Whether its utilising 2PP laser fabrication for producing micro/nano-scale devices with user-defined 3D geometries……

Or fast maturation of cells in less than 30 days using Axol's Human iPSC-derived Neural Stem Cells protocols….

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PLATFORMA
Skin & Muscle Phenotypic Platforms

PLATFORMA – new skin and muscle models for a demanding world

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PLATFORMA
Skin & Muscle Phenotypic Platforms

PLATFORMA – new skin and muscle models for a demanding world

Project Coordinator: *Prof. E Rafailov, Aston Institute of Photonic Technologies*

Project Title: *'Peripheral Nervous System Tissue Engineering for Medical and Cosmetic Testing Applications'*

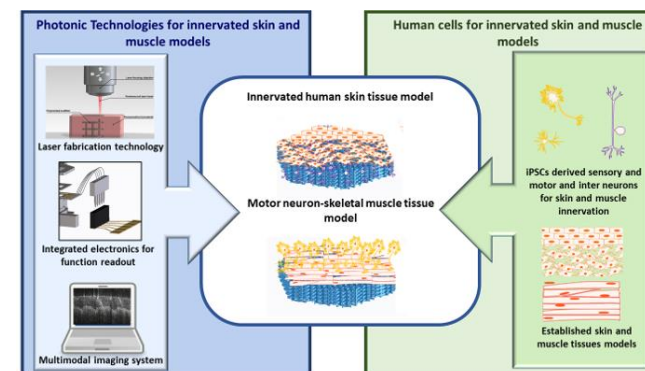**Call Topic:** *H2020 – FETPROACT – 2019-2020*

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PLATFORMA is an EU-funded but commercially driven project to produce high-content phenotypic platforms screening cosmetics, pollutants and new therapeutics. We propose to create purpose-built, 3D modular human tissues supported by laser-printed bio-compatible scaffolds from which electro-physiological status of the cells can be monitored.

Skin-Sensory Module - Applications

- Peripheral neurotoxicity testing of cosmetics, pollutants and transdermal delivery of new therapeutics, etc.
- Development of wound healing assays and wound healing therapeutic strategies
- Study interactions of human sensory neurons and dermal tissue

Muscle-Motor Module – Applications

- Investigation of human neuromuscular junction formation and signal transmission upon administration of therapeutic agents.
- Studies of muscular atrophies & motor neuron diseases with genetically engineered or patient-derived cells.
- Long-term monitoring and analysis of drug effects (toxicity and efficacy) with live 3D imaging and electro-physiological recordings.

Why PLATFORMA?

High content screening tools are urgently required to reduce dependence on animal testing and provide academia and industry with state-of-art models for research purposes.

Skin-sensory Module - (StratiCELL) will be a first in class industrial innervated human skin tissue model, grown around a specialized scaffold structure, which will ensure the monitoring of functional connectivity. Sensory-skin has the potential to mimic neurogenic inflammation (itch), pain and well-being. This model will make it possible to study the interaction between sensory neurons and cutaneous cells and will be used for efficacy testing and the study of drug candidates.

Muscle-motor module (AXOL) - until now, no physiologically relevant model capable of mimicking the processes of neuronal control over muscle tissue has been produced at an easily available or even repeatable and distributable level. Motor neurone diseases such as amyotrophic lateral sclerosis (ALS) are becoming of increasing interest to academic, pharmaceutical and other industrial sectors. The muscle-motor-neuron module will offer an unparalleled tool for studying everything from disease mechanisms to potential treatments.

Launched in October 2020, Platforma is an EU-funded collaboration of partners inspired by the results of the MESO-BRAIN project. Platforma will extend MESO-BRAIN results from the Central Nervous System to Peripheral Nervous System in the direction of market demand.

Scaffold Fabrication - Laser nanoFab GmbH (LNF) is a young spin-off company that draws on 20 years of research expertise in the field of laser-, nano- and biotechnology with the goal of making high-precision research technologies available to the market. LNF develops high-precision manufacturing technologies and manufacturing strategies, including the well-known two-photon polymerization. In PLAT-FORMA, LNF is developing the process strategy for manufacturing complex and highly integrated components of the skin-sensory and muscle-motor modules, as well as the integration of high-precision electrodes for signal acquisition. In this context, LNF also takes over the production of the module-specific polymer platforms as well as the transfer of this development into a product.

Fast maturation of cells in 30 days - Axol Bioscience's cerebral cortical neural stem cells (NSCs) are derived from integration-free, induced pluripotent stem cells (iPSCs) under fully defined neural induction conditions. Axol Human iPSC-Derived Neural Stem Cells express typical markers of cerebral cortical neural stem and progenitor cells such as PAX6 and FOXG1. They spontaneously form polarized neural rosette structures when cultured as a monolayer. Additionally, Axol's NSCs can generate cortical neurons that are electrically active and have the ability to form functional synapses and neural circuits in vitro.

Multi-modal OCT and FS Imaging System – Aston is delivering a compact and affordable photonic characterisation solution. Combining two photonic approaches, Optical Coherent Tomography, and Tissue Fluorescence Spectroscopy in one multimodal system will facilitate a compact and cost-effective universal, comprehensive, and reliable approach for monitoring printed tissues in time-course development.

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