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Isolation and identification of bacteria of extreme longevity in permafrost environment

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There are number of cases of bacteria in diverse environments, which have remained viable over inordinate lengths of time. Bacteria were isolated from a permafrost exposure of Mammonth Mountain on Aldan River in Estern Siberia, where one of the oldest perennially frozen deposits aged probably older than 2 million years on the Earth are distributed. The microorganisms in permafrost appear to be isolated among mineral particles and ice, but they are unfrozen due to relatively high permafrost temperatures (from -2 to -5°C). Such microorganisms, if they do not grow, should be very old and have special mechanisms of repair of collapsing cell structures because of huge duration of their existence. One of isolated bacteria presented Gram-positive, endospore-forming large (1-1.5μm x 3-6 μm) rods. Colonies of the microorganisms were able to undergo both aerobic and anaerobic growth at +20°C in GYP, MRS and NA media, and the optimum growth temperature was about 37°C. They were also growing at -5°C. The isolate is most related to Bacillus cereus based on 16S rRNA analysis. Spores of Bacillus spp. are known to be one of the most resistant among bacterial species. A number of other strains was also isolated and studied, including their biochemistry. The question of whether the isolate is involved in the active life in underground permafrost and for how long remains to be answered.

Biography

Vanda Hilimonyuk has completed her Ms. Sc. study in the field of Geology in 1980 and PhD in the field of Geocryology in 1988 from Moscow State University. Now she is research professor and deputy of Geocryology Department head, Geological Faculty of Moscow State University. She conducts research and teaching in the field of assessment human impact on permafrost due to construction of cities, pipelines, back dust emission etc in Northern areas of Russia. She has published more than 25 papers preprints and book charters. She was a member of scientific board and she was an invited speaker at number of all-Russian and International conferences in the field of Geocryology. She particiaptes in international collaborative projects for permafrost degradation study.

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