Selection and dissemination of antibiotic resistance genes from wastewater treatment plants into the aquatic environment and clinical reservoirs (RADAR)

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Participants

- **Coordinator: University of Bucharest**
- **Partner 1:ECO-IND**
- **Partner 2: National Institute of Infectios Diseases "Prof.Dr. Matei Balș"**
- **Partner 3: University Politehnica of Bucharest**
- **Partner 4: National Institute of Medical-Military Research Development "Cantacuzino"**

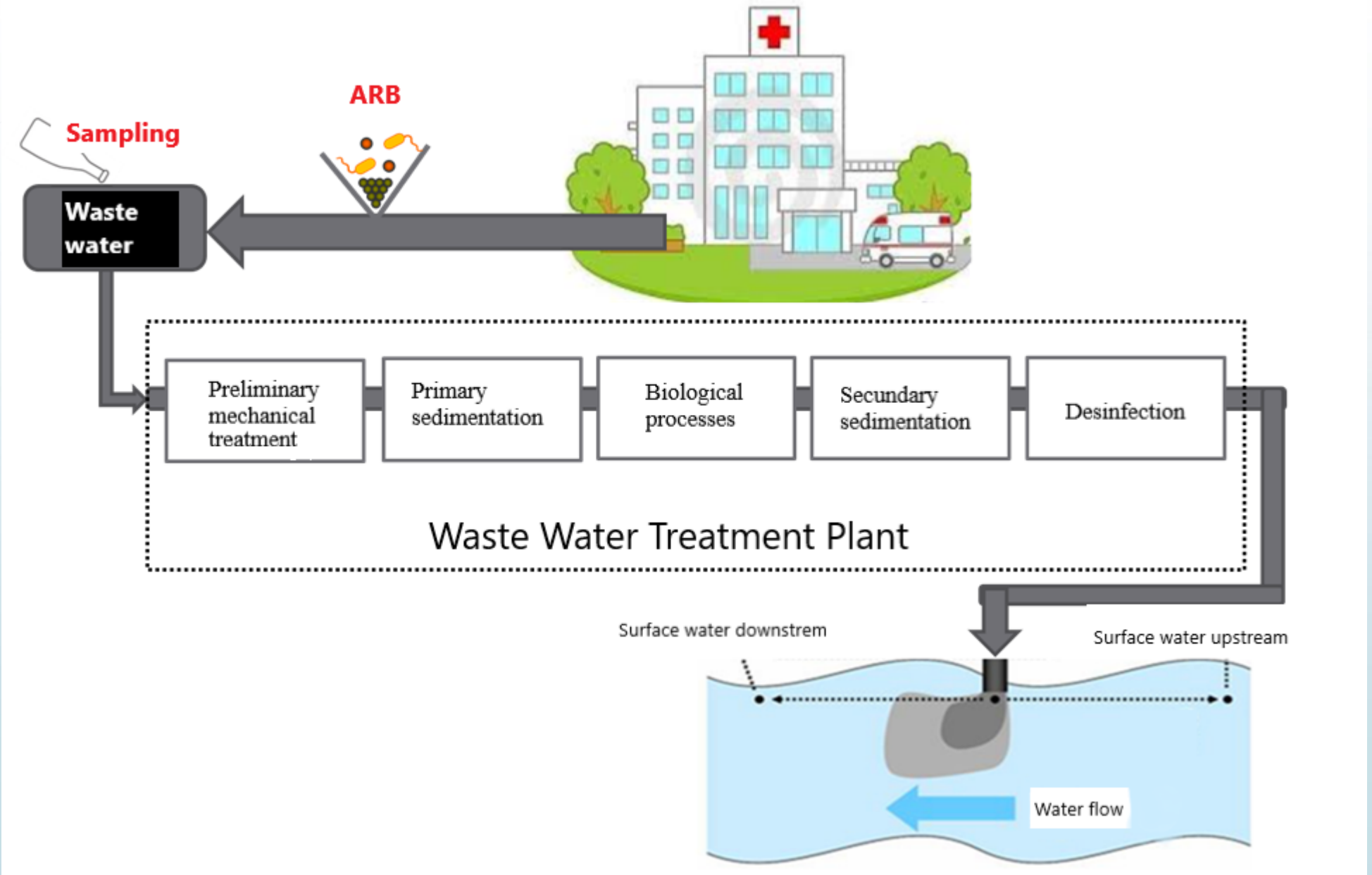
Working packages

- **WP1 –Sampling campaign**
- **WP2- Physico-chemical, microbiological and ecotoxicological characterization of environmental samples and strains isolated from environmental / clinical samples**
- **WP3- Genetic characterisation of ARB and ARG**
- **WP4- Metagenomic evaluation of the environmental samples**
- **WP5 – Epidemiological studies**
- **WP 6- Project management and results disemination**

ARB - antibiotic resistant bacteria
ARG - antibiotic resistant genes

Characterisation:

- **Physico-chemical methods**
- **Microbiology**
- **Ecotoxicology**
- **Genetics**



Objectives

- monitoring the occurrence and dynamics of pharmaceutically active compounds (PhACs) during the wastewater treatment process (from influent to effluent)
- characterization bacterial communities structures and determination of ARB and ARG prevalence in different aquatic environments
- establishing the correlations between the presence of certain pollutants and the presence of certain ARB and ARG in different environments
- ecotoxicological studies to predict the acute and chronic toxicity of PhAC (due to the persistence and bioaccumulation) in the aquatic environment;
- analysis of the correlations between the consumption of antibiotics administered in the hospital units of infectious diseases, quantified in defined daily doses (DDD) and the level of AR in the respective hospital units
- assessment of the variation and dependence between different variables measured throughout the study for a comprehensive understanding of AR epidemiology
- designing a map of AR in clinic versus aquatic environment by comparative analysis of GRA sequences;
- establishing experimental models for predicting the risk of spread of AR in WWTPs and in the intestinal microbiota, through conjugation studies and evaluation of the genetic context of ARG

ARB - antibiotic resistant bacteria
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Expected results

- identification of optimal managerial and technical solutions for wastewater treatment
- assessment AR transmission risks related to water treatment, avoiding the undesirable consequences for the environment microbiota and human health.
- the first map of AR in clinical versus aquatic environment in Romania
- the first metagenomic data regarding AR in the aquatic environment in Romania.
- identification of new genetic determinants of AR
- a starting point for further design of new or more effective antibiotics
- defining the degree of selective pressure exerted by antibiotics used in infectious diseases hospitals or produced by the pharmaceutical industry on the aquatic environment
- establishing the degree of correlation between clinical and environmental strains and knowing their flow from hospitals to the environment and vice versa.

Results obtained until present (february 2022)

17 papers indexed in Clarivate

5 papers indexed in ohter international databases

21 international conferences

12 national conferences

1 patent requests

1 PhD thesis

18 Master and bachelor dissertations