

Due to demographic and life style changes, degenerative diseases are an enormous medical and socio-economic challenge in industrialised nations. Among them, the musculoskeletal diseases osteoarthritis (OA), rheumatoid arthritis and osteoporosis are the most prevalent. If we consider osteoarthritis, there is currently no gold standard for the repair or prevention of onset of this disease. There are three major challenges: reducing inflammation, cartilage repair and subchondral bone repair. Biomimetic approaches for tissue repair in osteoarthritis require tight spatiotemporal control of bioactivity in order to address these challenges in a coordinated fashion.

This consortium proposes a nanobiotechnological approach to provide spatiotemporal control of therapeutic bioactivity on command and demand based on a novel gene activated matrix platform. The S&T objectives of this project are complemented with an innovative program of public outreach, actively linking patients and society to the evolution of this project.

### **Societal impact of GAMBA**

#### **Health Impact**

Around 6 per cent of the European population suffer from frequent knee pain and radiographic osteoarthritis. It has been estimated that around 35 to 40 million Europeans suffer from this disease. Some degree of limitation in their daily activities is experienced by 80 per cent of the affected population while 25 per cent are totally disabled. Musculoskeletal diseases count among the most frequent disease burdens and are the major cause of disability.

The current management of osteoarthritis is not regenerative but merely symptomatic, aimed at reduction of pain, controlling inflammation with non-steroidal anti-inflammatory drugs with an ultimate option of total joint replacement.

Implantation of autologous chondrocytes cultivated on biomaterial scaffolds is a more recent approach, does however not account for

subchondral bone that supports the cartilage and can not avert the destructive inflammatory processes.

While being a basic research project, GAMBA will propose new therapeutic approaches and treatments for osteoarthritis. In the long run, this is intended to result in novel treatment options yielding improved therapeutic outcome and quality of life for the affected patients.

### **Citizen awareness**

Social, economic and ethical issues related to the research performed in the GAMBA project are of concern. These issues must be shared with and understood by the general public and affected patients in particular. GAMBA Partners will strive to increase patients' knowledge and awareness of the challenges and issues at stake. Through the project dissemination programme ( WP8 and 9, “

[Patient and Citizen Panels](#)

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), GAMBA will encourage patients and citizens to interact with scientists and policy makers to fully understand the rationale and impact of the project.