

Laboratory of Nucleic Acid Biochemistry

Keywords: RNA viruses, reverse genetics, virus evolution, antivirals



Research group activities

Group is actively engaged in research focused on two main directions:

1 Yeast dsRNA viruses: cloning, curing, reconstruction, evolution and ecology.

Genomic, transcriptomic and proteomic consequences of dsRNA viruses on host cell are interpreted as model framework to establish universal mechanisms behind any virus of interest, so creating a paradigm network for virus-host interactions. Totiviridae family viruses from yeast *Saccharomyces cerevisiae* and closely related yeast are being investigated by means of modern molecular biology techniques, involving advanced level manipulations on genomic material, its cloning, sequencing and further comparative analysis. We aim at understanding of intra- and extracellular relations of yeast dsRNA viruses in order to elucidate evolutionary pathways of these viruses and uncover principles of distribution within an ecosystem.

2 Nucleoside/nucleotide based antivirals for retroviruses.

Nucleoside/nucleotide based antivirals constitute an essence of modern high efficacy antiretroviral (HIV, for instance) treatment. While being a game-changer treatment upon discovery, nowadays it suffers from emerging resistance and multiple side effects due to life-long administration. Recently, innovative and more advanced measures against genuine retroviral replication enzymes have been proposed and substantiated. The aim of our research is to develop compounds active at level of catalytic cycle of retroviral replication enzymes, linking an exclusive specificity and efficacy into binding approach.



Proposal

We are looking for:

- Collaboration calls for basic and applied research in area of RNA virus research, namely cloning of viral genomic RNA, virus promoter discovery and related analysis.
- Partnership for participation in ERC, HORIZON 2020 and other programs in field of molecular virology and related disciplines.
- Internships for training in the following areas: advanced bacterial and yeast gene engineering, protein purification and enzymology assays; analysis of DNA/RNA biosynthesis at single nucleotide resolution; labeling and visualization of specific RNA in vitro and in situ.



Meet our team

PI:

Dr. Saulius Serva

PhD students:

Aleksandras Konovalovas

Algirdas Mikalkėnas

Lina Aitmanaitė

Bachelor and Master level students



Research outcomes

Group participates in a number of collaborations, both at leading or partnership positions in diverse programs: National Research Programme, Global Grants, Researcher teams' and Challenge ideas.

- Konovalovas A, Servienė E, Serva S. 2016. Genome sequence of *Saccharomyces cerevisiae* double-stranded RNA virus L-A-28. *Genome Announc* 4(3):e00549-16.
- Daiva Tauraitė, Rytis Ražanas, Algirdas Mikalkėnas, Saulius Serva & Rolandas Meškys (2016): Synthesis of Pyridone-based Nucleoside Analogues as Substrates or Inhibitors of DNA Polymerases. *Nucleosides, Nucleotides and Nucleic Acids*, 2016 Apr 2;35(4):163-77.
- Juliana Lukša, Saulius Serva, Elena Servienė, *Saccharomyces cerevisiae* K2 toxin requires acidic environment for unidirectional folding into active state. *Mycoscience*, 2015, Vol. 57, Nr. 1, p. 51-57.
- Serva, S., Lagunavičius, A. Direct conjugation of peptides and 5-hydroxymethylcytosine in DNA. *Bioconjugate Chem.* 2015, 26, 1008–1012. DOI: 10.1021/acs.bioconjchem.5b00165.
- Podoliankaitė M, Lukša J, Vyšniauskis G, Sereikaitė J, Melvydas V, Serva S, Servienė E. High-Yield Expression in *Escherichia coli*, Purification and Application of Budding Yeast K2 Killer Protein. - *Mol Biotechnol.* 2014 Jul;56(7):644-52.



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