

## Partner Search Form

Horizon Europe

Health



Date 4.7.2025.

Deadline 16.8.2025.

### CONTACT

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<b>Country</b>	Croatia		

### Organisation type

<b>Research organisation type</b>	<input checked="" type="checkbox"/> Legal person <input type="checkbox"/> Non-profit <input checked="" type="checkbox"/> Public body <input type="checkbox"/> Research Organisation	<b>Number of employees:</b>	777
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**Short introduction of key areas of institute's/department's research:**

**Department for Dangerous Pathogens**

The Department for Dangerous Pathogens focuses on the molecular epidemiology and phylogeny of emerging pathogens, primarily viruses. Our work includes studying hantaviruses and endemic arboviruses, especially flaviviruses such as West Nile virus and Usutu virus.

A key area of interest is analyzing genomic variations in these viruses using high-throughput sequencing and bioinformatics. We aim to identify genetic adaptations that affect virus transmission, host interactions, and the population genetics of RNA viruses.

Hantaviruses remain a central focus of our research. These viruses have a trisegmented genome encoding four proteins, and we are especially interested in the 3' untranslated region (UTR) of the S segment. This region, which makes up about 15% of the small genome segment, is thought to play several roles in the viral replication cycle, including regulation of RNA stability and translation, functioning as an RNA decoy, and aiding in immune evasion.

Our BSL-3 laboratory and cell culture collection enable us to conduct infectious virus research safely and effectively.

**Department of Translational Medicine and Immunology**

The Department of Translational Medicine and Immunology focuses on **emerging and reemerging viral zoonoses**, such as **orthohantaviruses and SARS-CoV-2**, with particular emphasis on **innate immunity and viral pathogenesis**. A core area of our research is the **immunobiology of monocytes, macrophages, and NK cells**, studying their roles in controlling viral infections to identify molecular targets for new therapeutic strategies.

Combining **molecular, cellular, and translational approaches**, we work with **highly pathogenic viruses in BSL-3 settings** and perform advanced **in vitro and ex vivo studies** using primary immune cells and clinical samples. Our technical expertise includes **flow cytometry, multiplex immunoassays, virus neutralization tests, gene expression analyses, and RNA sequencing**. Through **interdisciplinary collaborations**, we strive to translate fundamental research into clinical applications for improved management of viral infections.

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Former participation in an European project?

☒ YES ☐ NO

Project title / Acronym:

Activities performed:

- 2021-2026 Participating institution of the project **European Clinical Research Alliance on Infectious Diseases (ECRAID-Base)**, H2020-EU.3.1. and H2020-EU.3.1.3. (Grant agreement ID: 965313), <https://www.ecraid.eu/>
- 2021-2024 Partner institution of the project **Joint Action to Strengthen Health Preparedness and Response to Biological and Chemical Terror Attacks (JA TERROR)**, EU - Third Health Program, <https://www.jaterror.eu/>
- 2020-2024 Participating institution of the project **Enhanced Networking on Antimicrobial Resistance Surveillance with Next Generation Sequencing (AmReSu)**, H2020-EU.4.b. (Grant agreement ID: 952491), <https://semmelweis.hu/amresu/>
- 2019-2023 Partner institution of the project **Strengthened International Health Regulations and Preparedness in the EU Joint Action (JA SHARP)**, EU - Third Health Program, <https://thl.fi/en/web/thl/research-and-development/research-and-projects/joint-action-on-strengthened-international-health-regulations-and-preparedness-in-the-eu-sharp-ja>
- 2018-2023 One work package of the project **Competence Center in Molecular Diagnostics (CEKOM)**, EU/European Fund for Regional Development: KK.01.2.2.03.0006, <https://genos-glyco.com/projects/CEKOM>
- 2017-2023 Two work packages of the scientific project **Strengthening the capacity of CerVirVac for research in viral immunology and vaccinology**, EU/European Fund for Regional Development: KK.01.1.1.01.0006, <http://zci-cervirvac.hr/en>
- 2016-2021 One project package of the project **Platform for European Preparedness Against (Re-)emerging Epidemics (PREPARE)**, EC Framework 7, University of Oxford, UK, <https://cordis.europa.eu/project/id/602525>
- 2015-2020 Participating institution of the project **Evaluating mHealth technology in HIV to improve Empowerment and healthcare utilisation: Research and innovation to Generate Evidence for personalised care (EmERGE)**, H2020-EU.3.1. and H2020-EU.3.1.4. (Grant agreement ID: 643736), <https://www.emergeproject.eu/>

Expertise / Commitment offered
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**Description of your expertise**

**Department for Dangerous Pathogens**

We specialize in molecular epidemiology of zoonotic viruses in rodents and mosquitoes, focusing on hantaviruses, flaviviruses and also *Francisella tularensis*. A key research area is the evolution and transmission of emerging orthohantaviruses and arboviruses, using viral genomics and functional virology approaches. We investigate genomic variation using high-throughput sequencing and bioinformatics to identify adaptations influencing spread and host interaction. Our work includes high-throughput genome sequencing of West Nile, Usutu, and Monkeypox viruses. Hantaviruses, with their trisegmented genome encoding four proteins, remain a central interest, particularly regarding the debated function of the 3' untranslated region in the S segment.

Our BSL3 laboratory enables infectious work under high biosafety conditions. It houses Class II/III biosafety cabinets, ultracentrifuges, and a Leica Stellaris live cell imaging system for long-term imaging of cells. We apply classical virology methods such as virus isolation, plaque/focus assays, and neutralization tests. For large-scale virus propagation of viruses growing to low titers, a roller bottle cell culture system is available as well as ultracentrifuge for viral concentration.

We maintain viral isolates including Dobrava, Hantaan, Puumala, Seoul, Tula (hantaviruses), and Usutu and West Nile viruses (lineages 1 and 2). Expression plasmids for the N and glycoproteins of Andes, Hantaan, and Puumala viruses support functional studies outside of BSL3 settings.

Given our diagnostic role, we are knowledgeable in implementing and validating real-time PCR assays for pathogens such as West Nile virus, Monkeypox virus, CCHFV, Toscana virus, *Francisella*, and *Leishmania* among others.

Our adjacent cell culture suite allows preparation of stocks from cryopreserved lines including A549, Caco-2, HEK293, Hep-G2, HUH-7, MRC-5, Vero E6, Vero TMPRSS2, WI-38, and WISH. Analytical capabilities include:

- Proteomics: BMG Labtech Clariostar+, Luminex Magpix, flow cytometry (Beckman Coulter Cytotflex, Cytex Aurora & Aurora CS)
- Genomics: qPCR, digital PCR (Applied Biosystems AbsoluteQ), Sanger sequencing (ABI 3500), NGS (Oxford Nanopore MINion, Illumina MiSeq)

We have provided biosafety and molecular diagnostics training independently and with partners such as CDC and APHL.

Our infrastructure includes a fully equipped BSL3 laboratory for Risk Group 3 pathogens equipped with Class II/III Biosafety cabinets, incubators, a confocal microscope, ultracentrifuge, multimode plate reader. The BSL2

laboratory with cell culture suite, houses platforms for nucleic acid extraction, real-time and digital PCR, and classical and high-throughput sequencing, with robotic systems for library preparation.

#### **Department of Translational Medicine and Immunology**

Our research group specializes in the study of **infectious diseases**, with a particular focus on **emerging and reemerging viral zoonoses** that pose significant threats to public health.

A key area of our research is **viral immunity**, with an emphasis on **innate immunity** and its role in early defense against viral pathogens. As part of this, we are investigating several emerging **viruses** (orthohantaviruses, SARS-CoV-2 and its VOCs) exploring their impact on host organisms and the intricate dynamics of **pathogen-host cell interactions**, shedding light on how viruses evade immune responses and how the host adapts to infection.

A core aspect of our research is the **immunobiology of monocytes and macrophages in viral infections**, exploring their roles in antiviral defense and immune regulation aiming to unravel the molecular mechanisms that shape disease outcomes. By dissecting fundamental immune pathways, we seek to identify novel therapeutic targets and advance our understanding of host responses to viral infections.

As we are working in a clinical setting our group encourages an interdisciplinary approach by collaborating with various ID experts (clinicians, microbiologists) within our institution to bridge fundamental research with translational applications aiming to direct research findings and results into clinical practice.

Our work integrates molecular and cellular approaches with cutting-edge technologies and our technical expertise includes:

- work with highly pathogenic viruses in BSL3 setup (viral isolation, cultivation, quantification, viral infections)
- highly skilled in work with hematopoietic primary cells (monocytes/macrophages, NK cells, dendritic cells, PBMC) and various cell lines (Vero E6, Vero E6 TMPRS, THP-1, A549, MRC-5, HEK 293, Caco-2, HUH-7, HEP-G2, Wi-38) in *in vitro* research
- proficient in performing long-term and short-term *in vitro* experiments with infected immune cells
- *ex vivo* research on different clinical samples of infectious origin (blood, serum, plasma, cerebrospinal fluid, urine, PBMCs, nazopharyngeal swabs)
- work with rodent tissue samples
- classical and spectral flow cytometry and cell sorting

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- different immunoassays (xMAP bead-based multiplex assays, ELISA, immunofluorescence assay) or functional immunoassays (virus neutralization test)  
- multiplex gene expression analysis  
- RNA-seq analysis  
- advanced bioinformatic data analysis on biological datasets

**Keywords specifying your expertise :**

Virology, high-throughput sequencing, virus sequencing, phylogeny, BSL3, Emerging infectious diseases, viral immunity, innate immunity, pathogen-host cell interactions, monocyte and macrophage immunobiology

**Commitment offered:**

☒ Research      ☐ Demonstration      ☒ Training  
☒ Technology      ☐ Dissemination      ☐ Other:

**Do you have other partners for this topic (which partners/country)?**

- The Faculty of Forestry and Wood Technology, Croatia
- The Faculty of Veterinary Medicine, Croatia.
- University of Ljubljana (the team of Ass. Prof. Miša Korva), Slovenia
- CReSA Animal Health Research Centre (the team of Dr. Núria Busquets), Spain
- Center for Proteomics, Faculty of Medicine, University of Rijeka, Croatia
- Centre for Research and Knowledge Transfer in Biotechnology, University of Zagreb, Croatia
- Institute Ruđer Bošković, Croatia
- Helmholtz Centre for Infection Research, Braunschweig, Germany

Profile of partner sought

**Role**

<input checked="" type="checkbox"/> technology development	<input checked="" type="checkbox"/> research	<input checked="" type="checkbox"/> training
<input type="checkbox"/> dissemination	<input type="checkbox"/> demonstration	<input type="checkbox"/> other _____

**Country /region**

Europe wide

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### Expertise required

#### **Department for Dangerous Pathogens**

We are seeking partners from both academia and industry for future joint project applications, including regional as well as Europe-wide funding calls.

To advance our understanding of genomic adaptations in zoonotic viruses responsible for host-pathogen interactions, viral adaptation, interspecies transmission, ideal collaborators would be those already studying such pathogens or processes. Access to ABSL-2 or ABSL-3 laboratory facilities would be highly advantageous, enabling us to jointly address critical biosafety and experimental challenges.

We also welcome partners who either have access to, or require support with the analysis of, samples from wild animals or insects hosts in lieu of our expertise.

In addition, we are particularly interested in collaborators with experience in functional virology to support research on tri-segmented orthohantaviruses. Prior expertise in establishing reverse genetics systems for negative-sense RNA viruses with segmented genomes is highly desirable and would greatly enhance our ability to investigate viral replication, pathogenesis, and host interactions.

#### **Department of Translational Medicine and Immunology**

We are seeking a research institute, university, biotech SME or clinical center with proven experience in immunology, virology, translational research for building up consortium for Horizon Europe-Health. Ideally, the partner should be based in an EU Member States or associated countries.

The ideal partner should have strong expertise in innate immunity research, monocyte/macrophage research and their role in viral infections. Experience with live cell confocal imaging and cell sorting will be particularly valued. Access to animal biosafety level 3 facility is highly desirable. Experience with target viruses or models: e.g., orthohantaviruses, SARS-CoV-2 would be a significant advantage.

Prior participation or coordination of international research projects (e.g., Horizon Europe, NIH, etc.) is an asset.

I agree with the publication of my contact data: ☒ YES

☐ NO