

From Potatoes to Advanced Biomaterials: GreenNanoBone Launches to Develop Treatment for Medication-related Osteonecrosis of the Jaw (MRONJ) based on Sustainable, Biocompatible, Bioactive and Antimicrobial 4D Materials

New EU-funded project aims to prevent and treat a severe adverse drug reaction to bone-targeting agents in cancer survivors using sustainable, AI-optimised biomaterials derived from food waste.

Liverpool, 12 June 2025 – A major new European research project, GreenNanoBone, launches today to address an increasingly urgent medical condition affecting thousands of cancer survivors: medication-related osteonecrosis of the jaw (MRONJ). GreenNanoBone aims to develop and validate sustainable, biocompatible, bioactive, and antimicrobial 4D materials to stimulate bone and tissue regeneration, derived from plant-based nanoparticles extracted from potato waste. This interdisciplinary project is funded with around 8,6 million euros by the European Union and coordinated by the University of Liverpool. Within the next 4 years, it will develop groundbreaking treatment technologies hereby contributing to a sustainable future by promoting a circular economy.

MRONJ occurs when bone-targeting agents (BTAs) like bisphosphonates — essential for preventing bone metastases in breast, prostate, and lung-cancer patients — cause progressive destruction of jawbone tissue, leading to chronic pain, infections, and difficulty eating. MRONJ currently affects an estimated 6000 people in the EU and the UK per year. With rising numbers of cancer survivors, MRONJ cases are also increasing — demanding new and effective therapies. Current treatments are limited and often rely on long-term use of antibiotics, contributing to the growing threat of antimicrobial resistance.

GreenNanoBone aims to develop a precise, minimally invasive treatment approach for tissue regeneration. The consortium is focused on creating sustainable, biocompatible, bioactive, and antimicrobial 4D hydrogels—injectable or printable materials designed to support the regeneration of bone and soft tissue. Sourced from plant-based food industry waste, these innovative materials will be optimised using artificial intelligence and validated in pre-clinical models to ensure safety, efficacy, and compliance with medical-grade manufacturing standards. Ultimately, GreenNanoBone will not only improve the lives of MRONJ patients, but also lay the foundation for treating other skeletal conditions like osteoporosis and complex fractures, while embedding sustainability and innovation into the future of European healthcare.

“With GreenNanoBone, we’re not just addressing an urgent clinical need — we’re rethinking how novel medical solutions can be developed in an effective, sustainable, and socially responsible way,” says Dr Kasia Gurzawska-Comis, project coordinator from the University of Liverpool and Aarhus University. *“We’re combining regenerative medicine with AI, while also integrating social science and health economics to ensure broad impact and real-world viability. With our unique approach, we hope to inspire other businesses to explore the natural world for sustainable solutions.”*

The interdisciplinary approach of the project brings together 18 partners from all over Europe, involving chemists, biomaterials scientists, biologists, clinicians, social scientists and health economists, working together across disciplines and sectors.

GreenNanoBone exemplifies the synergies between Horizon Europe Pillar II Clusters by addressing unmet medical needs in oncology (Cluster 1: Health), advancing climate-neutral and circular bio-based manufacturing methods (Cluster 5: Climate, Energy and Mobility), and transforming agricultural food waste into high-value medical materials (Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment). By harnessing residual potato pulp from the starch industry to develop advanced biomaterials, GreenNanoBone contributes to Europe’s Green Transition. This “design for circularity”

model aims to reduce the environmental footprint of medical manufacturing, enabling scalable, clean production methods.

Project Key Facts

Title: GreenNanoBone - Sustainable 4D hydrogels functionalised with plant-based nanoparticles for bone regeneration in cancer patients

Start: 01.06.2025

Duration: 48 months

Budget: 8,6 million €

Coordinator: The University of Liverpool

Website: www.greennanobone.eu

LinkedIn: [GreenNanoBone](https://www.linkedin.com/company/greennanobone)

Project Partners

Denmark

Aarhus Universitet

Aarhus Universitetshospital

Kobenhavns Universitet

Finland

Tampereen Korkeakouluosaatio SR

Helsingin Yliopisto

Germany

EURICE – European Research and Project Office GmbH

MyBiotech GmbH

Ireland

F6S EU Tech Innovation Network Designated Activity Company

Luxembourg

Luxembourg Institute of Science and Technology

Moldova

Asociatia de Cercetare a Maladiilor Cronice



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Portugal

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