



Short population report

Study of HLA genes in Russia Bering Island Aleuts

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ABSTRACT

HLA-A, -B, -C and -DRB1 alleles and haplotypes have been studied in a group of Aleuts from Bering Island (Commander Islands, Russia). Many of their ancestors were original from other Aleutian Islands, like Attu and Atka Islands (USA) and may have had a low degree of admixture with Russians. HLA haplotypes are found to be specific and quite different from other First North America Inhabitants (including Amerindians, Na-Dene and Eskimo), as it was previously shown in a less numerous Aleut population. HLA-A*24:02 is found in a very high frequency; this character is shared by Pacific and Amerindian populations. In conclusion, HLA, other genetic markers, anthropological and linguistic traits make Aleuts to be different from First America Inhabitants and closer to Europeans and Asians: specifically Aleut relatedness has been found with Scandinavian Saami (Lapps) and Finns and Baikal Lake area Buryats, where all of them may have initialing being originated.

Aleutian Islands are a chain of Islands that goes from Alaska to Kamchatka Peninsula (Russia) South to the Bering Strait (Fig. 1, Supplementary Material). Ancient population from these Islands are often assimilated or bound to Eskimo and many times Eskimo-Aleut group is wrongly referred. Eastern Aleuts (closer to Alaska) call themselves “Unangan” and western ones were called Aleuts by Russians [1]. Aleuts have altogether different linguistic and anthropological characteristics than those of other American ancient populations; they also have a much elaborated culture that is completely different to that of Eskimo. Aleuts have mummified their dead and Eskimo have not. Aleuts houses have a ceiling entrance and they are mainly marine hunters, while Eskimos have ice-built “igloo” homes and are mostly land hunters [2]. Aleuts arrival to their islands may have been through Alaska and Beringia or/and through Kamchatka Peninsula [1]. Genetic studies of VIII century BC mummies and 1403 CE Aleut remains show a genetic continuity until present day Aleuts. [3]. Alaska, including Aleutian Islands, was sold to Russia in 1867 (except the two Commander Islands: Bering and Copper) [3].

We have aimed to study Aleuts HLA profile with samples from Russian Bering Island (Fig. 1, Supplementary Material). 104 individuals volunteered with at least one Aleut parent ancestry. Bering Island

Aleuts had been displaced by Russian administration from Attu and Atka Islands between 1825 and 1928, when Aleuts may have underwent admixture with Russians [2]. HLA-A, -B, -C, and -DRB1 alleles were obtained by PCR-SSOP-Luminex technique [4] (Luminex Corporation, Austin, TX, USA), DNA direct automatic sequencing was only done when standard Luminex DNA typing yielded ambiguous results [5]. Statistical analysis was performed with Arlequin V.3. [6]. Sixteen HLA different alleles are found, highest frequency HLA-A alleles are: A*24:02, A*02:01, A*03:01, A*01:01, A*68:01 and A*26:01. (Table 1, Supplementary Material). Thirty four HLA-B alleles were found: HLA-B*40:02 shows the highest frequency one. Twenty HLA-C alleles were found: C*03:04, C*04:01 and C*07:02 were the most frequent alleles. Twenty five HLA-DRB1 alleles were found: the most frequent were DRB1*07:01, DRB1*15:01 and DRB1*01:01. (Table 1, Supplementary Material). High resolution typing of HLA-DRQB1* was not fully performed but most frequent alleles were DQB1*03:01, alleles belonging to DQB1:02 group, DQB1*05:01 and DQB1*06:02.

Extended haplotypes were observed and found that three out of the ten most frequent HLA-A, -B, -C and -DRB1 extended haplotypes contained the HLA-A*24:02 allele (Table 2, Supplementary Material). HLA*24:02 is a genetic marker for both Amerindians and Pacific

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Islanders. [7–11]

Aleuts HLA extended haplotypes show an altogether different haplotypes set (Table 2, Supplementary Material. See also Table 2 of Ref. [1]) and it is observed that 11 out of the 16 most frequent HLA-A, -B, -C, -DRB1, -DQB1 haplotypes in Aleuts are exclusively being found in Aleuts [1]. Thus it may be considered whether Aleuts should be a group apart from Amerindians, Na-Dene and Eskimo because of HLA Genetics, Language, anthropological and cultural traits as mentioned above. Also, HLA data are concordant with those of X and Y chromosomes [3,12].

Studies comparing HLA Aleut profile with worldwide populations (13,164 chromosomes) by Neighbor Joining and Vista relatedness software showed that Aleuts seem to have common origins with European Scandinavian Lapps (Saami) and Finns, and all of these groups are related with Baikal Lake area Buryats, from where all of these populations may have been originated (Fig. 2, Supplementary) [1,13], Russian admixture is possible in our sample, but not more than that of a smaller sample which gave very similar HLA profile to the one showed in the present paper (Tables 1 and 2, Supplementary Material) [1,11]. Indeed, emigrations from Baikal Area Lake (Buryats homeland) to East, West and North have been postulated [13].

All genotype data included in this paper are held in www.allele-frequencies.net and identifier number is 3619 [14].

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.humimm.2019.07.295>.

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