

How European Project MEFISTO drives meniscus replacement forward?

The EU project MEFISTO, which has just been launched, aims to take advantage of novel approaches and sets itself the clear goal to successfully counteract the epidemic of post-meniscectomy knee osteoarthritis.

What are the technological innovations of the novel approaches in MEFISTO? Answer Prof. Elizaveta Kon MEFISTO Scientific Coordinator.

Potential relief for national health systems

For most of the 20th century the preferred approach to meniscus treatment was the removal of the damaged tissue (meniscectomy). This practice expanded with the advent of arthroscopy. In recent decades the understanding of meniscal function, and consequently, the management of meniscal injuries, has continued to evolve with increasing commitment among physicians towards the preservation of the meniscus whenever possible. However, based on the observation that meniscal resection is still widely performed, a huge rate of post-meniscectomy osteoarthritis can be expected in the European population in the coming years. In particular, the treatment of osteoarthritis in young to middle-aged patients is challenging, often involving the sacrifice of the patients' knee joints (metal resurfacing) and represents a social and economic burden for national health systems.

Two approaches, one goal

2 innovative personalized nanotechnological solutions for meniscal substitution will be developed in MEFISTO. In the first proposed solution, a novel biodegradable scaffold will promote revascularization in the peripheral zone, while leaving the inner zone avascular, reflecting the native meniscal tissue aiming complete meniscal regeneration in young patients. In a second approach, functionalization with drug delivery micro/nanoparticles of a non-biodegradable meniscal prosthesis will provide modulation of inflammation in elder patients.

Personalized solutions after meniscectomy

The project MEFISTO will profile and identify the population of patients who, after meniscal resection, are at higher risk of early compartment degeneration and will provide evidence in vitro and in animal models towards a personalized approach for the patient. Younger patients with early osteoarthritic changes will be addressed by treatment in the form of a controlled vascularized bioactive biodegradable meniscal scaffold, which will regenerate the native meniscus. A bioactive non-biodegradable meniscal prosthesis, acting as a mechanical unloading device and a drug delivery system, with the capacity to modulate the inflammatory environment will be targeted at patients with advanced osteoarthritis. A socio-economic analysis of the efficacy of existing meniscal substitutes will complete the project.

For further information please contact us via www.mefisto-project.eu.