

■ Aims of bayresq.net

- Interdisciplinary basic research
- A leading edge through digital networking
- Open data management

Within the Bavarian research network "New strategies against multi-resistant pathogens using digital networking" (bayresq.net), six interdisciplinary research teams are funded over a period of 5 years by the Bavarian State Ministry of Science and the Arts. By applying novel and interdisciplinary approaches of basic research, the overall objective is to counteract the development and spread of resistant infectious pathogens.

A major focus lies on the use of digital methods to elucidate infectious processes as well as complex host-pathogen interactions in order to develop novel therapeutic approaches. A central data platform as well as an open data management within the network will help to optimally interconnect all projects and illustrate the potential of digitalization in research.



■ Research sites in Bavaria



■ Funding details

Volume: 10 million euro
Funding period: 5 years
An evaluation by the Scientific Advisory Board will take place after 2.5 years to implement potential adjustments in order to ensure high quality research.
Start: January 2020

■ Participating universities

- Friedrich Alexander University of Erlangen-Nuremberg (FAU)
- Julius Maximilian University of Würzburg (JMU)
- Ludwig Maximilian University of Munich (LMU)
- Technical University of Munich (TUM)
- University of Regensburg (UR)

■ Contact

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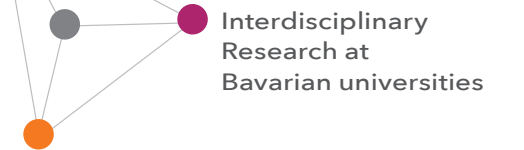


■ bayresq.net is a member of



bayresq.net
Neue Strategien gegen
multiresistente Krankheitserreger
mittels digitaler Vernetzung

Digitalization in the fight against multi-resistant pathogens



Interdisciplinary
Research at
Bavarian universities

Projects in brief

DynamicKIT

The rising number of resistant causative agents of tuberculosis constantly requires novel drug combinations for a successful therapy. In this project, new experimental methods and artificial intelligence should help identify innovative combinations of active substances against resistant tuberculosis pathogens.

Helicopredict

Approximately 90% of all gastric cancers are associated with *H. pylori*. Antibiotic resistances are increasingly observed for this pathogen. In a medical setting, it is of crucial therapeutic importance to identify the occurrence of a resistant *Helicobacter* strain. Based on sequencing data of the pathogen, this project develops an algorithm to predict antibiotic resistances.

Metabodefense

The efficiency of host macrophages against pathogens is different in each individual. Several exogenous factors (e.g. drugs) can influence the metabolism of these immune cells. This project investigates the metabolism of macrophages as well as potential factors which can impact the function of macrophages during the defense against pathogens.

IRIS

The human immune system perceives commensal skin bacteria such as *Staphylococcus epidermidis*; however, they are well tolerated. This project investigates how the immune system can be reprogrammed to break immune tolerance in order to eliminate multi-resistant pathogens through an induced immune response.

Rbiotics

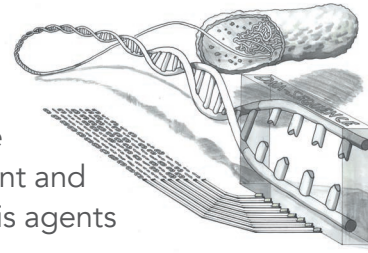
This research project investigates peptide nucleic acids (PNA), a novel class of RNA-like molecules, and their effect on bacteria. These RNA-antibiotics can be modified through simple chemical means to specifically attack emerging pathogens. In order to automate this design process, a digital platform using high-throughput data and machine learning is being implemented.

StressRegNet

The focus of the StressRegNet project lies on the identification of chemical stimuli (stressors) which cause bacterial stress responses mediated by sRNAs and/or global transcriptional regulators. The control of bacterial adaptation to the host and to antibiotics will be investigated in the widespread human pathogens *Salmonella* and *Campylobacter* via high-throughput screening and machine learning approaches.

DynamicKIT

Artificial intelligence against multi-resistant and dormant tuberculosis agents



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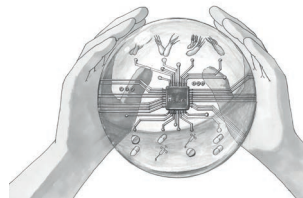


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Helicopredict

Genome-based prediction of resistance in *Helicobacter pylori*



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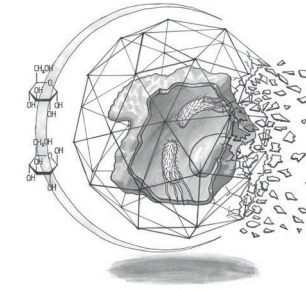


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Metabodefense

Can our metabolism protect us against pathogens?



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IRIS

The control board of the immune system against multi-resistant pathogens



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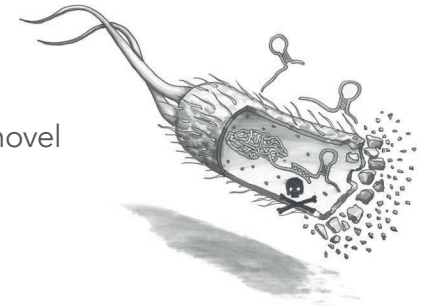


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Rbiotics

Developing novel RNA-based antibiotics



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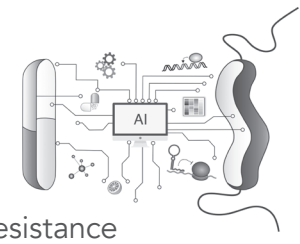


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StressRegNet

Stress signals that impact bacterial virulence and antibiotic resistance



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