

Genelex Laboratory #:20470-11

Participant: Jane Doe

Summary of Findings:

The results of the mtDNA sequencing test for Jane Doe found differences with the Cambridge Reference Sequence at positions 16111, 16187, 16223, 16290, 16319, 16362, 64, 73, 146, 153, 235, and 263. The bases found at these positions are listed on your certificate.

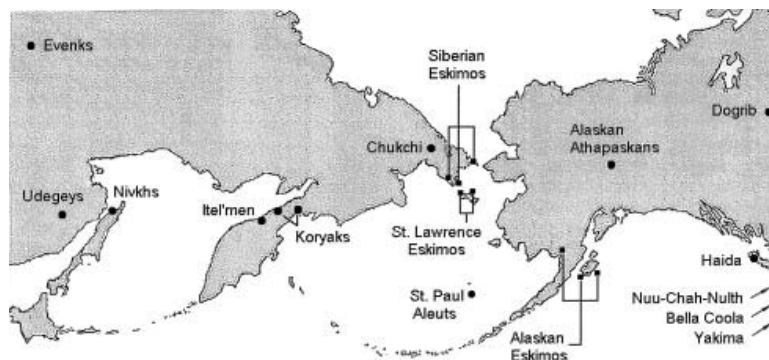
Results:

The mtDNA signature may be used to identify an individual and their direct maternal lineage. The mtDNA signature may also be helpful in identifying ethnic origins. Portions of the hypervariable region I and II from the mtDNA were amplified and sequenced from base pair positions 16100-16569 and 1-290 respectively. The mtDNA sequence data was compared to the Cambridge Reference Sequence. Any differences from the Cambridge Reference Sequence outside of the stated region will not be detected by using this test. This information was then referenced with current mtDNA haplogroup and archaeological information sources to provide a description of the origins of the maternal line.

Haplogroup Assignment: A

Haplogroup Description:

You belong to Haplogroup A, a lineage originating in North East Siberia in the ancient Chukotkan populations (Chukchi and Siberian Eskimos). Your ancestral clan spread to the Americas and now represents over 40% of Native American populations.



According to genetic theory, all humans descend from a woman nicknamed "African Eve." This unknown woman probably lived in Africa, perhaps in Kenya, about 145,000 years ago (~5,700 generations). She was a very distant cousin of the Neanderthals, but unlike them, she became an ancestor of all modern humans. She wasn't the only human female in her generation -- some scientists think that she belonged to a human population of about 2,000 people. The other women of her time certainly left daughters and granddaughters, but African Eve was the only woman in her generation whose descendants in the female line are still living today.

Geneticists divide African Eve's descendants into haplogroups popularly called "clans" to make the subject easier for lay people to understand. Different types of mtDNA correspond to different haplogroups. Currently, there are only 33 major haplogroups. Again, there have been different maternal lines in existence in human history, but these are the only lines that can be found in existence today.



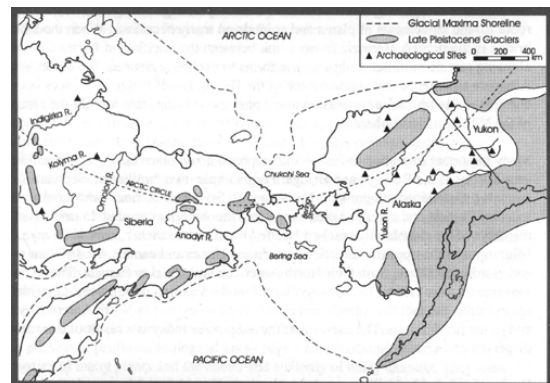
Haplogroup A is thought to have come about 30,000-40,000 years before the present in Siberia. Sometime between the start of this line and its eventual colonization of the entire North and South American continents, Haplogroup A colonized Beringia (Alaska and the land bridge connecting North America and Asia during the last ice age). After settling in Beringia for a number of years, your ancestors crossed the Alberta ice-free corridor and spread throughout the American continent. Eventually, the land bridge became flooded with the end of the ice age isolating those peoples still in Beringia, the Na-Dene and Inuit, from those that traveled

south, the Amerind-speaking people. Haplogroup A is now found in high proportions among the Chukchi, the Eskimo-Aleuts, the Na-Dene and the Amerind populations.

Prehistorical History of Siberia and Beringia:

Prehistorical times are studied in three separate periods. Since the emergence of humans until 12000 B.C., this first period is called the Palaeolithic Age (40,000 – 8,000 BC); this period is also named the Old Stone Age. The Palaeolithic Age which left only cave paintings, primitive stone tools and monuments was followed by a transitional period between 12000 B.C. and 8000 B.C. called the Mesolithic Age or Middle Stone Age. This period established the foundations for systematic organization of agriculture during the Neolithic Age. The Neolithic Age emerged between 8000 and 2700 B.C. It is also known as the New Stone Age.

Beringia existed during a time when much of Canada was covered in massive sheets of ice. Because of its arid climate, Beringia remained untouched by glaciers. Instead, the landscape consisted mainly of vast steppe tundra, which supported a broad variety of flora and fauna. Cold and arid, Beringia was clothed in the hardy grasses, herbs, dwarf birch and willows of the Mammoth Steppe. This plant life supported the woolly mammoth, the mastodon, the steppe bison, the giant beaver, the North American horse, and camel. Also present were large predators - the giant short-faced bear, the American lion and the scimitar cat.



Researchers of Ancient Beringia have found stone tools, ivory weapons and the butchered bones of mammoths, bison, bear, lion and hare, all animals that would have been available to hunters during that Ice Age period. The ancient people needed the tools for hunting. The first tools

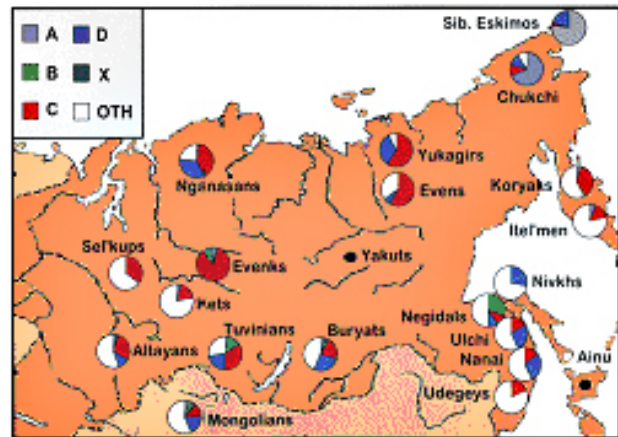


humans made were constructed from wood and bone. These included cudgels, spears, and acute sticks. Then they began to make the tools from a more solid material - stone. This is why this period is referred to as “the early stone age”, or Paleolithic.

Ancient Beringia Chukotkan populations (Chukchi and Siberian Eskimos):

Archaeological records of Kamchatka, Chukotka and Alaska that date back 15,000 years ago suggest that the inhabitants of ancient Beringia were two distinct populations. One was an inland population of mammoth, bison and reindeer hunters, whereas the other consisted of small groups of fishing and sea mammal hunting populations who were scattered along the coast of Beringia.

The earliest inhabitants of Beringia possessed a limited number of founding mtDNA haplogroups. Nearly all Native Americans belong to one of five mtDNA haplogroups: A, B, C, D or X. The “reindeer” Chukchi have haplogroups A, C and D while the Siberian Eskimos only show haplogroups A and D. Your ancestors were very like the aboriginal inhabitants of Chukotka, the Chukchi and the Siberian Eskimos. The submergence of the Bering land bridge about 10,000 years ago separated Chukotka and Alaska. Eventually, a few distinct populations evolved in the northern Pacific Rim of America and presumably reflected the Paeleoasiatic-speaking Chukchi, Na-Dene-speaking Indians and Eskimo-Aleuts.



The Chukchi are both coastal hunters of sea mammals and interior reindeer breeders and herders. Dogs played a role in the historic cultures of both groups. There are dozens of ancient camps that were found by archeologists and which preserved arrows and spearheads, knives and scrapers.



The earliest among these camps are Ananaiveem (~8400 years ago) and Koolen IV (~6000 years ago). Camps of later periods are have been found in great quantities on riverbanks in the Chukot peninsula. Ancient dwellers lived in settlements and traveled very little due to the cold conditions of the tundra. If hunting or fishing grounds were suddenly exhausted, whole tribes died out as it happened with the Yukagirs on the Omolon river when the deer suddenly changed their usual migration courses. The arctic culture of sea-

hunters was adapted to the sea: buttoned-up, wittily cut waterproof fur clothes, houses built half underground of whale bones and heated with fat-lamps, curtains made of deer fur, inconsumable

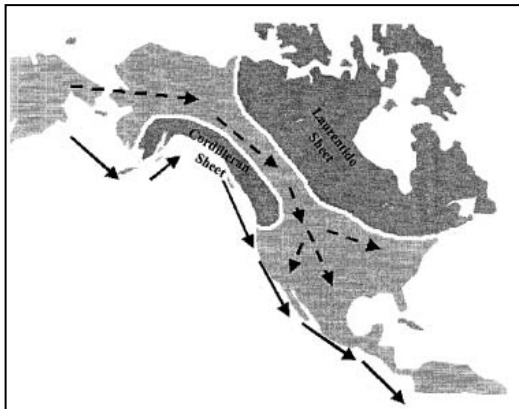
fast kayaks and large but light canoe made of walrus skin, turning harpoons with coming-off heads and many other skilful items made out of stone or bones.



Petroglyphs, rock drawings, from the Chukot region, dating from the late Stone Age (~1000 BC.), frequently show hunting scenes: a hunter, while sitting in a small boat, strikes a huge wild deer with a spear or a harpoon. Kayaks, small waterproof boats upholstered with leather on all sides and having a special manhole for the oarsman, were used for deer hunting. Their main purpose was to detain deer not allowing them to swim away down the river. Scenes of hunting whales, sea-otters and some other sea animals, depicted large boats with high sharp fronts and a large number of oarsmen.

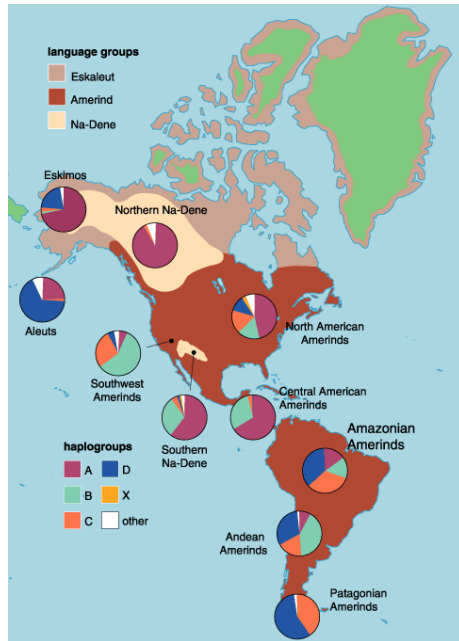
Dancing figures surrounded by huge mushrooms are also depicted. The mushrooms are, most probably the hallucinogenic species, flyagaric. The dancing figures of men-flyagarics could also be evidence of the deep roots of shamanism in the Far North-East of Siberia. A state close to a shaman's ecstasy was achieved through chewing flyagaric, frantic dancing and a beating of tambourines.

Migration to the Americas:



A widely accepted theory about the arrival of humans in North America has proposed that a wide ice-free corridor east of the Rocky Mountains split the giant ice sheet that covered Canada towards the end of the last Ice Age. Human populations would have crossed the Beringia land bridge and moved down through Alaska into the rest of North America about 12,000 years ago, when the glaciers receded, probably following the movement of prey animals. New research involving genealogy and archaeology, has cast doubt on this idea as it left too little time for migration through the Americas. Since the Monte

Verde site in Chile puts humans in South America thousands of years before the opening of the Canadian ice sheet, these early human populations must have found a different entryway into the Americas. Convincing evidence suggests that humans were using watercraft 40,000 years ago, and recently, scientists have suggested coastal-boat "leapfrogging" that bypasses the glacial barriers. Your ancestors would have exploited the rich food environment provided by marine mammals, fishing and the gathering of shellfish.



Nearly all Native Americans belong to one of five mtDNA haplogroups: A, B, C, D or X which are broadly distributed throughout the Americas. Central East Asian populations exhibit all five lineages common to Native American populations. The Altai of southern Siberia, near Lake Baikal, are the only known modern ethnic group whose membership represents all five Native American founding haplogroups. Based on studies of Native Americans DNA, scientists have arrived at many different and often contradictory conclusions about the number and sequence of migrations from Asia to the Americas. A broad range of dates has been estimated (43,000 – 11,000 years ago). Early studies suggested that the Americas were peopled multiple migrations. Torrini suggested that the initial wave of immigrants consisted only of individuals having haplogroups A, C and D (34,000-26,000), while a later wave brought haplogroup B (15,000-12,000) and a third wave brought the Na-Dene (9,000 – 7,2000). More

recently single migration models support a continuous flow of small groups across Beringia to America in search of food and other resources (30,000 – 20,000 years ago). Male genealogical studies of the Y-chromosome, support this initial large single wave and also a later wave from eastern Siberia to form the Na-Dene and northern Amerindian groups. Although there is still no agreement on the number of founding migrations, the exact age of the migrations, or the combination of Native American groupings, there is unqualified support for an Asian origin to early Americans and an early migration to America of approximately 30,000 – 20,000 years ago.

Scientists believe that the ancient Beringian populations that gave rise to the Chukchi, the Eskimo-Aleuts and the Na-Dene Indians underwent a recent bottleneck in which genetic variation was reduced (about 13,000 to 7,000 years ago) followed by an expansion of Haplogroup A in the Arctic and Subarctic regions of North America. In North America, Haplogroup A shows the highest frequency in Canada, the eastern United States and central Mexico. Haplotype B is highest in the West and Midwest, Haplogroup C shows a uniform frequency throughout except for a decrease in Alaska. Haplogroup D is fairly high in Alaska and low in most of Northern America.

Early Cultures in the Americas:



The earliest well-defined cultures in the New World have been placed by radiocarbon dating at about 9000 to 10,000 BC. At this period, two distinct traditions in North America are known: the Paleo-Indian big-game hunters of the Great Plains and eastern North America, and the Desert-culture peoples of the western basin-range region.

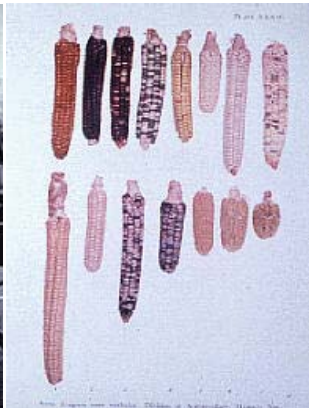
Paleo-Indian cultures (12,000 – 7000 BC) are frequently associated Clovis sites. Clovis fluted projectile points, associated with the killing of mammoth, bison, and horse have been reported throughout North America and at scattered sites from Alaska to Ecuador. The eastern limit of these cultures is in the vicinity of the western Great Lakes, while the most intensive occupation was on the western plains.

The Desert-culture tradition, an adaptation of food-collecting peoples of western North America, seems to have been established by about 9000 BC. The most extensive knowledge of this way of life comes from cave or rock-shelter sites, such as Danger Cave in western Utah, in which the desiccated remains of vegetal and animal materials have been discovered along with stone tools. The Desert peoples made intensive use of virtually all aspects of their habitat, specializing in the use of vegetable fibers for a wide variety of implements, including twine, nets, baskets, sandals, and snares. An essential feature of Desert assemblages is the milling stone, for use in grinding wild seeds.



American Archaic cultures, those that occur between Paleoindian hunter groups and the peoples who have realized some combination of pottery making, burial mound construction, and garden technology, existed from about 8,000 BC to 1,850 AD. In the eastern United States, traditions utilizing the woodland areas appear to have existed from 1000BC to 800AD.

Rise of agriculture:



In the Northern Hemisphere, food-collecting cultures were well adapted to several specialized ways of life by about 4000 BC. Desert materials have been found associated with the earliest known cultivated plants in the New World. Here, it appears that squash, peppers, and beans were being cultivated as early as 6500 BC although mostly wild plants were eaten. At about 2500 BC a primitive variety of corn (maize) first appeared in the Tamaulipas area. It appears, however, that

corn was first domesticated elsewhere, possibly in the Puebla area of south central Mexico, where a date of 3600 BC is reported from materials associated with early corn in a cave near the town of Tehuacán. The development of efficient techniques for growing corn, beans, and squash, was necessary before village and town life was possible.

The Anasazi existed around 2000 years ago and are thought to be the ancestors of modern Indian tribes like the Hopi, the Zuni and the Pueblo. The earliest Anasazi probably settled in the plateau area because water was more available. They settled into three distinct population centers, which

were Chaco Canyon, Mesa Verde, and Kayenta and eventually spread out across the entire plateau. The Anasazi tradition can be divided into the Basket Makers and the Pueblo.

South and Middle America:

By 2500 BC, techniques of cultivation had also reached the northern coast of Peru, at sites such



as Huaca Prieta, a pre-Inca Center (2500 BC). There was a mixed dependence upon marine foods such as sea urchins, mollusks, and fish; upon wild plants, mostly tubers and roots; and upon cultivated plants, including beans, peppers, and a different genus of squash than that cultivated in the early horizons in Tamaulipas. Gourds and cotton were also grown, the gourds for use as containers and net floats, the cotton for twined fabric and cordage. The architectural remains consisting of one- or two-

room, small cobble-walled subterranean stone houses. From the Valdivia site in Ecuador, several hundred miles to the north, radiocarbon samples indicate that ceramics may have been present there as early as 2500 BC, and another date from Panama indicates that the ceramics of the Monagrillo phase were manufactured by about 2000 BC. Present knowledge of the northern coast of Peru does not reveal ceramics before about 1200 BC, indicating an isolation of this area from cultural developments to the north. With ceramics, corn and other indications of Middle-American influence appear in Peru.



Ice Maiden:

The Ice Maiden was a girl only 12-14 years old who was apparently sacrificed by Inca priests 500 years ago. She was a frozen and well preserved mummy, discovered in September 1995 on Mt. Ampato in the Peruvian Andes by anthropologist Johan Reinhard and Miguel Zarate. Her mtDNA was analyzed at The Institute for Genomic Research in Rockville, Maryland. Some mtDNA from a heart sample was analyzed and scientists concluded that the Ice Maiden belonged to the native American Indian Haplogroup A.

This information is meant to give you a plausible snapshot of what life was like when and where your maternal line originated. It combines the results of ongoing archaeological, linguistic and genetic research. Because the study of human pre-history is not exact and must rely on assumptions, scientists may disagree about the best interpretation of existing knowledge. As additional research results become available our assumptions may be updated or change completely. Your maternal inheritance is a small part of your overall inheritance but provides you with one of the clearest earliest views of your ancestry. It's like finding an especially beautiful and informative artifact in the remains of an ancient village or campsite. Genelex hopes that this information has been exciting and informative to you. We are honored to have played a role in your search for your genetic ancestors.

Percentage of Population that are haplogroup A:

Vietnamese – 0%
Taiwanese – 10%
Koreans – 8%
Mongolians – 5%
Evenks – 4%
Chukchi – 68%
Eskimo-Aleut, Siberian – 77%
Eskimo-Aleut, St. Lawrence – 76%
Na-Dene, Haida – 92%
Bella Coola – 78%
Nuu-Chah-Nulth – 40%
Zuni – 15%
Jemez – 0%
Akimal O’odham – 4%
N.Piaut/Shoshoni – 0%
Nahua – 61%
Pai Yuman – 7%
Kiliwa – 0%
Cochimi – 8%
Navajo – 52%
Apache – 38%



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