

**PNRR Missione 4, Componente 2, Investimento 1.4 “Potenziamento strutture di ricerca e creazione di "campioni nazionali di R&S" su alcune Key Enabling Technologies”**  
*Iniziativa finanziata dall'Unione europea — NextGenerationEU.*

**National Center for Gene Therapy and Drugs based on RNA Technology**  
**Sviluppo di terapia genica e farmaci con tecnologia a RNA**

Codice progetto MUR: **CN00000041** – CUP UNINA: **E63C22000940007**

**Doctorate of National Interest**  
**RNA THERAPEUTICS AND GENE THERAPY**

**TITLE OF THE RESEARCH PROJECT**

**Inflammation in cardiovascular disease: role of miRNAs**

**SELECT ONE OF THE FOLLOWING RESEARCH AREA:**

- ☒ **Mechanisms of Diseases and Drug Target Identification**
- ☐ **Design and Delivery of New Gene Therapy and RNA-Based Medicines**
- ☐ **Validation and Safety In Preclinical and Clinical Studies**

**LOCATION OF THE RESEARCH ACTIVITY (INSTITUTION/DEPARTMENT):**

Department of Pharmacy, School of Medicine and Surgery, University of Naples Federico II

**TUTOR:**

Prof. Armando Ialenti (BIOS-11/A)  
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**PROPOSED RESEARCH ACTIVITIES (max 300 words):**

Cardiovascular diseases (CVD) are the leading causes of morbidity and mortality worldwide. In recent years, several studies have confirmed the crucial role of the immune system, through both innate and adaptive mechanisms, in these pathologies, making it a promising research target for the early identification of pathogenesis markers, as well as for the diagnosis and monitoring of CVD and their treatment. MicroRNAs (miRNAs) are small, endogenous, conserved, non-coding RNAs that regulate gene expression by promoting mRNA degradation or repressing translation, thereby downregulating protein production. Recently, there is increasing evidence that different miRNAs such as miRNA-1,

miRNA-29, miRNA-126, miRNA-133, miRNA-214 are involved in the pathogenesis of several cardiovascular disorders such as hypertension, atherosclerosis and heart failure. Based on this, this project aims to achieve a deeper understanding of role of miRNAs affecting the cardiovascular system. The study of miRNAs related to cardiovascular diseases will involve both in vitro and in vivo approaches, utilizing state-of-the-art technologies. Specifically, will be employed:

- simple (monoculture) and complex (bi- and three-dimensional cultures) cell lines to establish models useful for understanding the genetic, biochemical, and molecular determinants underlying the etiopathogenesis and progression of diseases
- animal models, both traditional and transgenic, with the latter representing a valuable approach to understanding complex pathophysiological phenomena and validating new therapeutic targets
- imaging techniques, flow cytometric analysis, differential gene expression analysis through single-cell RNA sequencing, and proteomic analysis
- databases and bioinformatics and statistical approaches

A better understanding of the miRNAs involved in cardiovascular diseases could therefore facilitate the identification of new therapeutic targets for the prevention and treatment of these pathologies.

***This study addresses the requirements of both the Travel Project and PNRR, and it is capable of contributing to the achievement of the objectives set out in these projects.***