



# UNAT

Ultra-small Nanohybrids for Advanced Theranostics

## Consortium



### Coordinator

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## The project

Nanoscale materials have gained a place in the spotlight as enablers of combination diagnostic-therapeutic technologies due to their tiny penetrating sizes and their unique functional properties.

**Nanohybrids** that contain both organic and inorganic components, including metallic ones, offer tremendous opportunity for the functionalisation of biological or bioactive molecules.

The EU-funded UNAT project will explore the capabilities of metal-carbon nanohybrids for multimodal in vivo imaging and therapy of tumours via electromagnetic radiation.

The **diagnosis and therapy of cancer** will be evaluated through an ambitious campaign of preclinical in vitro and in vivo experiments.

[www.unat-project.eu](http://www.unat-project.eu) - @ProjectUNAT

## Funding scheme:

Marie Skłodowska-Curie Actions (MSCA)

<https://marie-sklodowska-curie-actions.ec.europa.eu/>

Project type: Research and Innovation Staff Exchange (RISE)

[https://ec.europa.eu/info/h2020-msca-rise-2020\\_en](https://ec.europa.eu/info/h2020-msca-rise-2020_en)

Call: H2020-MSCA-RISE-2020

## Key figures:

4 years (2021-2024)

4 partners

4 countries

832 k€

## Objective

Nowadays, research focusing on control and use of nanomaterials in different areas including life sciences has become a key driver of innovation.

UNAT project aims at a **systematic interdisciplinary study of metal-carbon nanohybrids (NHs) for advanced theranostic application**. Indeed, development of NHs based on organic & inorganic moieties can synergistically or antagonistically influence functional properties of engineered nanotheranostic medicines.



*Yellow and blue luminescent colloidal solutions of carbon nanodots*

UNAT will develop innovative approaches for synthesis and multi-functional application of ultra-small (<10 nm) carbon-based NHs functionalized with various metal atoms for diagnostics and therapy of cancer. In particular, carbon cores of NHs will be chemically synthesized from biomasses and bio-wastes. The combination of pre-clinical in-vitro & in-vivo experiments will allow to evaluate theranostic potential of the NHs.

UNAT will associate an industrial partner from Greece (Bioemtech), a research and innovation center from Ukraine (Science Park) and 2 academic research groups from France (UCBL) and Italy (CNR). The uptake efficiency and specific localization of the NHs in biological cells depending on their intentionally designed surface chemistry will be studied in details. Extremely rich physico-chemical properties of the NHs will allow their application as universal multi-modal (MRI, PET, X-ray, Fluorescence, Photoacoustic) in-vivo bio-imaging agents. The multimodal imaging strategy will allow us to correlate the images obtained with the use of various imaging facilities to increase general reliability of visualization of the NHs localization in tumours. Various exciting electro-magnetic sources used for medical purposes will be simultaneously used for **therapy of cancer tissues containing the incorporated NHs**. Strongly complementary research experiences of the partners involved in UNAT and a high degree of cooperative integration between them will allow a deep scientific study of the theranostic potential of the NHs.

## Research and Innovation Staff Exchange (RISE) projects

RISE projects involve organisations from the academic and non-academic sectors (in particular SMEs), based in Europe (EU Member States and Horizon 2020 Associated Countries) and outside Europe (third countries).

Support is provided for the development of partnerships in the form of a joint research and innovation project. This is aimed at knowledge sharing via international as well as intersectoral mobility, based on secondments of research and innovation staff (exchanges) with an in-built return mechanism. The organisations constituting the partnership contribute directly to the implementation of a joint research and innovation project by seconding and/or hosting eligible staff members. The RISE action aims at increasing international, interdisciplinary and intersectoral mobility of researchers in Europe, strengthening of Europe's human capital base in R&I, increasing Europe's attractiveness as a leading destination for R&I and at better quality R&I contributing to Europe's competitiveness and growth.



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