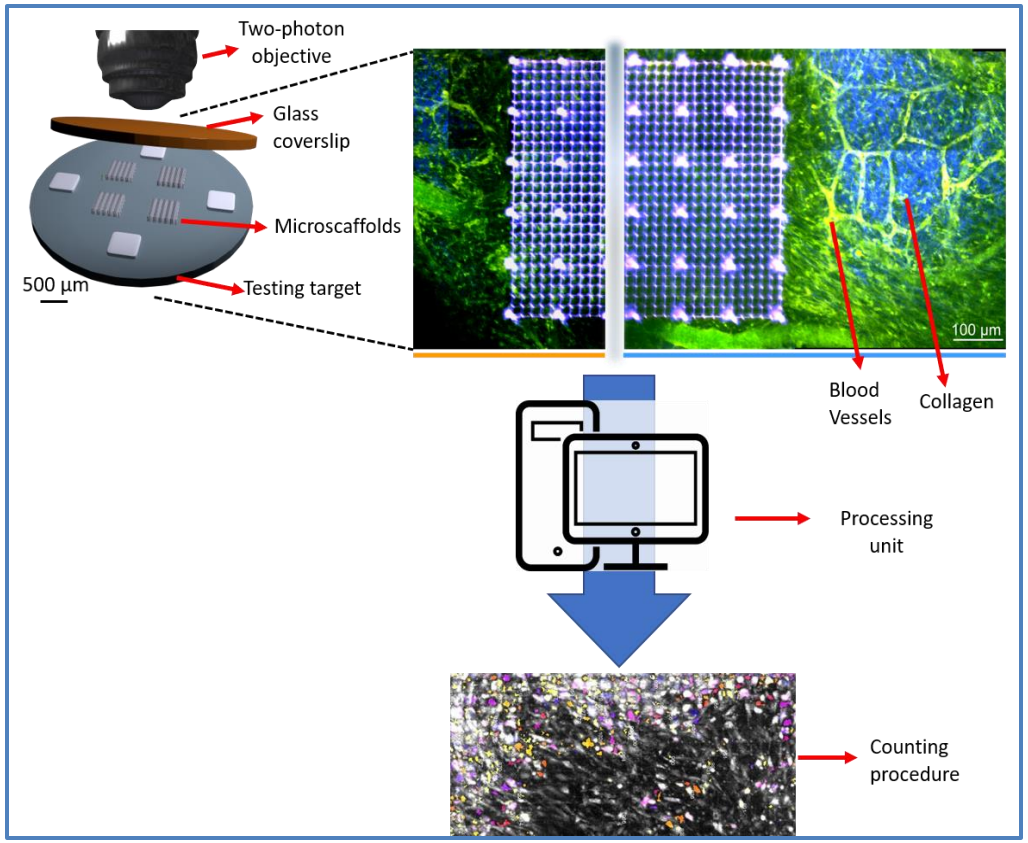
MICROATLAS: A MINIATURIZED IMAGING WINDOW FOR INTRAVITAL NONLINEAR MICROSCOPY



PRIORITY NUMBER:

KEYWORDS:

MICROATLAS is a miniaturized, low invasive, implantable imaging window for intravital nonlinear microscopy on living organisms. The platform is designed for in vivo quantification of the biomaterial implant response or tumor growth and its response to a drug. It allows to reposition the observation field on the microscope to monitor the evolution over time, thus significantly reducing the number of animals used for the experiment.

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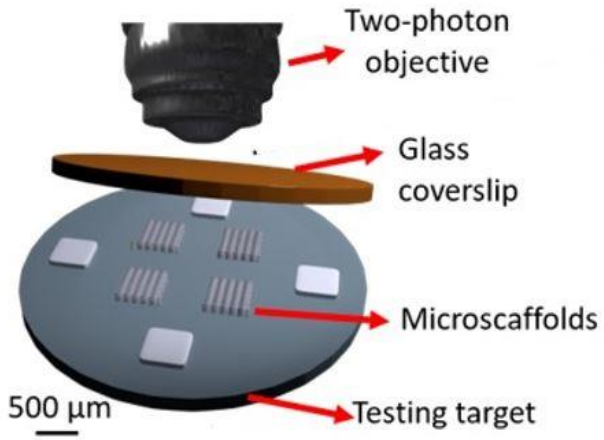

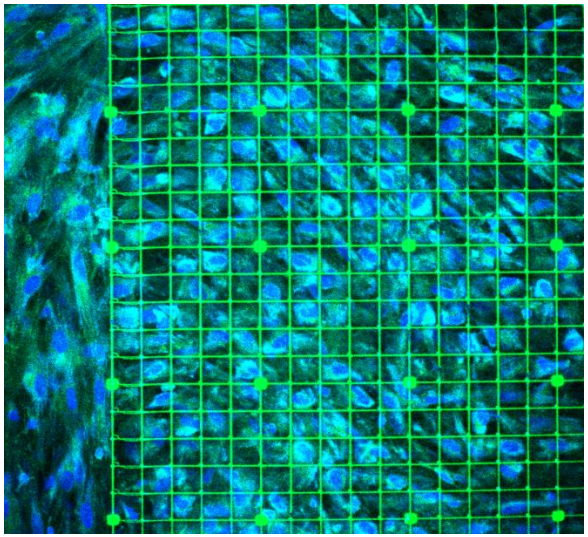

DESCRIPTION:

Microatlas is a subcutaneous implantable device in experimental animals; it contains miniaturized scaffolds, which guides tissue regeneration of the hosting living organism, and microscopic reference geometries which both allow repositioning the two-photon microscope field of view in different time points and real-time adaptive-optic techniques. The device is obtained by 2 photon laser photo-polymerisation. Microatlas allows robust in vivo quantitative analyses of the fibrotic response to the biomaterial, up to the cellular scale, in space and over time, as required by ISO10993 Standards, without the need for histopathology at intermediate times.

Microatlas has been largely validated into the chicken embryo model to be paired with brand-new biomaterials which require in vivo pre-clinical validation processes. The platform guarantees high level of feature precision thanks to the two-photon laser writing fabrication process.

ADVANTAGES:

- Compact design that allows mini-invasive subcutaneous implantation surgery procedures. This quality reduces the implant related inflammatory response in small laboratory living organisms, such as white mice and chicken embryos;
- no direct persistent percutaneous access (painful and invasive);
- Cost reduction up to 90%, diminishing euthanized laboratory animals in each mid-time points.

APPLICATIONS:

- Biocompatibility testing of in vivo materials;
- Analysis of tumor growth and the effect of drugs in vivo;
- Imaging windows for animal trials;
- Quantification of tissue reaction;
- Intravital microscopy;
- Fluorescence / two-photon microscopy.

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