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News:

Biomaterials and additive manufacturing: osteochondral scaffold innovation applied to osteoarthritis (BAMOS project)

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Osteoarthritis (OA) is a degenerative joint disease, typified by a loss of quality of cartilage and changes in bone at the interface of a joint, resulting in pain, stiffness, and reduced mobility. "According to the World Health Organization, 40% of people over the age of 70 have OA. This joint disease affects around 0.4 billion people with patients in Europe accounting for up to 30%. The figure is set to increase with the ageing problem" (Monzón et al., 2018). The BAMOS project particularly addresses the challenges in OA treatment (Ondrésik et al., 2017) by providing novel cost effective osteochondral scaffold technology for early intervention of OA to delay or avoid the joint replacement operations. This BAMOS project brings together international leading research centres with wide-ranging complementary research expertise in the context of a collaborative scheme of research exchange and networking to:

1. Define clinical specifications (Canadas et al., 2016) of the osteochondral scaffolds and the clinical delivery procedures to be used.

2. Develop new osteochondral scaffold biomaterials in order to provide appropriate mechanical environment for support bone and cartilage formation simultaneously.

3. Develop innovative additive manufacturing (AM) techniques to produce patient-tailored osteochondral scaffold for large osteochondral defect repairs.

4. Assess the osteochondral scaffolds in both in vitro disease relevant model and in vivo clinical animal model. The scaffold will be ready at the end of the project for clinical trial.

5. Train early stage researchers in the context of collaborative research, equip them with the advanced knowledge and expertise to tackle grand societal healthcare challenges, and enable them to building the world class scientific research profile.

The consortium of BAMOS is formed by four European partners (University of Las Palmas GC, University College London, University of Minho, and Royal National Orthopaedic Hospital) and three Chinese partners (Xi'an Jiaotong University, Zhejiang University, and Shaanxi Hengtong Intelligent Machine Co., Ltd.). The project is structured under nine work-packages (WPs) as shown in Fig. 1.

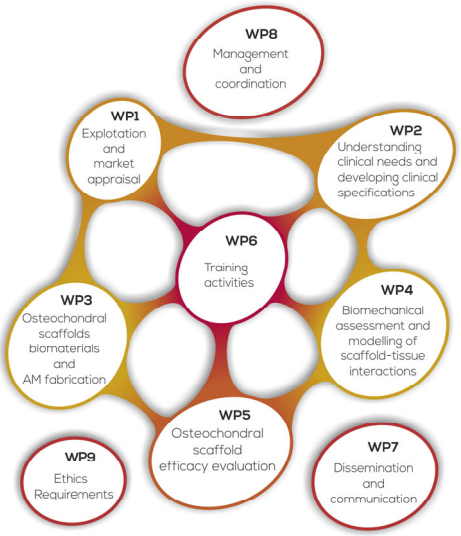

Fig. 1 BAMOS project structured under nine work-packages (WPs)

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For the first year of the project 14 researchers from partners of BAMOS have travelled abroad to carry out research and training activities. The total number of researchers, during the four years of the project, to carry out mobility is 30. The objective is improving technical skills as well as collaborating with other partners in common research.

The main dissemination activities so far are as follows:

1. BAMOS presentation at British Orthopaedic Research Society (BORS) 2017 (London, March, 2017). The results of the work carried out during the first secondment of the BAMOS project were presented in the BORS annual meeting in London.

2. Successful organization of the workshop of BAMOS project in TERM STEM/FORECAST 2017 (Porto, November, 2017). The event, organized by the 3B's Research Group–Biomaterials, Biodegradables, and Biomimetics from the University of Minho, in Porto on Nov. 17, had an important number of attendees and interesting presentations of speakers in the field of osteochondral tissue engineering.

3. Participation of BAMOS project in AM Motion Project's Workshop (Lisbon, November, 2017). BAMOS project participated in the event organized by AM Motion Project in the context of the European Strategic Approach on AM.

4. BAMOS project supports the conference "Bio-Design and Manufacturing 2018" taking place in Hangzhou, China (Aug. 26–28) and arranges one symposium in 2018 TERMIS (Tissue Engineering and Regenerative Medicine International Society) World Congress, Kyoto, Japan (Sept. 4–7).

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