

Synthesis of viral proteins for diagnostics

Keywords: Recombinant proteins, diagnostics, ELISA, nucleocapsid protein, virus-like particles, S. cerevisiae



Research group activities

Analysis, synthesis of viral proteins in yeast and their practical application is the main research field of our group. We are focusing on aspects related to the production of recombinant proteins in yeast expression systems, the development and optimization of expression systems dedicated to the production of recombinant proteins as virus-like particles. The core research techniques used in the department are the methods of molecular biology and biotechnology, leading to obtain recombinant plas-

mids, genetically modified bacteria and yeast, and purification of proteins. Yeast expressed recombinant proteins are applied in the tests for detection of virus-specific antibodies in human serum and oral fluid samples. We have powerful diagnostic tools, such as yeast-expressed recombinant proteins for diagnostics of human hantaviruses, porcine parvovirus, human bocaviruses 1-4, human metapneumovirus, and bovine Schmallenberg virus.



Proposal

- **Developing new diagnostic kits:**
 - Establishing of non-invasive or low-invasive methods for measuring of virus specific antibodies in patient serum, saliva and urine samples.
 - Evaluation of enzyme linked immunosorbent assay (ELISA), immunoblot, dot-blot and lateral flow immunoassays using recombinant proteins.
 - Standardization and methodical validation of newly developed tests.
- **Protein production in yeast expression system.**



Meet our team

Lead researcher

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Research Group

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Research outcomes

Most important publications

- Lazutka, J., Špakova, A., Sereika, V., Lelesius, R., Sasnauskas, K., Petraitytė-Burneikienė, R. (2015). Saliva as an alternative specimen for detection of Schmallenberg virus-specific antibodies in bovines. *BMC Veterinary Research*. 11(1):237
- Lazutka, J., Žvirblienė, A., Dalgedienė, I., Petraitytė-Burneikienė, R., Špakova, A., Sereika, V., Lelesius, R., Wernike, K., Beer, M., Sasnauskas, K. (2014). Generation of Recombinant Schmallenberg Virus Nucleocapsid Protein in Yeast and Development of Virus-Specific Monoclonal Antibodies. *Journal of Immunology Research*. 2014:160316.
- Petraitytė-Burneikienė, R., Nalivaiko, K., Lasickienė, R., Firantienė, R., Emužytė, R., Sasnauskas, K., Žvirblienė, A. (2011). Generation of recombinant metapneumovirus nucleocapsid protein as nucleocapsid-like particles and development of virus-specific monoclonal antibodies. *Virus Res*. 161(2):131-9.
- Tamošiūnas, P. L., Petraitytė-Burneikienė, R., Lasickienė, R., Akatov, A., Kundrotas, G., Sereika, V., Lelešius, R., Žvirblienė, A., Sasnauskas, K. (2014). Generation of Recombinant Porcine Parvovirus Virus-Like Particles in *Saccharomyces cerevisiae* and Development of Virus-Specific Monoclonal Antibodies. *Journal of Immunology Research*. 2014:573531.
- Tamošiūnas, P.L., Petraitytė-Burneikienė, R., Bulavaitė, A., Marcinkevičiūtė, K., Simutis, K., Lasickienė, R., Firantienė, R., Ėmužytė, R., Žvirblienė, A., Sasnauskas, K. (2016). Yeast-generated virus-like particles as antigens for detection of human bocavirus 1-4 specific antibodies in human serum. *Applied Microbiology and Biotechnology*. 100(11):4935-46.



Resources

Long-term collaboration with:

Research institutes:

- Institute for Novel and Emerging Infectious Diseases Greifswald - Insel Riems, Germany
- Institute of Virology, Giessen University, Giessen, Germany
- Health Protection Agency, London, UK

Industry:

- Euroimmune AG, Germany
- Abcam Ltd., U.K.
- Arc Dia International Oy Ltd, Finland



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