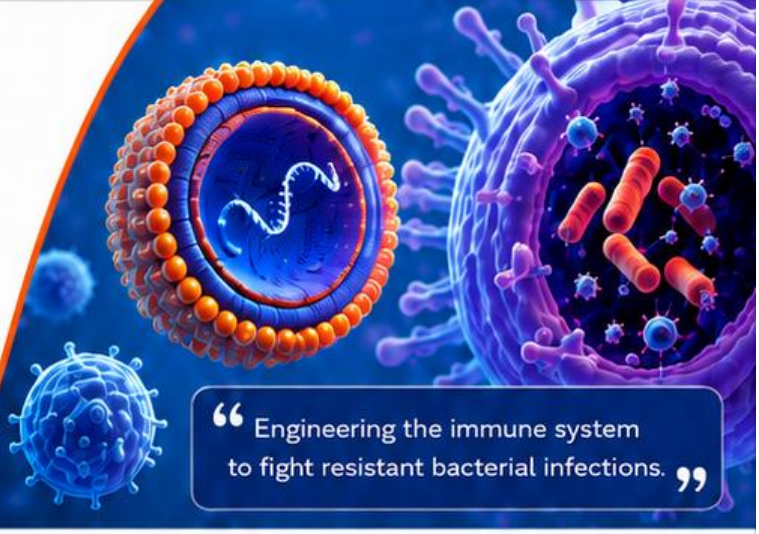
NanoBiCAR

Next-generation immunotherapy to fight resistant bacterial infections

A novel immunotherapy for infectious diseases using **mRNA-loaded lipid nanoparticles** to target tuberculosis and antimicrobial resistance.



> "Engineering the immune system to fight resistant bacterial infections."

THE CHALLENGE

Bacterial infections are responsible for an estimated **20% of global mortality**. Tuberculosis (TB) is the leading cause of death from a single infections agent. The rise of multidrug-resistant TB further limits the effectiveness of current antibiotic-based treatments.

Current therapies face key limitations, including **antimicrobial resistance**, difficulties in reaching **intracellular bacteria** and reduced efficacy in vulnerable or **immunocompromised patients**.

THE NANOBICAR VISION

NanoBiCAR aims to develop a radically new immunotherapeutic approach to bacterial infections.

Instead of targeting bacteria directly, the project explores how to **engineer the immune system to recognise and eliminate infected cells and extracellular bacteria.**

Using tuberculosis as a proof of concept, NanoBiCAR combines **mRNA delivery, lipid nanoparticles, nanomedicine and synthetic biology** to develop innovative therapeutic platforms with potential application beyond TB.

OUR INNOVATIVE APPROACH

NanoBiCAR uses mRNA encapsulated in lipid nanoparticles to enable the ***in vivo*** **production of immunotherapeutic agents through three complementary strategies:**

- **In vivo production of immunotherapeutic agents** to reprogram immune cells and enhance their ability to fight infection.
- **Production of immunotherapeutic agents** that connect immune cells with infected cells and bacteria, amplifying the immune response.
- **Expression of xenoantigens in** infected cells to make them more visible and vulnerable to the immune system.

WHY NANOBICAR IS DIFFERENT

- Targets both intracellular and extracellular bacteria.
- Designed to work independently of antibiotic resistance.
- Applicable to latent, acute and chronic infections.
- Safe, adaptable and suitable for resource-limited settings.
- A new paradigm for immunotherapy beyond cancer.

EXPECTED IMPACT

- Better therapeutic options for tuberculosis and multidrug-resistant infections.
- Reduced dependence on conventional antibiotics.
- New immunotherapy platforms for infectious diseases.
- Future clinical and industrial translation of mRNA-based nanomedicine.

PROJECT AT A GLANCE

DURATION	COORDINATOR	FUNDING PROGRAMME	GRANT AGREEMENT	WEBSITE	X (TWITTER)	LINKEDIN
Feb 2025 – Jan 2028 (36 months)	Universitat Politècnica de València	EIC Pathfinder / Horizon Europe	No. 101186252	www.nanobicar.eu	@NanoBiCAR_EU	NanoBiCAR Project

CONSORTIUM PARTNERS

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