

Abstract for 6th AMR Conference – April 2022, Basel, Switzerland

National Center of Competence in Research AntiResist: New approaches to combat antibiotic-resistant bacteria

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Antibiotics are powerful and indispensable drugs to treat life threatening bacterial infections, such as sepsis or pneumonia. Antibiotics also play a central role in many other areas of modern medicine, in particular to protect patients with a weakened immune system during cancer therapies, transplantations or surgical interventions. These achievements are now at risk, with the fraction of bacterial pathogens that are resistant to one or more antibiotics steadily increasing.

The discovery and development of novel antibiotics faces complex societal, economic, technological and scientific challenges. The declining pipeline for novel antibiotics and increasing resistance to existing drugs gradually reduces the options clinicians have to treat bacterial infections.

The National Center of Competence in Research **AntiResist** aims to bring about a paradigm shift in antibiotic research with an interdisciplinary approach that assembles a Swiss-wide network of research groups from the fields of clinical research, biology, chemistry, computation, engineering and pharmacology.

The research program is structured into three four-year phases covering strategically and dynamically evolving milestones. NCCR AntiResist is proposing to understand the habitats, physiology and heterogeneity of pathogens in human patients and to use this information to develop in-vitro models mimicking relevant aspects of infected human tissues and host physiology (phase I – 2020-2024). These models will then be used as platforms for drug screening (phase II, 2024-2028), and the most promising, validated approaches will then be translated into novel screening platforms for the next generation of antibiotics (phase III, 2028-2032).

By closing the gap between the bedside and the bench, we aim to accelerate the development of new antimicrobial therapies.

NCCR AntiResist is funded by the Swiss National Science Foundation, and the home institution is the University of Basel.