



## BIOFABRICATION OF ARTIFICIAL VASCULARIZED TISSUE

TECHNOLOGIES, CHALLENGES AND PERSPECTIVES

### WORKSHOP ARTIVASC 3D

BIOFABRICATION OF ARTIFICIAL VASCULARIZED TISSUE – TECHNOLOGIES, CHALLENGES AND PERSPECTIVES

We kindly invite you to join our final ArtiVasc Workshop. With keynote lectures, scientific talks and an exhibition we will show the current developments from ArtiVasc and biofabrication. For more information please visit our website: [www.artivasc.eu](http://www.artivasc.eu)

- Date** October 28 - 29, 2015
- Venue** The workshop will take place at Fraunhofer Institute for Laser Technology ILT Steinbachstraße 15 52074 Aachen, Germany
- Registration** Please use the registration form on our ArtiVasc Website: [www.artivasc.eu](http://www.artivasc.eu)
- Contact** Dr. Nadine Nottrodt  
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#### PROJECT COORDINATOR

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#### PROJECT MANAGER

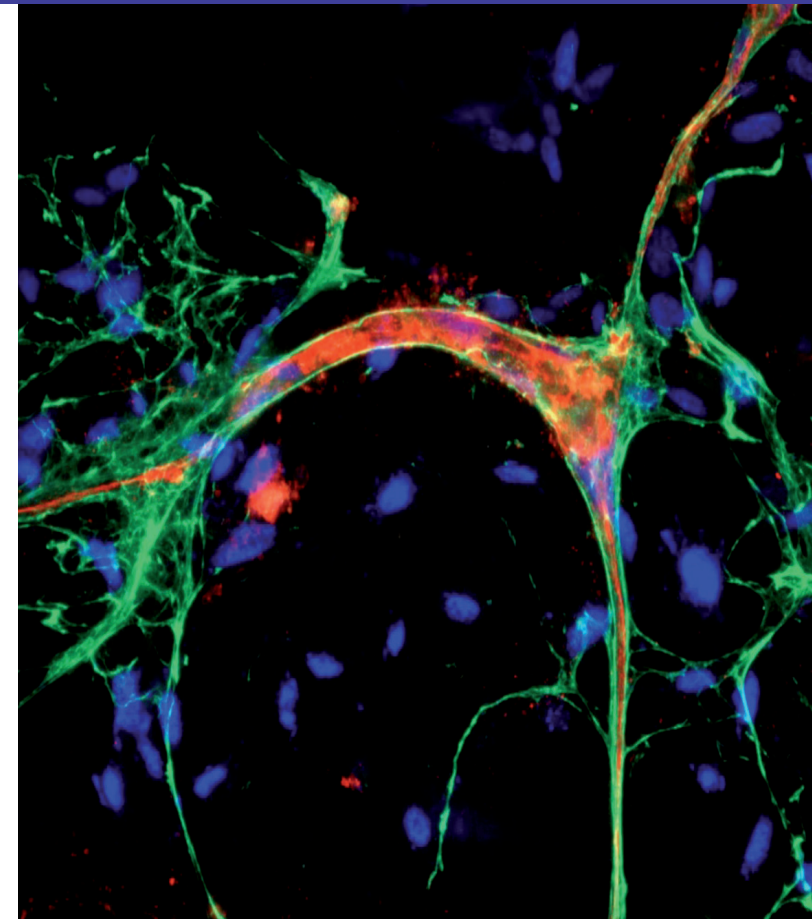
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For further information please see  
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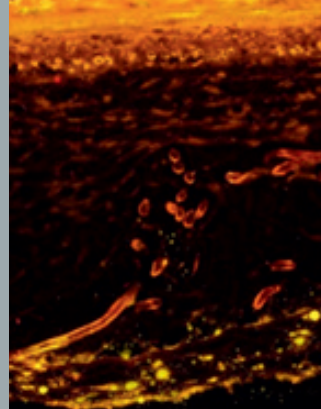


Cover photo: Isolated pericytes of vascular structures (Immunofluorescence), © UEA.

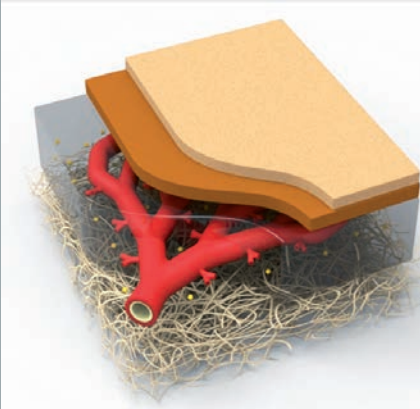




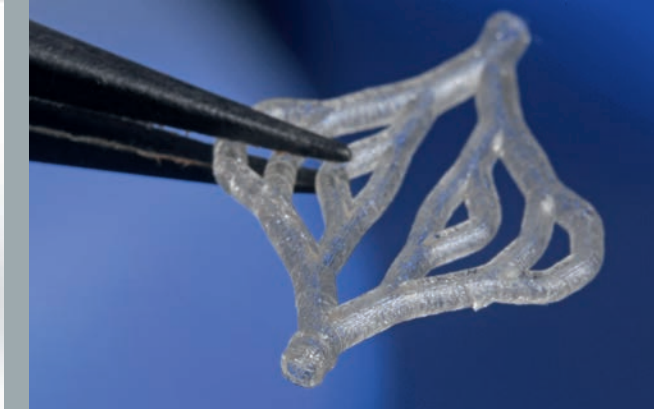
Integrated ILT laser module (© Fraunhofer IPA).



Staining of layered fat tissue (© BDF).



3D Model of artificial tissue (© ULO).



Branched vessel system (© Fraunhofer ILT).

## PROJECT AIMS

ArtiVasc 3D aims are to provide a biofabrication technology which enables building up vascularized, artificial fatty tissue. The artificial vascularization will, for the first time allow a connection to the natural tissue enabling entire nutrition and metabolism of fat cells. The combination of the fatty tissue with a dermal and epidermal cell layer has already been demonstrated. A 3-layered skin equivalent is currently under development.

## APPLICATIONS

The application of the achieved project developments are many-folds. We address two main applications: 1. in vitro skin models for pharmaceutical, cosmetic and chemical research and 2. in vivo soft tissue replacements in burn and trauma treatment.

## PROJECT RESULTS

Due to the close collaboration of a multidisciplinary team consisting of scientists working in the fields of chemistry, biology, physics, medicine and engineering an artificial fatty tissue has been realized. Therefore several developments in the following domains have been achieved:

### Material, Design and Functionalization

- Development of new synthetic resins, support material and crosslinkable biomaterial to enable fabrication of biocompatible vessel-like systems and surrounding tissue
- Modelling and design of the planned structures gives input for material and process development
- Biofunctionalization of artificial material allows proper cell cultivation

### Process and Machine Development

- Combination of Inkjet printing technology with laser based stereolithography processes
- Branched porous vessels made by laser based stereolithography
- The surrounding network for cell cultivation will be generated by hydrogel dispensing and electrospinning

### Tissue Generation and Validation

- Development of a bioreactor for cell cultivation with characteristic cell types and co-cultivation of endothelial cells, pericytes and adipocytes
- Fundamental understanding of matrix-tissue interaction to develop intact fatty tissue
- Evaluation of the newly developed tissue through in vitro and in vivo tests

## PROJECT DETAILS

<b>Acronym</b>	ArtiVasc 3D
<b>GA No</b>	263416
<b>Start Date</b>	November 1, 2011
<b>End Date</b>	October 31, 2015
<b>Duration</b>	48 months
<b>Project Budget</b>	10,5 million euro
<b>EC Funding</b>	7,8 million euro
<b>Type</b>	Large-scale integrating project

## CONSORTIUM

