

PRESS RELEASE

GIOTTO European project kick off

Osteoporosis (“porous bone”) is a very common bone disease, it is more frequent after menopause and with aging but it can occur also at younger age. It occurs when the body loses too much bone, as a result bones become weak and brittle - so brittle that a fall or even mild stresses such as bending over or coughing can cause a fracture. It has been calculated that an osteoporotic fracture occurs every 3 seconds in the world, and it is most likely to occur in the hip, spine or wrist, but other bones can also break. After a fracture, patients can lose their independence, suffer from chronic pain and become depressed, thus osteoporosis turns into an impressive socio-economic burden.

The **GIOTTO** project is funded by the European Union under the Horizon 2020 research and innovation programme, call H2020-NMBP-TR-IND-2018-2020 (TRANSFORMING EUROPEAN INDUSTRY), and it will exploit the most recent materials and manufacturing technological advancements to help healthcare systems fight the consequences of this disease. Medical doctors will work together with scientists and medical device producers to develop and test new solutions based on cutting edge technologies such as 3D printing and smart nano-biomaterials. *Ad hoc* devices will be designed for the different types of osteoporotic fractures stimulating bone regeneration while reducing bone loss.

In addition to 3D-printing and the most updated technologies for bone scaffold manufacturing, also the most advanced technologies will be put in place such as the nano-functionalisation for the smart release of active molecules. The use of additive manufacturing technologies will enable device personalisation to match and better align with the patient’s anatomy and fracture type. A further boost to meet patient specificity and needs will be provided through use of functionalised magnetic nanoparticles in order to allow controlled mechano-transduction. An Internet of Things platform will be developed to gather and collate measurable data inputs about device effectiveness and to provide decision support software as a service to improve the design, manufacture and clinical function of the proposed devices, ultimately managing the overall value chain. Safety and sustainability of the final solutions will guide the overall development since the beginning, though testing and the involvement of regulators.

GIOTTO project kick-off meeting was held in Brussels on February 4th and 5th 2019. Representatives of the 14 partner institutions from 10 European Countries gathered together with the European Commission officer, Dr. Matteo Bonazzi, the advisory board and the Project Coordinator Prof. Chiara Vitale-Brovarone from Politecnico di Torino (Italy), to detail the plan of activities for the first year of the project.

A real European project

The research partners are Politecnico di Torino (ITALY) and Universidad Complutense de Madrid (SPAIN) focusing on smart nano-biomaterials for bone regeneration, Newcastle University (UK) for the development of resorbable polymeric blends: these three partners will also develop strategies for surface functionalisation with novel biomolecules. Additive manufacturing expertise comes from Università di Pisa (ITALY) and Universiteit Maastricht (NETHERLANDS). Collagen-based formulations and bioresorbable polymeric blends are another area of expertise covered by the group of Politecnico di Torino (ITALY) and Newcastle University (UK), respectively. The *in vitro* biocompatibility evaluation in bone-mimicking co-culture is performed by Foundation for Research and Technology Hellas (GREECE), while the partner with consolidated expertise in multiscale modelling and mechanical characterisation of biomaterial is Dublin City University (IRELAND).





On the other side, the industrial partnership has been shaped in order to provide the right level of expertise and skills needed to bring GIOTTO cutting-edge results close to the patient and the market. Two SMEs with a core business in nanomaterial production have been involved, Fluidinova SA (PORTUGAL) for the doped nano-hydroxyapatites and mesoporous bioactive glasses and Tecnan (SPAIN) for the functionalised superparamagnetic nanoparticles. A company leader in 3D printer and inks Cellink AB (SWEDEN) has been involved for the exploitation of the bio 3D printed device and inks. Functionalised collagen and biomolecule able to inhibit bone resorption will be developed by Novaicos SRLS (ITALY), Biomech Innovations AG (SWITZERLAND) will establish health economic models to identify the patient cohorts for GIOTTO devices and will supervise the implementation of ethical best strategies. IoT innovation will be targeted across the whole project both by a research partner (Dublin City University (IRELAND)) and by the SME leader in this field Yodiwo (GREECE). BeWarrant (BELGIUM) is the manager of exploitation, dissemination and communication of the project towards all groups of stakeholders, to ensure that all interested people will be aware of GIOTTO activities and results.

