1968, 30).

Chuarmas in 1030, establishing control over the Novgorod-Russian great princes of Kiev as well as
Europe from the Dnieper to the Ural River from 860 until they were defeated by the Turks
Hunnic as the state religion (Maurer, 1968, 29). The Xazars had control over all of Eastern
They kept other religious influences out of their area until about 740, when they accepted
Turkic-religious influences such as the double rule of Qaragh (Cherins) and Boys (local princes).

Archaeological and ethnographic evidence of the Western Turkic, became independent and moved into the Kuban River,

people (Maurer, 1968, 21-9).
Influenced by Qumans.

The Bulgars, it is likely that the Karacabey-Malalan were already speaking Kipchak Turkish.

The name Malakan could be a shifted variant, a continuation of Malakan or it could be related to the

descendants of the so-called Black Bulgarians, the Malakan, Bachele, after the Karacabey-Balzek in the Carpathian

Malakan River. They absorbed the Hruno-Malakan who were still living along the

Turkification of the area. They absorbed the Hruno-Malakan who were still living along the

Karacabey-Balzek, to live in the higher elevations to avoid conflict. The Moldavians began the

It is well-known among the Kipchaks that this is also the conflict that forced the

Bulgars of Volga-Balzek realm (Meneges, 1968, 32).

In 1236, the Mongols of the Golden Horde conquered the Yolga realm, destroying the Hruno-Malakan

language type that the Kipchaks speak.

The second major migration was up the Volga River, followed by the Kipchaks, who

much more than their immediate and eastern neighbors, the Osman-Speaking Crimean Turks of

Bulgarian populations exhibit very strong traces of the Slavic-Aramean or Slavic-Aryan type.

were influenced by Christianity and the Greek civilization. Today, however, the present-day

Turkic, their language, and their culture are the same and religion also

identity, and settled between the Balkans and the Danube. The Bulgarians spread out, and over
acquired the metalworking culture, and their weapons and metal work were held in high esteem. The Cimmerians, "animal-style" Celts, who descended from these peoples also acquired the Indo-European group into the Aryan and Thracian region. Evidence has been found of contact and possible migration of Scythians or later Iranians.

![Figure 1](image1.png)

There is also archaeological evidence of a profound influence of Scythian or later Iranian art on the Cimmerians. The Cimmerians had contact and influence from the Scythians or later Iranians, and this contact is evident in their art and culture.

Today, there are still people with these features in the Parmenian Basin. In 1968, 35 Qirghiz were the only two ethnic groups which physiologically resembled the Quman in Hwangta. These Qirghiz are also described by the Chinese as "green-eyed" and the "Quman in Hwangta." This similarity is also significant because of the Chinese sources the K'umăn-kuăn (Chin is also the name of the Quman, 1968, 35).

Qirghiz (whose language today is one of the Turkic languages most similar to Kachaq) is a name used in old records for the "Quman" of whom the ancestors of the Quman, who lived in northeast Mongolia, were part of a larger mongolian tribal confederacy, the Qai', whose other name was Kargaq, an older version of "Quman." They lived in northeast Mongolia, just east of the "Quman". It is believed that the Qirghiz were the result of a mixture of these peoples, as evidenced by their physical characteristics, which include fair skin, and blond hair with a height of 172 cm. Before migrating west, the Qurumans were still called Quma, and the name Quman is polysemous.
The Karachay and Balkar were defined by Muslims by the 1800's, though, and by this
time had mostly given up their former mixed religious beliefs, even the Syrian of park
The Karachay and Balkar were defined by Muslims by the 1800's, though, and by this
name that controlled the universe of the ancient Karachay.
There are also still several superstitions and names referring to the deities and spiritual beings of
mention of Tevri Terek, the "Sacred Tree" (God among the other members of Karachay society.
cesumed of their pagan traditions alive (Khvante and Mustafev, 2007). Even today, there is
throughout the history of the various peoples who inhabited the region, but they always keep
The Karachay may have converted to Christianity, Judaism, and Islam back and forth
their God
As all the Turkic peoples have been, and worshipped deities of nature, with Tevri (Tair) as the
has been varied and not well documented. It is clear, however, that they were originally pagan.
Although many Karachay are devout Muslims today, it seems that their religious heritage

1. The Karachay-Malaka People and Culture Today

was again in another mountainous country!

good experiences in the eastern mountainous areas, that the best place to settle to save their culture
day, though many are driven out quickly. Perhaps the ancestors of the Karachay, already having
protected many small groups of people in this way, safeguarding languages and cultures in this
their culture and people in the Caucasus Mountains (Khvante, 1998, 42). The mountains
culture and separate themselves from outside influence, just like the Karachay-Balkar preserved
in the Tien Shan Mountains of Central Asia, these Qirgis were able to preserve their

By the Chinese, traces of their industry can still be found in the forests and mountains of the
and then the United States. The following is a short account of how they came to those parts.

and their former "Kur" has only recently become less pronounced, since the introduction to Turkey ihimes differentials than other Karachays. This type of class differentiation among the Karachays of the lowland class in the Caucasian homelands, and it has often been remarked that they do.

It is said that one of the Karachay villages in Turkey consists almost entirely of those that were called "pig" or "pigs" in Turkish, and the society was somewhat feudal in nature (Kara, 1954).

and distinguished them as the "kuls" or serf class. The wealthiest owners of the stock were

To be able to maintain these large numbers of sheep, Karachays employed many laborers,

integral part of the regional economy.

et al. 2006). The Karachay/Malakar have long been producing high quality livestock as in

been found in Karachay sheep, indicating the authenticity of domestication in the Caucasus (Tape

domestication of sheep, if not the earliest, and a mitochondrial lineage not found elsewhere has

It is also interesting to note that the Caucasus may have been one of the earliest sites of

for their high breeding stock in livestock shows in London, Russia, and elsewhere.

thousands at a time in their individual sheep flocks (Kara, 1954). They have even won medals

most successful group in the Caucasus in developing hardy sheep and horse breeds, often having

Despite this story, it is well known in history that the Karachay and Malakar have been the

from Yugoslavia to their beloved plains!

women of this clan would eat pork in secret, decrying "May God curse those who sacrificed us

supposedly very successful in the rearing of pigs, and when they were convicted to Islam, one

informally, Chobchakari, which means "bevy pigs" according to our oral history; they were

(Chubkarev, 2006). There is a story of one of my mother's family clans, Chobchakari or
all of the total population of Karachays were deported to many locations in Central Asia and
Karachays alone lost over 25% of their potential population when at least 74,000 of them (nearly
thousands died of starvation, disease, and exposure, mostly old people and children. The
helping the Nazis and were deported from their lands by the thousands in cattle trains. Many
In WWII, the Karachay/Balkars, Ingush, Chechens, and others were accused by Stalin of
other groups, and so on.
drawn and dissolved, and drawn again. Different peoples were united and broken up, united with
drawn and dissolved, and drawn again. Different peoples were united and broken up, united with
of land and freedom, many of which were not kept (Congress, 1960, 19). Yugoslav borders were
When the Soviets came into power, the Caucasian ethnic minorities were given promises
October Revolution (Congress, 1960, 2-9).
again in 1877, revols were reawed, but were fruitless. In 1917, the Turkish regime fell in the
Turkey and the Middle East to escape the repression. When Russia and Turkey started fighting
and settled Russians in their place. In this long, many Karachays, Balkars, and others fled to
Circassians, plus also the other North Caucasian peoples in the same area. The Karachay-Balkars
who were left, including 600,000 "Circassians" (which probably comprises more than just
fall to Russian power in 1864. Tsar Nicholas I expelled and killed many of the native inhabitants
north Caucasus by the Kuban River, the Circassian and Karachay lands, were the last to finally
However, the Longhiont Caucasus Wars took their toll on the populations. The area of the
leaders of the freedom loving mountainers who rebelled against the Russian conquerors.
keeping the Russian armies at bay temporarily. Imam Shamil was one of the most famous
people, especially the Muslim courts, defended their homelands bravely for hundreds of years.
Russian forces decided to take over their land in the late 16th century. The Caucasus mountains
The Karachay and Balkar peoples had long been living in the mountains when the
recording in their oral histories, but over time, discrepancies, mixtures of accounts, and loss of oral

mountain of Tungus (Colarusso, 1992.1). The origins of these groups of people have been
diversity and uniqueness of the languages is such that the Caucasus has been known as the

Many different ethnic and linguistic groups inhabit the Caucasus Mountains. The

1.3 History of Genetic Studies in the Caucasus

relatives based on common culture.
someone of a different language group and religion, mostly for reasons of good marriage
was Karadzay. It is still known among many Turks, rather than a Karadzay, let alone

since the Karadzays settled in separate villages in Tunkéy where the ethnic village population
also have been influenced by migrants from Karadzays, though this is also probably not too common.
religious beliefs, intermarrying with non-Karadzays, though there are several cases. There may
in N, a closely-knit ethnic group which still maintains its language, religious, and
few members of the population have come directly from the Caucasus as well. They constitute

1960s and 70s. They are centered in Potseison N1, and are the subjects of the genetic study. A
from Tunkéy, a number of Karadzay migrated to the United States beginning in the

late 1800s and again after WWI.

Tunkéy and other communities of the Middle East, where they took refuge from persecution in the

Secumiller, 1996). Most are in Karadzay-Cherkessia, but there are significant numbers in

today, there is a sizable Karadzay/Balkar speaking world population of about 24,000

somewhere like Tunkéy

most returned to their homelands when access was restored to them, and some migrated to other

Spain to work in concentration camps (Commins-Richmond, 2002). After these deportations,
cell. Instead of being in chromosome form, as nuclear DNA is, mitochondrial DNA is circular and only
the nucleus of each cell, but in the tiny mitochondria in the cytoplasm that produce energy for the
mitochondrial DNA is passed down only through the mother of each person. It is not in

1.4 Specific aims of study

For mitochondrial genetic research:

Therefore, the inherent history and lack of genetic studies make Karachay’s good candidates
that I found had very few Karachay samples and did not hit the important segments.
Evidence on the Karachay’s, or they do, they are inaccessible to me (in Russian). The literature
recently there have been quite a few genetic studies on the Caucasus, but none have solid

subjects who expanded across Europe, but may be earlier migrations (Bulunova et al. 2003).

Other studies showed that the Caucasian populations are not descendants of Neolithic

subdivision. However, those distinctions were sometimes superfluous, and there were patterns of

by the mountains of geographical barriers in some area, but more through linguistic rather

1990s (Nasiede et al. 1999). Some studies indicated that these populations were not restricted

There were several of these done on the Karachay, Balkar, and modern populations in the early

studies. Early ones were conducted using blood groups, immunological, and biochemical markers.

For these reasons, people have focused on the genetics of Caucasian populations in a few

described Alans, Altai, Tungus, while others say they are Iranian in origin.

of the groups face their ancestry to the Alans, about whom little is known. Some sources

history has led to an unclear picture of how each group came to settle in these mountains. Several
I was immediately compelled to know that I would soon be standing my own at the moment

He was kind enough to invite me in and listened to my enthusiastic plea to do this study with

Dr. Schott's office was just in front of the poster. I knocked on the door to discover him inside.

Karakhanides in northern NL. I was stationed within a stone's throw of the door, but the few moments' notice that

wondered if the same kind of study could be done on the particular community of our

the Karakhanides, so I felt an immediate personal connection to this unique research. I

known from an oral history that my ancestors were Tukhies, and they had originally come from

Schott's, and it was about Native Americans' genetic relationships with Al affine peoples, I had

was possible to trace the genetic history of a population using DNA. The research was Dr.

Before stumbling upon a certain research poster on a Penn Museum wall, I had no idea if

II. My Discovery of Molecular Anthropology and the Beginning of My Research

II. Research Design and Methods

come from. My historical analysis will also be helpful in this regard.

(ethnic genetic contributions), and where geographically these influential factors may have

conclusions about which of them have influenced the Karakhanides population more than others

natural haplogroups in each of the populations and the Karakhanides, I was able to draw some

the Middle East, and Central Asia. By looking at the haplotypes of West and East Eurasian

comparing my results to those of previous studies involving populations in the Caucasus, Russia,

I used this mitochondrial DNA to study the maternal gene pool of the Karakhanides.

and DNA ideal for quick molecular analyses,

about 16,500 base pairs long. The English maternal inheritance, and lack of recombination make
tions could be used to give information about their origins, I explained to each of them that DNA even was, or how participants were diverse.

Just as I did not think it had a large impact, The final results show that the samples, since it is a distant cousin or even a first-generation relative, the sample may have been somewhat biased. In general, our closer relatives were eager to donate, while people who were less related were not.

I helped in the collection of samples. Also, that they are older and more well-known than I am was a great help in the collection of samples. Almost all the opposite sex are so strict in our community, my mother and father were a great help; and because I am a member of the opposite sex, I was able to relate to relatives easily. Approach people for sample donation, Karashey corresponds easily attended and performed by non-Yiddish contact from the Jewish-Karashey community in Northern N.J. I was able to relate to relatives easily.

This summer, I started collecting samples for my project. Because I am a member of a Pennsylvania Institutional Review Board. Soon after, the approval was issued, and I began my project.
many clans in the Karachay, perhaps over thirty, but most of the participants seemed to belong to the major ones.

This was not a problem because marriage rules in the Karachay community dictate that one can only marry someone if they had no common ancestors for seven generations back. In other words, exogamy prevailed, and I would expect more diversity even if participants were representative of a few clans.

In addition to the interviews, participants read and signed Informed Consent forms (Appendix II) to protect their privacy, with the option to withdraw if they wanted to later. Their identities were kept anonymous in all parts of the research project, only my advisor, Dr. Schurr, and I have this information. The individual results I have uncovered will be sent to each participant, along with a general and anonymous analysis of the Karachay population as a whole.

11.2 Laboratory Methods and Procedures

**Sample Preparation and DNA Extraction**

I collected buccal (cheek) cells from each participant through a cheek scraping method using an Omniswab applicator. The swabs containing the buccal cells were ejected into small cryovials containing 2 mL sterile 1X TE buffer, pH 8.0, and vials capped in parafilm to prevent loss of buffer volume.

At the molecular anthropology lab at Penn, I vortexed the buccal samples to resuspend the cells to collect the cells at the bottom. The cells were lysed with detergent and the DNA was extracted with phenol-chloroform (Maniatis et al. 1982). Purification with ethanol
For a specific haplotype (from previous published work) is present or not. The SNP analyses give information about whether a particular mutation that is expected

Sequencher 3.1 software tool (Gene Codes Corporation) Molecular Antropology and the resulting sequences obtained and compared using the

All sequencing reactions were read on ABI 3130xl DNA Analyzers in the Laboratory of

changes have been characterized from extensive previous studies. Identies key nucleotide mutations that define the broader mtDNA haplogroup. These defining

identities in the region of the mitochondrial genome within each individual, mtDNA, and also in Snuffer et al. (1999). HVS-1 Sequencing provides in individual patrons of mutations that have occurred in this region of the mitochondrial genome within each individual, mtDNA, and also in Snuffer et al. (1999). HVS-1 Sequencing provides in individual patrons of mutations that have occurred

(CR) was sequenced using the primers and polymerase chain reaction (PCR) conditions reported

Hypervariable Region 1 (HVRI) (nucleotide positions 16000-16400) of the control region

designations.

phylogenetically. Haplogroups and subhaplogroups are defined using letter and number

haplogroups that have common originating points of divergence, and are grouped together haplogroups that have diverged from a single mitochondrial Eve. Haplogroups are those sequences

knowledge of universal mitochondrial trees, in which the many individual sequences of

specific lineage within haplogroups (Snuffer et al. 1999). Previous studies have resulted in the

region (CR) sequencing to characterize major haplogroups (more general) and haplogroups

The mtDNA studies involved single nucleotide polymorphism (SNP) analyses and control

Mitochondrial DNA analysis

were used to create 1:10 dilutions that were used in all the following tests.

followed, and diluted DNA samples were re-suspended in water as stock solutions. The stocks
source populations were taken from the published literature (e.g., Bermejo et al., 2004). Populations or which surrounding populations could have similar roots. Data from these populations were taken from a hypothetical source West and East Eflusian source populations to the Kardashian's I compared my data with published

to assess different population origin models, using the relative genetic contributions of each of the haplotypes present in the populations. No use was made to evolve phylogenies or networks of mitochondrial haplotypes in the species. I constructed a tree using the median-joining network method (Bandelt et al., 1995). 

**Phylogenetic Analysis**

haplotypes (sequences). These are the ones most pertinent to the genetic history of the Kardashian's and Indian (Krivitskaya et al., 1999; 2003; Bamshad et al., 2001; Palumbi et al., 2004).


The SNP analysis involves screening Kardashian samples for mutations that define West

the haplotype is present or not. Their size indicates whether the enzyme cut at or not, and thus whether the mutation which defines number of fragments, and whenever possible to separate the different lengths of DNA fragments. The number of fragments, and

not, and the DNA is cut accordingly. The restriction enzyme digested samples are run on agarose gels in order to locate the banding pattern given by the enzyme digestion. The restriction enzyme digestion is present, the resulting band pattern either confirms or does not confirm the mutation is expected to be as follows: PCR and the mutation is discovered by typing to confirm it.
mitochondrial diversity seen in Figure 5 (Kayshul et al. 2004). The haplotypes are
This represents only the Karachay population and is a specific form of the more general one of
The network tree that was constructed using the specific sequences is shown in Figure 4.
information is in Table 1, and the visual representation of the table is Figure 3.
These were grouped into broader haplotypes, and some into subhaplotypes. These
haplotypes, those were grouped into broader haplotypes, and some into subhaplotypes:
the resulting data yielded 31 different haplotypes, about every other person had a unique
described, except for one which could not be sequenced, but was successful for AFLP analysis.
All of the 67 samples collected were able to be amplified and analyzed using the methods
Geographic location in the Caucasus, where present-day Karachay-Cherkessia exists:
Russian persecution in the late 1800s. For the sake of clarity in Figure 2, I have placed their
which is indicative of the genomic lineages that made it to Tucky when the Karachays fled from
Caucasus were their grandparents, who came in the 1870-1890s. This has produced a sample set
have not intermarried with Turks in Tucky. The first in their families to have come from the
born in Tucky were also mostly born in Karachay villages. In addition, the populations that they
next that they were collected in the US had no bearing on their genomic history. The participants
the participants had been born in Tucky and immigrated to the United States later in life, so the
whether these may have been intermarried with non-Karachays in their history. Almost all of
their birth locations and their parents' and grandparents' birth locations. This would clarify
When I had obtained the geographic information from participants, I had asked about

III. The Karachays

II. Results and Analysis

The most represented was L, which was 41% of all samples, with L1 and L2 being the most and 89% were R alleles, both of which are West Eurasian haplotypes. Of all the haplotypes in the Eastern Eurasian network were in Figure 7 (Krivits et al. 2002). Only 2% were N alleles. Overall, the Karaimys had 9% M alleles, which are East Eurasian in origin and represented haplotypes D, C, and N alleles.

The Indian mixed ancestry of M alleles, those that were present indicate a wide diversity, as well. With the intercestable and individuals from diversity in this haplotype. Although there was not a high frequency of haplotypes specific to this Indian sample, a lot of diversity was found. The Karaimys had representatives of all haplotypes and branching of the network tree, with only a single sample in the N haplotype branch.

The diversity of the haplotypes represented is needed to understand the extent of the variability in the individual sequences found. The Karaimys had representatives of only the M haplotype.

III.2 Haplotype Diversity

Analyses would have to be done on the Y-chromosome to clarify this issue. A gene pool may give a different story. Further geographic isolation (Schurr and Wallace, 2002). The isolated gene pool may have not diverged in the recent past, meaning they could have been the result of cultural or surnames. Also, some of the branches are very long. Percentages indicating old haplotypes that have the high number of haplotypes with respect to the sample size indicate that the sample where those particular haplotypes are found in the network.

Yellow circles and their locations represent the number of samples with a given haplotype and characterized by the sequence of mutations leading up to the yellow circles. The size of the
but when the history of the Karamajes is related to the Iranian Sassanians was considered, the
population. This was a surprise at first, since they are separated by a large geographical distance.
The next most similar population in haplogroup frequency is the Eastern Iranian
Caucuses, and significant admixture is likely.

expected outcome, since the populations have very little geographical distance between them in the
indicate more Western and less Eastern genetic influence. Overall, the similarities present in
are present in Karamajes. The Adygei also have many more H, and less Y, than Karamajes,
method are the absence of W in Karamajes, and the presence of I and H in Adygei, which
H, HY, I, R, T, W (haplogroups that are almost identical to that of the Karamajes, the only significant
similar to the Karamajes, and most are N1, as well. The frequenters of West Eurasian (U, K,
Karamajes and who speak a non-Turkic language. Their cultural traditions and folk dances are
Karamajes seem most similar to the Adygei, with a Caucasus population just west of the
The most similar and most dissimilar populations deserve closer analysis. Overall, the
Caucasian, a separate map is given in Figure 8.

effectively in Figure 2, to show more clearly where ethnic groups are located in the
individually in Table 2, and those which are the most unique are shown in Figures 6-9, and
Russia, and Central Asia (Turkic origins). Their specific haplogroup frequencies are represented
literature. I chose populations from the Caucasus, the Middle East and Iran (Sassanian influence).
I compared the frequencies of haplogroups to other populations found in the published
pool. I understood which populations may have contributed to the Karamajes national gene

III.3 Comparisons with Other Populations

Prevalent. The individual breakdowns of these percentages is shown in Figure 3.
admixture could have occurred when human Scotlans encountered the Chimains and Yeuset.

underwent significant admixture as they moved westward into the Carpathians. In addition, this
of the maternal ancestors of the Kazakh's origin, could have been from the Vylia Region, but

These results could indicate that the Turke of Central Asian population from which some

are in between Altaians and West Eurasia.

Bashkirs. This is expected because the Altaians are closer to East Asia than the Bashkirs, who

(45%), but less T's and H's. In these ways they were more dissimilar to the Kazakhs than

composition but less in frequency to the Kazakhs. They had even more N's than Bashkirs

Altaians were less diverse than Bashkirs, and more similar to Kazakhs in haplogroup

N's.

are closer to East Asia than Kazakhs. While Kazakhs have only 9% M's, Bashkirs have 32%

N9, Y). Also, the East European types (M) prevail in overall frequency, as expected, since they

more Westen and Easten European types that are not present in Karakays (Y, P, A, B, N1,

seen in the same frequencies (H, K, V), but Bashkirs have much more diversity and have both

Bashkirs have all the same haplogroups present in Kazakhs, except for R, and some are

NW of Mongolia and NE of Kazakhistan,

where Tunes originated. I compared with Bashkirs (North of Kazakhstan) and Altaians (montains

To test whether Kazakhs have affinities with other Turke populations in Central Asia,

Kazakh population haplogroups. Kazakhs have in place of these types more U's instead.

absence of H and R (West Eurasian) in Easten Kazakhs are the only discrepancies with the

Eurasian (Ypes present). The presence of W (West Eurasian), V, and B (East Eurasian), and the

Eurasian (is the same, 99%, while there are only slight differences in the frequencies of the West

outcome was supportive of this theory. The frequency in both populations of W types (Easte
Patients must be done.

populations; more substantial analyses on this data, and further research on the Y-chromosome
Thus, these results are only preliminary; and to elucidate further the contributions of various
haplotypes from a neighboring population with many haplotypes representative of that group,
haplotypes, one population may have received most of a specific haplotype of a less prominent
within these haplotypes. Also, although two populations could have different frequencies of
but the populations in question could have totally different and non-overlapping haplotypes
interaction patterns and the outliers. This is because haplotypes may be similar in broad terms,
populations in the Karchay material gene pool, these results may not be indicative of actual
Despite evidence from haplotype frequencies for the general contributions of certain

overwhelming.

neutral populations that may have had some genetic contributions, but the evidence is not
Karchay, are not initially very similar or dissimilar to the Karchay, and can be considered
Armenian gene pool. Georgians and Hugo's, which are also close in geographical terms to the
which are close in geographical and political affiliation with the Karchays. The types and
Western Ukrainians, Tutsis, Azeris, and Karagas (castrum Kasaeus, near Karchay), all of
acCORDING to haplotype frequencies with the Russians (in the west, near Moscovy, Litorins,)
and somewhat similar to Vahian peoples, they do not seem to have any clear affiliations, at least
Interesting to note is that while Karchays are most similar to Aryan Eastern Ukrainians,

Kargal from this region near the Altay Mountains before the Qingmns moved west toward the
problem, it is necessary to conduct further research on the genetics of the Karahalı people.

Thus, this study indicates that the Karahalı do not have a clear picture of their genetic
(Syrians and Allies),

Basin) who also had previously admixed with ancient Iranian peoples from the Caspian Region
Caucasus and later admixed with Turkic Qumans (also from near Aral and River
Turkic peoples from the Alar Mountain (Huns-Bulgars), who have moved westward into the
These outcomes are supportive of the theory that Karahalı are descendants of ancient

Alans,

Indeed, the closest in haplogroup types and frequencies seem to be the Eastern Huns and
geographic distance except for the Avars, who are located north to the west of the Karahalı.
Results indicate that Karahalı are not related closely to those groups that are closest in

haplogroup frequencies to those of the pertinent populations.

have analyzed the mitochondrial DNA from this population, and compared the resulting
represent those that have contributed to the genetic identity of the Karahalı in the Caucasus. I

The Karahalı, according to history, were descended from a variety of peoples, including

14. Conclusions


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66(4):639-68.


References Cited.
.contextualized_text
Figure 1: Flow chart of important ethnic groups and migrations that may have influenced Karachay genetic identity.
Figure 3: The different haplogroups represented by the Karachay population results.
Figure 4: Yakhchali Mitochondrial DNA Tree
Figure 6: Karachay Haplogroups with U's and M's Exposed.
Figure 6b: Eastern Iranians

Eastern Iranians (25) Malyschuk 2002 Russian
Figure 6c: Western Iranians

Western Iranians (101) Malysheva 2002 Russian
Figure 6: Irenians (no specific location).
Figure 6: Iraqis

Iraqi (216) Al-Zahery 2003
Figure 6a: Russians
Figure 8: Map of Ethnolinguistic Groups in Caucasus Region (from website: [Caucasus-ethnic.png](https://upload.wikimedia.org/wikipedia/commons/f/f4/Caucasus-ethnic.png))
### Genealogical Information

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<th>Ethnicity</th>
<th>Mother's Name</th>
<th>Place of Birth</th>
<th>Date of Birth</th>
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**Additional Notes:**
compounded form in the P.I.S. laboratory, and accessible by only those persons involved in the

Confidentiality: During the research project, all genetic and genetical data will be kept in

buccal cells, we will note fully document the history of the participant. However, it is one step from measuring the sequence nucleotide in the DNA from your

Sample. There are no direct benefits to you as a result of your participation in this

Diseases or Discomforts to Participant: The buccal cell collection procedure requires
designed to prevent further use of them outside of the parameters of this project.

extraction to bleed. The DNA will then be analyzed for mismatch and X-chromosome variation

within the molecular biology niches. Upon completion of the study, the DNA samples will be
taken back to the P.I.S. (Physician) laboratory at the University of Pennsylvania, and DNA will be

processed for each subject in 10-15 minutes and will be subject to any significant health issues. We

Procedures: If you decide to participate, we will obtain buccal (cheek) samples from you. This

different human groups.

manner from the participants. We can also encompass the spread of these markers in

potential or human movement through geographic areas by tracking the spread of these markers in

Purpose: In this research project, we will survey your mitochondrial DNA (mtDNA) and X

Karmam to elucidate their history and origins in West Asia and the Caucasus.

Informed Consent Form

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The Genealogical History of the Karmams

Appendix II (2 Pages): Informed Consent Form
Conclusions: You have read and understand the consent form. You agree to participate in this research study. You have the right to withdraw from the study at any time.

Terms of Participation: Your participation in this research project is completed voluntarily, and you understand the information provided above.

Research Contacts: Should you have any questions or concerns about this project or your rights as a research participant, please contact the PI (students) at the multiple addresses, telephone numbers, or email addresses provided above.

Compensation and Medical Treatment: While there is minimal risk to you in taking the bacteria cell DNA which will also be made available to you upon your request, your DNA will not be made available to you upon your request. The data obtained by the analysis of the project. Any data under the researchers' control will be disclosed in scientific reports or public presentations in a manner that does not reveal your identity. The data obtained by the analysis of