LIFE SCIENCES

Group of Amyloid Research

Vilnius University

Keywords: *Amyloid, prion, protein aggregation, protein misfolding, proteinaceous infectivity, neurodegenerative diseases*

Research group activities

Protein aggregation into amyloid structure has been associated with many human diseases, including such neurodegenerative disorders as Alzheimer's and Parkinson's, systemic amyloidosis and even some localized diseases such as type II diabetes or cataracts. There is an increasing evidence of amyloid nature of proteinaceous infectious particles – prions. One of possible ways of prion spreading is self-replication of amyloid-like fibrils, thus there is a chance of all amyloid-associated diseases to be potentially infective.

We study effects of environmental factors such as temperature, pressure, pH, ions, macromolecular crowding, and the presence of different organic solvents, ligands and biomolecules on aggregation kinetics, thermodynamic stability, and structural properties of amyloid-like fibrils. We believe that only comprehensive knowledge of all factors may give genuine understanding of mechanisms of amyloid self-replications and thus proteinaceous infectivity.

Proposal

- We offer expertise in studies of protein misfolding and aggregation and in production of recombinant amyloid-related proteins.
- We are open for collaborative projects related to protein misfolding and aggregation.
- We are looking for partners for developing competitive research projects targeting HORIZON 2020 and other international programs.

Meet our team

Lead researcher

Dr. **Vytautas Smirnovas**

PhD students

Ričardas Mališauskas

Tomas Šneideris

Undergraduate and postgraduate students

Dovilė Skujienė

Karina Sluckaitė

Romuald Stanilko

Ieva Lubytė

Elžbieta Kulicka

Meet our team

Undergraduate and postgraduate students

Greta Musteikytė

Mai Nguyen Ngoc

Andrius Sakalauskas

Mantas Žiaunys

Research outcomes

- **Iashchishyn, I. A., Sulskis, D., Nguyen Ngoc, M., Smirnovas, V. & Morozova-Roche,** L. A. Finke–Watzky Two-Step Nucleation–Autocatalysis Model of S100A9 Amyloid Formation: Protein Misfolding as 'Nucleation' Event. ACS Chemical Neuroscience 8, 2152–2158 (2017).
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- **Sneideris T, Milto K, Smirnovas V** (2015) Polymorphism of amyloid-like fibrils can be defined by the concentration of seeds. PeerJ 3:e1207.
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- **Malisauskas R, Botyriute A, Cannon JG, Smirnovas V** (2015) Flavone derivatives as inhibitors of insulin amyloid-like fibril formation. PloS one 10:e0121231.
- **Milto K, Michailova K, Smirnovas V** (2014) Elongation of mouse prion protein amyloid-like fibrils: Effect of temperature and denaturant concentration. PLoS one 9:e94469.
- **Milto K, Botyriute A, Smirnovas V** (2013) Amyloid-Like Fibril Elongation Follows Michaelis-Menten Kinetics. PLoS one 8:e68684.

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