



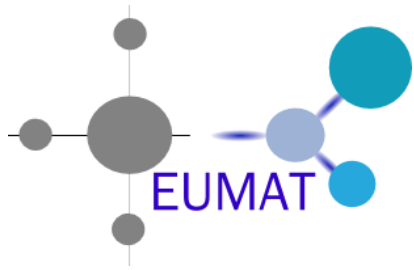
#InvestEUresearch



Horizon 2020 Work Programme for Research & Innovation 2018-2020

EMRS Event
Vienna, 29th October 2018

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Contact details

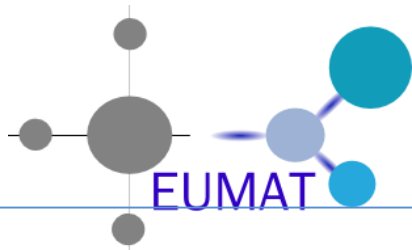
Real-time nano-characterisation technologies

(DT-NMBP-08-2019)

DT-NMBP-10-2019

Open Innovation Test Beds for nano-enabled surfaces and membrane

DT-NMBP-03-2019



Organisation / Company profile

Charles University of Prague, Second Faculty of Medicine
Department of Biophysics

Departmental Focus:

Tissue engineering.

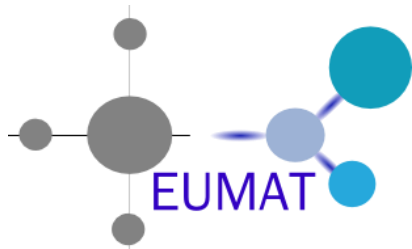
- Development of three-dimensional scaffolds based on biodegradable functionalized nanofibres.
- Smart nanofiner scaffolds for cell-free implants
- Targeted and controlled drug delivery
- Nanofibers yarn for biosensors

Protein engineering

- Molecular dynamics simulation and protein structure modelling.
- Modelling of the biokinetics of radiopharmaceuticals.

Upscaling.

- Fabrication of nanofibers on a larger than laboratory scale
- Preclinical and clinical studies



Existing projects consortium

Suggested tentative consortium:

Czech Republic: Charles University: Nanofiber production and optimization

ProNanoTech, s.r.o. (SME): Industrial production of nanofibers

Italy: University of Campania Vanvitelli of Naples: Studies on micro-RNAs and chemotherapy agents as anti-cancer tools in human cancer and in vitro toxicological studies of nanomaterials

Biogem, (SME): Protein factory and production of proteins and antibodies for nanofiber functionalization

INBB, University of Ancona: Characterization of nanofibers and nanogel for in vivo use

Finland: Biocenter Oulu and Faculty of Biochemistry and Molecular Medicine, University of Oulu, Oulu, Finland: Studies of the biological effects and biodistribution of the nanomaterials in organoids.

UK: Trent University of Nottingham: In vivo models and omic approaches for the characterization of the effects of nanofibers on biological models

Biogel (SME): production of Peptigel

Austria: Ludwig Boltzmann Institute: production of smart hydrogels

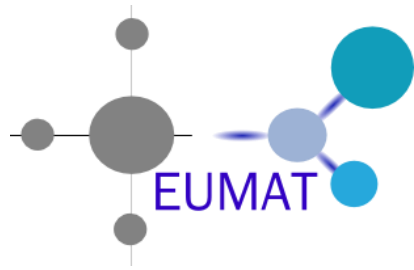
Technical University Vienna: Design of nanogel for regenerative and cosmetic use

Austrian Cluster for Tissue Regeneration (SME): Industrial development of nanogel for regenerative and cosmetic use

Germany: University of Applied Science Zittau/Gorlitz:

Croatia: TrentMedical School, University of Zagreb: characterization of the cell interactions with smart scaffolds

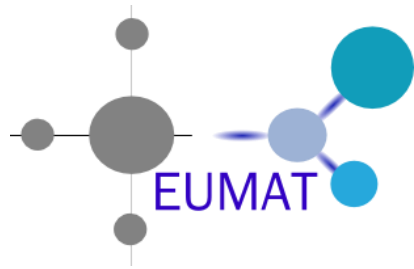
Slovakia: Clinical Trial Services (SME): organization of clinical trials



Project Idea

- **Main goals:**

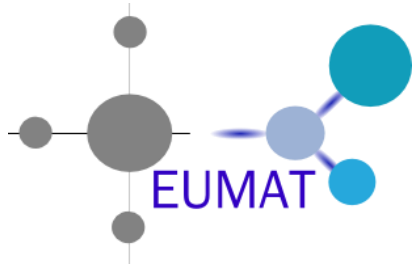
- Upscaling of nanofiber production and their on-line characterization for the health market application - development of a highly effective nanofiber production technology based on alternate current spinning electrospinning aiming to an effective low cost product.
- Optimization of nanostructured membranes by specific antibody systems for targeted and highly efficient detectors of ultralow drug, nucleic acids and pollution concentrations in air and fluids (including biological fluids). Like drug identification sensors for personalized medical application as well as for security applications
- Design and optimization of nanosensors for circulating nucleic acids predictive of survival (circulating microRNAs) and of response to therapy (cell free DNAs).



Project Idea

- ***Specific goals (1):***

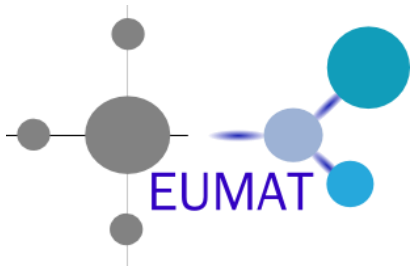
1. Development of more efficient technologies for competitive production of nanofibers
2. Optimization of injectable gels functionalized with effectively produced nanofibers for novel drug delivery systems in medicine including the certification procedure
 - a. Oncology
 - b. Regenerative medicine
3. Design of novel health care drug delivery systems based on functionalized and fractionalized nanofibers for cosmetics
 - a. Nail polish functionalization
 - b. Skin masks



Project Main Background

Nanogauze – product in the final stage for the world health market

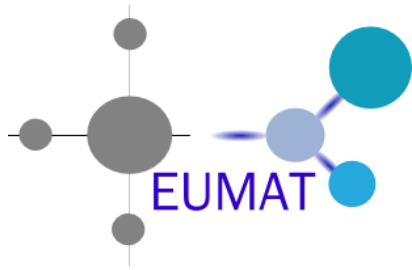
- a. Skin cover
- b. Suture smart cover for surgery
- c. Scar-free treatment for plastic surgery



Expected impact

Expected impacts:

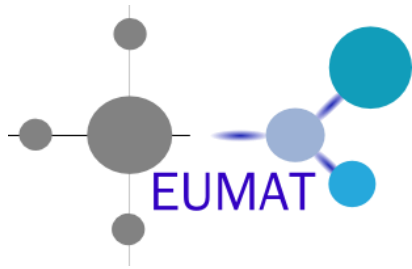
- *Measurable improvement of speed by at least a factor 2 of nanoscale characterisation procedures, in comparison to already established performance and reliability for the application leading to a significant increase in industrial competitiveness;*
- *Significant reduction of the time for nanomaterials-based product development, which should be quantified with respect to established conditions for specific market sectors, with a return of investment in less than 5 years;*
- *Quantifiable enhancement of the ability to control the quality and reliability of products, with consequent improvement of product lifetime and associated environmental benefits.*



Expected impact

Expected impact:

- *Open and upgraded facilities at the EU level for the design, development, testing, safety assessment, and upscaling of nano-enabled surfaces and membranes;*
- *Attract a significant number of new SME users, with at least a 20% increase for existing test beds;*
- *Increased access to finance (for SMEs in particular) for investing in these nano-enabled surfaces or membranes or in applications using them;*
- *At least 15% improved process parameters and 20% faster verification of nano-enabled surfaces or membranes performance for highly promising applications;*
- *At least 20% improvement in industrial productivity, reliability, environmental performance, durability, and reduction of life-cycle costs of these nano-enabled surfaces or membranes;*
- *At least 15% indirect reduction in energy consumption for applications using novel nano-enabled surfaces or membranes.*
- *Relevant indicators and metrics, with baseline values, should be clearly stated in the proposal.*



Looking for partners

- **Industrial and academic partners for the clinical grade development of nanosensors**
- **Industrial and academic partners for the development of optical and electronic detection of signals from the nanosensors**
- **Partners experienced in certification processes**
- **Partners for a production and distribution**
- **Any partner who needs our expertize in the Framework of European cooperation**