

The CELLSCREEN Project

Spatially defined addressing of cells to surfaces

The project CELLSCREEN combines the expertise for combinatorial synthesis of peptide arrays with a laser printer and solid amino acid toner particles (DKFZ, Heidelberg), the engineering expertise needed to improve that machine (Fraunhofer IPA, Stuttgart), and expertise to scan and analyse cells bound to the arrays generated with a scanner developed at UAR, Linz. Thereby, we want to explore if we can address cells at will to surfaces and readout these events.

Problem/needs addressed by the sub-project

Tissues and organs comprise of different cell types that communicate with each other and the surrounding extracellular matrix. Crucial for the maintenance and repair of tissues is a well-defined 3D arrangement of the different cells that e.g. decides on the spatial location of stem cell niches (Fig. 1).

The signals used are poorly understood, which is one of the main obstacles in Tissue Engineering that aims e.g. to assist in the repair of dysfunctional tissues. A method to fix cells at defined locations could help to find out more about these signals.

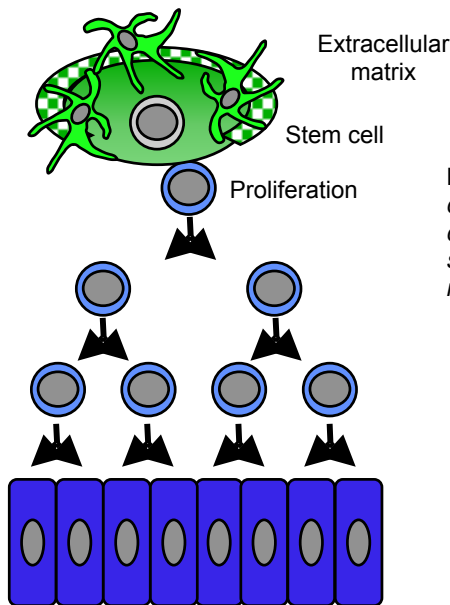


Fig. 1; Cells remain committed as stem cells through signals from their neighbourhood

Statements and thoughts

Dr. Frank Breitling
Lead participant

The Regins project is a platform that gives us the opportunity to combine a wide span of expertises for a first proof of principle experiment.

Thereby we can adapt the formats of our complementary methods and machines in order to embark for a truly interdisciplinary project.



Fig. 2 Peptide laser printer

Objectives of the sub-project

We want to demonstrate that a library of 130.000 small peptides bound to a solid support can be synthesised by combinatorial synthesis with a peptide laser printer (Fig. 2 & 3) developed at the DKFZ and at the Fraunhofer IPA.

Cell-binding to defined peptide spots is to be detected in a proof of principle experiment with the array scanner developed at UAR.

REGINS project partner

REGINS (REGional standardised Interfaces for a better integration of regional SMEs in the European Economy) is an INTERREG III C Regional Framework Operation (RFO) that aims to support interregional cooperation projects (Sub-Projects) within the thematic priorities automotive, biotechnology and logistics within the participating partner regions Upper Austria, Stuttgart Region, Lombardy Region and West-Pannon.

Summary/activities of the sub-project

The Fraunhofer IPA plans to improve the calibration and the resolution of the peptide laser printer (Fig 2). Crucial for that is a better knowledge of the control of the LED-arrays.

The DKFZ plans to synthesize an array of tetrapeptides bound to a 20cm x 20cm glass slide with cell resistant properties.

In a proof of principle experiment these peptide spots are assayed with the scanner developed at UAR (Fig. 4), and adapted for the project planned.



Fig. 4 The BiochipScout

Contribution to strategic goals of REGINS

The partners have complementary know-how (DKFZ: synthesis of peptide arrays; IPA: construction of suitable machines; UAR: readout systems for arrays) and thus are interested in a sustainable know-how transfer, especially to ensure compatible formats.

The participant's complementary expertise allows for an integrated project with the main driving force for exchange of experience being the common interest in compatible formats that enable e.g. read-out of bound cells to peptide arrays.

A successful project would generate results that enable the participants to publish their technology, expand it to other fields, and promote translational research.

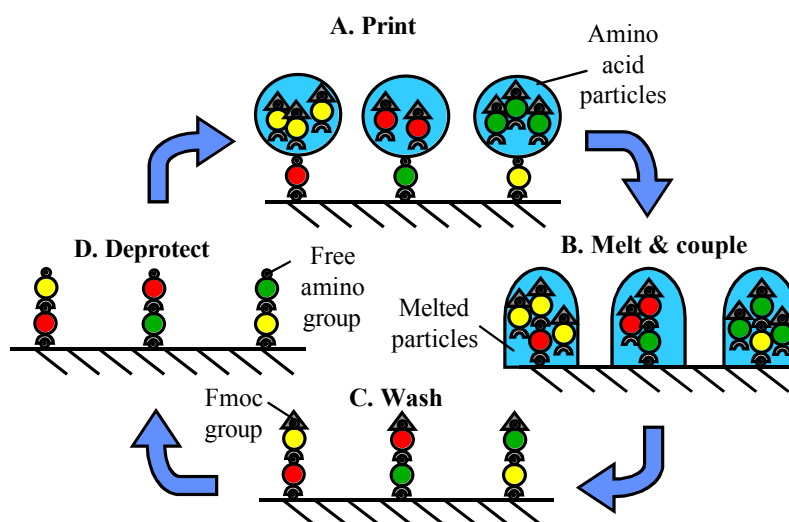


Fig. 3 Combinatorial peptide synthesis with a laser printer

Facts and figures

Name of the sub-project	CELLSCREEN - Spatially defined addressing of cells to surfaces	
Duration	July 1 st 2005 – May 31 st 2006	
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