

Call: 9th Call – JPIAMR Joint Call on Diagnostics and Surveillance 2019

Title: Yeast-based biosensors for the specific and accessible detection of pathogens and antimicrobial resistance

Acronym: AntiRYB

Project composition

Type	Name	Institute	Country
Coordinator	Geir Klinkenberg	SINTEF Industry	Norway
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Abstract

Early and specific detection of microbial infections is crucial for the containment of diseases and for reducing the dependence on the use of antibiotics. There is however a lack of reliable, cheap and easy to use detection methods for day-to-day monitoring of infection and antimicrobial resistance in samples from patients, animals and the environment. This deficiency is critical for the abuse of antibiotics and the diffusion of antimicrobial resistance. The aim of this project is to establish a method based on yeast biosensors that will detect with high specificity pathogens from different sources to develop a new, fast and specific diagnostic tool for resistant pathogens as well as specific bacterial species. We will achieve this by joining together strong research groups on antimicrobial resistance, systems biology, and strain engineering at SINTEF, Chalmers University and National Medicines Institute. Particular focus will be given to the detection of ESBL or carbapenemase-producing strains belonging to the emerging ESKAPE group of resistant pathogens. The biosensor is developed using the yeast *Saccharomyces cerevisiae* as host, which will be engineered to express specific receptors able to recognise unique molecules produced by the pathogens. The ligand-receptor binding initiates a cascade mechanism that activates the genes for the production of a red pigment visible to the naked eye. Using the biosensors, we aim to identify molecular markers specific for resistant pathogen strains, to enable fast, easy and inexpensive point-of-use profiling of resistant pathogens.