Universidad de Navarra
Facultad de Ciencias

**MÁSTER EN INVESTIGACIÓN BIOMÉDICA**
**Research Project Proposal**
Academic year 2026-2027

**Project Nº** 42

**Title:** *Targeting the inflammatory nexus between lung cancer and cardiovascular disease*

**Department/ Laboratory** *Translational Research in Cardiology, Dpt. Cardiology and Cardiac Surgery, CUN & Dynamics of the Antitumor Immune Response group, Cancer Division, CIMA*

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**Summary**

Both lung cancer and cardiovascular disease (CVD) are leading causes of mortality worldwide. Lung cancer patients face up to a 12-fold higher risk of dying from heart disease, underscoring the urgent need to understand shared mechanisms and develop cardioprotective strategies for high-risk individuals. Inflammation is a key link between cancer and CVD, not only contributing to disease progression but also increasing susceptibility to cardiovascular side effects from anti-cancer therapies. Immune checkpoint inhibitors (ICIs), widely used in advanced lung cancer, can trigger inflammation-related cardiovascular complications such as myocarditis and heart failure.

This project aims to unravel the inflammatory mechanisms behind cardiovascular injury in lung cancer patients, identify early biomarkers of cardiac damage, and explore anti-inflammatory treatments to reduce immunotherapy-induced cardiotoxicity. These insights will support the development of personalized, cardioprotective strategies in oncology.

To study the cancer-CVD interaction, we have developed a two-hit mouse model combining cardiovascular risk factors (hypertension and high-fat diet) with lung tumors. This model enables the analysis of tumor progression, cardiac function and remodeling, and immune activation. The impact of ICIs on cardiac dysfunction, inflammation, and tumor growth will be assessed using echocardiography, ELISA, histology, and fluorescence imaging. Key proinflammatory mediators such as TNFα and IL-1β will be targeted with clinical-grade agents or mouse surrogate antibodies to evaluate their therapeutic potential.

This approach will advance the knowledge on how to improve cardiovascular safety in lung cancer patients receiving immunotherapy.

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| yes | X |
| no | |

Does the project include the possibility of supervised animal manipulation to complete the training for animal manipulator?