

# Bacterial antibiotic resistance and pathogenesis

Keywords: gram-negative bacteria, antibiotic resistance, toxin-antitoxin systems, pathogenesis



## Research group activities

Bacterial resistance to antimicrobial drugs is one of the most serious obstacles in the treatment of infectious diseases worldwide. Infections caused by gram-negative bacteria that developed ability to resist most of the available antibacterial drugs, have continued to be a major problem for hospitalized patients. We focus our research towards understanding of molecular basis

underlying the antibiotic resistance in clinic and in the environment with the emphasis on novel resistance mechanisms, on pathogenesis of opportunistic gram-negative pathogens and on bacterial toxin-antitoxin systems. We also develop molecular techniques for detection of pathogenic bacteria.



## Proposal

- We offer molecular, biochemical and genetic analysis of antibiotic resistant bacteria;
- We offer identification, structural and functional characterisation of bacterial toxin-antitoxin systems;
- We offer molecular and genetic engineering tools for investigation of specific gram negative bacterial pathogens.
- We are open for collaborative projects in the fields related to antibiotic resistance, bacterial pathogenesis and prokaryotic toxin-antitoxin systems.
- We are looking for partners for developing competitive research projects targeting HORIZON 2020 and other international programs



## Meet our team

Our team includes highly experienced researchers having scientific background in biochemistry, molecular microbiology, genetic engineering and enzymology.

### Lead researcher

Prof. dr. **Edita Sužiedėlienė**

### Research Group

dr. **Julija Armalytė**

dr. **Arvydas Markuckas**

dr. **Danute Labeikytė**

### PhD students

**Jūratė Skerniškytė**

**Renatas Krasauskas**

**Dukas Jurėnas**



## Research outcomes

- **Skerniškytė, J.; Armalytė, J.; Kvietkauskaitė, R., Šeputienė V., Povilonis J., Sužiedėlienė E.** (2016). Detection of *Salmonella* spp., *Yersinia enterocolitica*, *Listeria monocytogenes* and *Campylobacter* spp. by real-time multiplex PCR using amplicon DNA melting analysis and probe-based assay. *Int J Food Sci Tech.* 51: 519-9.
- **Krasauskas R., Labeikytė D., Markuckas A., Povilonis J., Armalytė J., Plančiūnienė R., Kavaliauskas P., Sužiedėlienė E.** (2015). Purification and characterization of a new  $\beta$ -lactamase OXA-205 from *Pseudomonas aeruginosa*. *Ann Clin Microbiol Antimicrob.* 14:52.
- **Povilonis J., Šeputienė V., Krasauskas R., Juškaitė R., Miškinytė M., Sužiedėlienė E.** (2013). Spread of carbapenem-resistant *Acinetobacter baumannii* carrying a plasmid with two genes encoding OXA-72 carbapenemase in Lithuanian hospitals. *J Antimicrob Chemother.* 68:1000-6.
- **Jurėnaitė M., Markuckas A., Sužiedėlienė E.** (2013). Identification and characterization of type II toxin-antitoxin systems in the opportunistic pathogen *Acinetobacter baumannii*. *J Bacteriol.* 195:3165-72.
- **Armalytė J., Jurenaitė M., Beinoravičiūtė G., Teišerskas J., Sužiedėlienė E.** (2012). Characterization of *Escherichia coli* *dinJ-yafQ* toxin-antitoxin system using insights from mutagenesis data. *J Bacteriol.* 194: 1523-32.



## Resources

Our laboratory is equipped with the systems for genotyping by pulse field electrophoresis (Biorad) and analysis software (Bio-numerics), automated systems for DNA isolation, liquid handling robotic platform (Tecan), real-time (Eppendorf, Biorad) and liquid

chromatography systems (Äkta, GE Healthcare). We possess a large collection of characterised antibiotic resistant bacteria of clinical and environmental origin.



## Contacts

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