

9<sup>th</sup> Edition of International Conference on **Environmental Science & Technology**  
&  
48<sup>th</sup> World Congress on **Microbiology**  
&  
50<sup>th</sup> International Congress on **Nursing Care**

June 24-25, 2019 Moscow, Russia

### Extra-long mitochondria of xylophilic fungi: structure and functions

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**Statement of problem:** Mitochondria are the most important organelles of eukaryotic cells, performing various functions in the cell, the main one of which is respiration. Mitochondria (including fungal mitochondria) undergo permanent fragmentation to small organelles and reverse assembly into larger filamentous structures. In the fungi described the extreme form of mitochondrial assembly - the mitochondrial reticulum - a continuous network of filamentous mitochondria distributed throughout the cell. We found that some species of xylophilic basidiomycetes form extra-long mitochondria. The purpose of this study is to study of extra-long mitochondria of xylophilic fungi. Results of the study will be at the same time a contribution to understanding how fungi have adapted to the using of such "difficult" substrate as wood and a contribution to the expansion of our knowledge about such important eukaryotic organelle as mitochondrion.

**Methodology & Theoretical Orientation:** To study the dynamics of the distribution of mitochondria used methods of fluorescence microscopy, and to study the ultrastructure - transmission electron microscopy. We applied an inhibitory analysis to test the hypothesis about the formation of giant mitochondria in xylophilic fungi as an adaptation to the conditions of fasting for nitrogen and protection against autophagy.

**Conclusion & Significance:** Extra-long mitochondria are continuous long channels located along the longitudinal axis of mycelial cells clearly differ from the mitochondrial reticulum. Xylophilic fungi can destroy wood, which is extremely poor in nitrogen content. It can be assumed that the formation of extra-long mitochondria in the mycelium of xylophilic fungi cultivated on such media is one of the adaptations of wood-destroying fungi to life under nitrogen limited. The work was supported by the Russian Foundation for Basic Research (RFBR № 18-04-00266).

### Recent Publications

1. Kamzolkina OV, Matrosova EV (2006) Fungal Mitochondria (Review) (in Russian) In: Mycologia today. Eds. Yu T Dyakov, Yu S Sergeev. National Academy of Mycology Moscow 1: 47-66.
2. Matrosova EV, Masheika IS, Kudryavtseva OA, Kamzolkina OV (2009) Mitochondrial morphogenesis and ultrastructure of basidiomycetes from genera Agaricus and Pleurotus Cell and Tissue Biology 3: 369-380.
3. Ojovan SM, Bakeeva LE, Shtaer OV, Kamzolkina OV, Vyssokikh MYu (2010) Effect of a mitochondria\_targeted antioxidant on ageing of Podospora anserina Biochemistry, Supplemental Series A 4: 38-42.
4. Kudryavtseva OA, Kamzolkina OV, Masheika IS, Sellem CA (2012) Mitochondrial respiratory mutant of Podospora anserina obtained by short-term submerged cultivation of senescent mycelium Microbiology 81: 651-662.

### Biography

Olga V Kamzolkina is a Russian Mycologist, Professor in the Mycology and Algology at Department of Biology and Faculty of the Lomonosov Moscow State University. She founded a cyto-physiologists school for students and PhD students. She is author of over 100 publications, several patents and books in the fields of cell biology, fungal cytology and physiology as well as fungal antimicrobial activity and light & electron microscopy. She is the Member of the European Mycological Association and Obshchestvo Biotekhnologov Rossii Im. Yu.A. Ovchinnikova. She is currently studying fungal endocytosis, mitochondrial organization and functions in mycelial fungi from the different ecological niches. She gives lectures and laboratory course for bachelors and masters in fungal cell biology and physiology of fungi.

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