

# **“Permafrost of Siberia and Alaska — the freezer of the genetic material of the Ice Age”**

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Arctic Siberia and Alaska are known to be one of the main deliverers of the well-preserved materials of Ice Age animals. Its entrails bound by the permafrost show us wonderful natural storage of the preserved remains of the animal carcasses until nowadays.

Judging by the radio-carbon analysis of famous mammoth carcasses and of the other their contemporaries we can divide two periods of their most frequent death - the Karginyskiy interglacial epoch (50,000-25,000 years ago) and the end of Sartan glacial epoch - the beginning of the Holocene climatic optimum (13,000 – 9,000 years ago). At those time periods the consequence of strengthening thermokarst (melting) processes and river activity had created the wildest different natural traps for the big mammals.

Recently molecular investigations of bones and soft tissues of mammoths and other animals excavated from frozen ground in the north of Siberia have been carried out. A number of specialists performed genetic investigations in order to reveal phylogenetic relations between the mammoth and African and Indian elephants. Other researchers are seeking to obtain well-conservable DNA from the cells of the mammoth soft tissues, bones and hairs to revive a mammoth by cloning or making the transgenic individual. The frost produces a destroying effect on the remains of the extinct animals, it deforms and saps them. Satisfactory conservation of soft tissues is possible only under ideal burial conditions after the animal's spontaneous death.

XXI century brings for us the outstanding finds of frozen carcasses of the Pleistocene beasts in Siberia. In 2000-2001 the remains of Jarkoff and Fishhook Mammoths from Tainyr Peninsula were taken inside the huge blocks of permafrost and delivered to the ice-cave which now becomes the Museum of the permafrost in Hatanga settlement (Siberia). The samples which were taken from these remains show how are important to keep the remains in the frozen conditions because DNA preserved in it much better. The researches show that some cells from the skin looks like as undamaged in frozen conditions, also firstly sweat glands were found.

After such results the next finds of the head and leg of Yukagir mammoth (2002), head of Oimyakon baby mammoth (2004), Yamal baby mammoth-Lyuba (2007), Kolyma rhino (2007) were preserved frozen. Some samples from these specimens gave for us the outstanding results in DNA study.

At present, after successful experiments of cloning animals, there emerged the prospect of resurrecting of extinct animals (like mammoths) or disappearing animal species. In addition, the gene potential of the microorganisms has been studied very poorly too. Permafrost zones are very interesting from this point of view as nature-formed conditions intended for long-term storage.