Adaptation of microalgae to extremely polluted waterbodies from radionuclides

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Water pollution is an important cause of the phytoplankton decline. Consequently, the effect of anthropogenic contaminants on microalgae and cyanobacteria has been studied in detail. An alternative approach is to study the mechanisms that allow adaptation of phytoplankton to anthropogenic pollution. Adaptability of microalgae to contaminated environments is very relevant to understand the evolutionary ecology of phytoplankton under anthropogenic global change. Little is known about the mechanisms that allow rapid adaptation of microalgae to these extreme environments. An outstanding example of the adaptation of microalgae to extreme anthropogenically-generated environments (i.e., residual waters from radiochemical plant with extremely high levels radionuclides contamination, severe acidity and elevated conductivity) has been discovered in a huge evaporation pond at some plant atomic industry near the Yenisei River. Although it is usually assumed that extremophile species inhabit these extreme environments, all the microalgae living in these ponds are mesophile species that have developed a very fast adaptation to extreme waters. Experiments have proven that only a single, rare, spontaneous mutation is necessary to produce the adaptation to the extreme contamination in evaporation pond. Microalgae living in the extreme ponds of residual waters from radiochemical industry could be the descendants of mutants with changes on a single-gene or few genes that confer a large adaptive value under extreme contamination.

Speaker Biography

Lydia Bondareva is a specialist in the field of the environment, studying the effects of anthropogenic pollution of various natures on the health of the population. She is the author of over 150 scientific articles and monographs.

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