



**Fund “Nauka” Project № 21010 Resume – Competitive-based Session 2021:**

“Antibiotic resistance, epidemiology and management of *Serratia marcescens* associated infections”

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The aim of this project is to study the main mechanisms of resistance of clinically significant isolates of *Serratia marcescens* obtained from patients hospitalized in three university hospitals to a set of antibacterial drugs widely used in medical practice and to establish the genetic basis of this resistance. Due to the innate polymyxin resistance of *S. marcescens*, the role of the selective pressure associated with the increasing use of colistin and resulting increased incidence of diseases related to this bacterial species should be established. Another objective of the project is to study the epidemiology of *S. marcescens* associated infections in a hospital setting and to make recommendations for successful management of *Serratia*-related infections.

**Objectives:**

1. Test the susceptibility of collection of clinically important *S. marcescens* isolates to a set of antibiotics;
2. Determination of the genetic mechanisms of resistance to beta-lactam antibiotics;
3. Establishment of the relationship between colistin use and the incidence of *S. marcescens*-associated infections in hospitals;
4. Trace of the epidemiological connection between the isolates of *S. marcescens* from the investigated three hospitals in the city of Varna;
5. Development of an algorithm for prevention, diagnosis and etiological antibacterial therapy of nosocomial infections associated with *S. marcescens*.

**Materials:**

The study will be using an already formed collection of 200 isolates of *S. marcescens*, obtained from various clinical materials of patients hospitalized in three hospitals in city of Varna – “St. Marina” University Hospital, “St. Anna” General Hospital and “Prof. Dr. Dimitar Stamatov” Obstetrics, Gynecology and Neonatology Hospital in the period 2017-2021.

## Methods:

The susceptibility test for a set of antibiotics will be performed using the Bauer-Kurby disk-diffusion test, as well as the automated Phoenix100 and Vitek 2 systems. Polymerase Chain Reaction (PCR) will be used to establish the genetic basis of resistance as well as the degree of genetic similarity between the isolates. Statistical methods such as alternative analysis and t-test will be used to determine the relationship between colistin use and the incidence of *S. marcescens* associated infections.

## Expected results:

1. Discovery of a wide distribution among the studied isolates of genes encoding broad-spectrum beta-lactamases, including carbapenemases;
2. Assessment of the possible relationship between the use of the polymyxin antibiotic colistin and the incidence of *S. marcescens*-related infections;
3. Establishment of the degree of genetic similarity between the studied isolates will be established, which will clarify important details regarding the epidemiological spread of *S. marcescens* in hospital environment and will contribute to optimizing measures to limit and treat related bacterial diseases.