

# BioBusiness in the Oulu region

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Bioforum Oulu, Oulu Innovation**

**28.3.-4.4.2008 South Africa**

# Oulu Today – basic facts

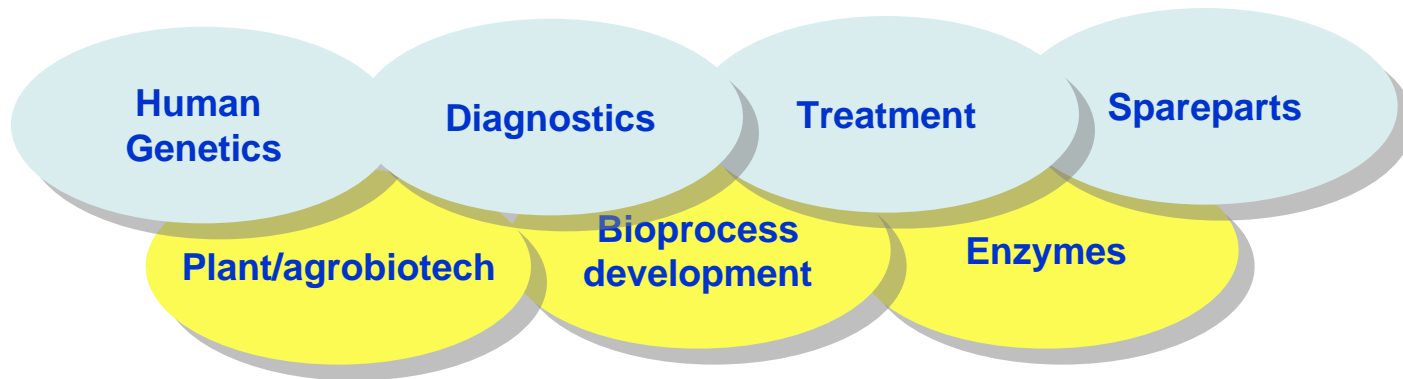
- A growth centre - nationally
- A leader in wireless ICT technology – globally
- A centre of education – Northern Finland
- A diversified culture city
- A young population structure
- Home of Technopolis, a technology park among the biggest ones in Europe
- State of the art business environment with 800 hitech companies
- An incubator of hitech companies – aiming global

# OULU IS KNOWN FOR ITS GROWTH ENTERPRISES OPERATING IN THE GLOBAL MARKET



# Bioforum Oulu, Oulu Innovation

- implements the innovation strategy in the field of Life Sciences
- is a member of the national HealthBio cluster
- The focus fields:



# Biocluster Oulu's strength - strong academic research

## Case - Collagen research / FibroGen

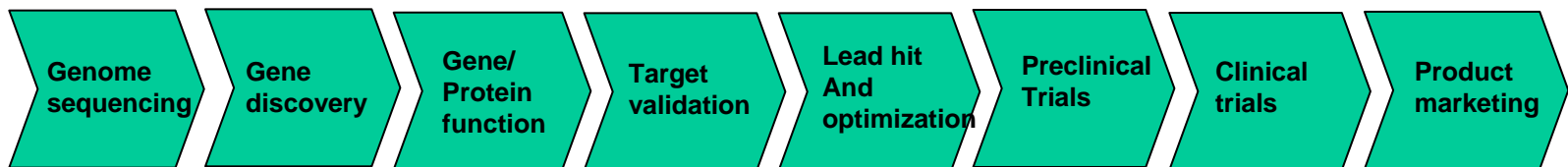
- The breakthrough research on collagens and their production methods in Oulu was a part of the foundation of FibroGen
- At present, FibroGen is a successful US-based biotech company.
- produces highly purified and characterized recombinant collagens and synthetic gelatins.
- several internally developed drugs in clinical testing.
- develops therapeutics for tissue fibrosis, anemia, ischemic conditions, diabetic complications and cancer.

# Examples of academic research in Life Sciences

- anemia and other hypoxic conditions: Hypoxia-inducible factor (HIF)
- bone: BMPs and osteoporosis
- lipid metabolism in mitochondria: FAS
- obesity, metabolic syndrome and atherosclerosis: associated early markers (ghrelin, adiponectin, resistin) and immune response
- extracellular matrix: collagen XIII, XV and XVIII (malignant processes, cell migration)
- bioprocesses (core service): difficult proteins to produce such as rec. collagens, Wnts and BMPs
- transgenic mice and analysis (core service)
- protein crystallography and structural analysis (core service)
- gene transfer / gene silencing (core service)

# Value Chain Approach (Capgemini 2006)

## Drug Discovery (services)



Several research groups

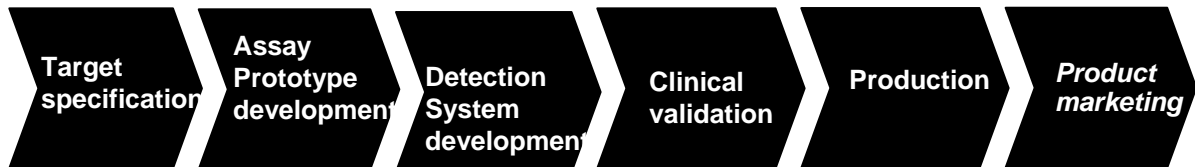
Core Facilities at Biocenter Oulu, Univ. of Oulu, VTT and MTT

*Medicres*  
Medipolis GMP Oy (MJ BioPharm)  
Pharmatory Oy  
Fermion (Orion)

Orion Corp.  
Hormos Medical (QuatRx)

Novamass Analytical/Systems Biology Worldwide  
Triacle Biocomputing, Cellogico  
BioSilta, BioPro Consult

## In vitro Diagnostics



Several research groups

Core Facilities

VTT Technical research center  
Chaperone

Orion Diagnostica  
SBA Analytics Ltd (IDS)  
Biotop Oy

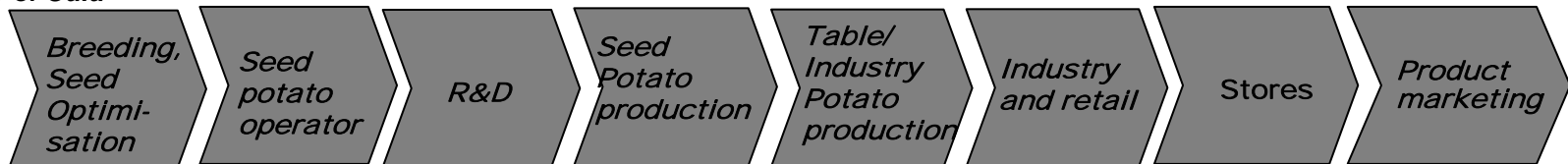
MTT AgriFood Research Center, Univ of Oulu

FinPom

Farmer network

Profood

## High Grade Area – Seed Potato



HZPC

Northern Seed Potato

bioforum

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# Case: Cellogico

- Bio – ICT company.
- Cell simulation models based on published data
- Wet lab to confirm and to complement the models
- to support customer's go / no go decisions



# Case: Novamass Analytical Ltd

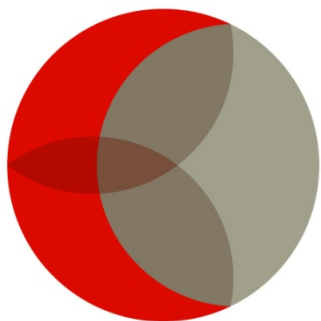
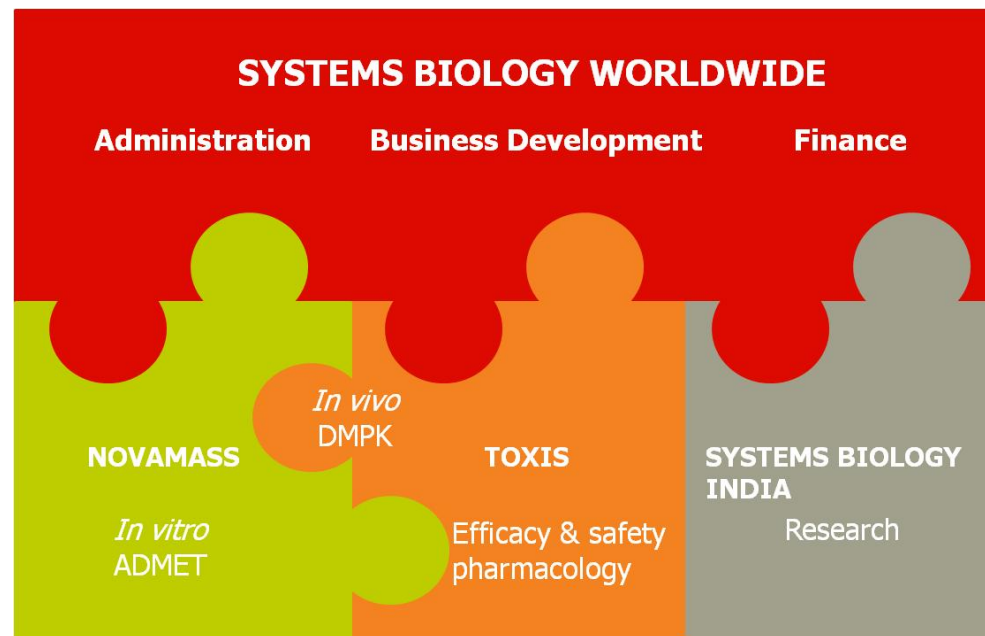
- ADME (administration/distribution/metabolism/excretion) studies for drug discovery and development companies.
- lead optimisation, lead selection and drug candidate characterisation
- intelligent throughput services to support customer's go / no go decisions
- Systems Biology Worldwide Network – combining strengths of Finland and India

# Systems Biology Worldwide Ltd Intelligent Throughput Service - ITS

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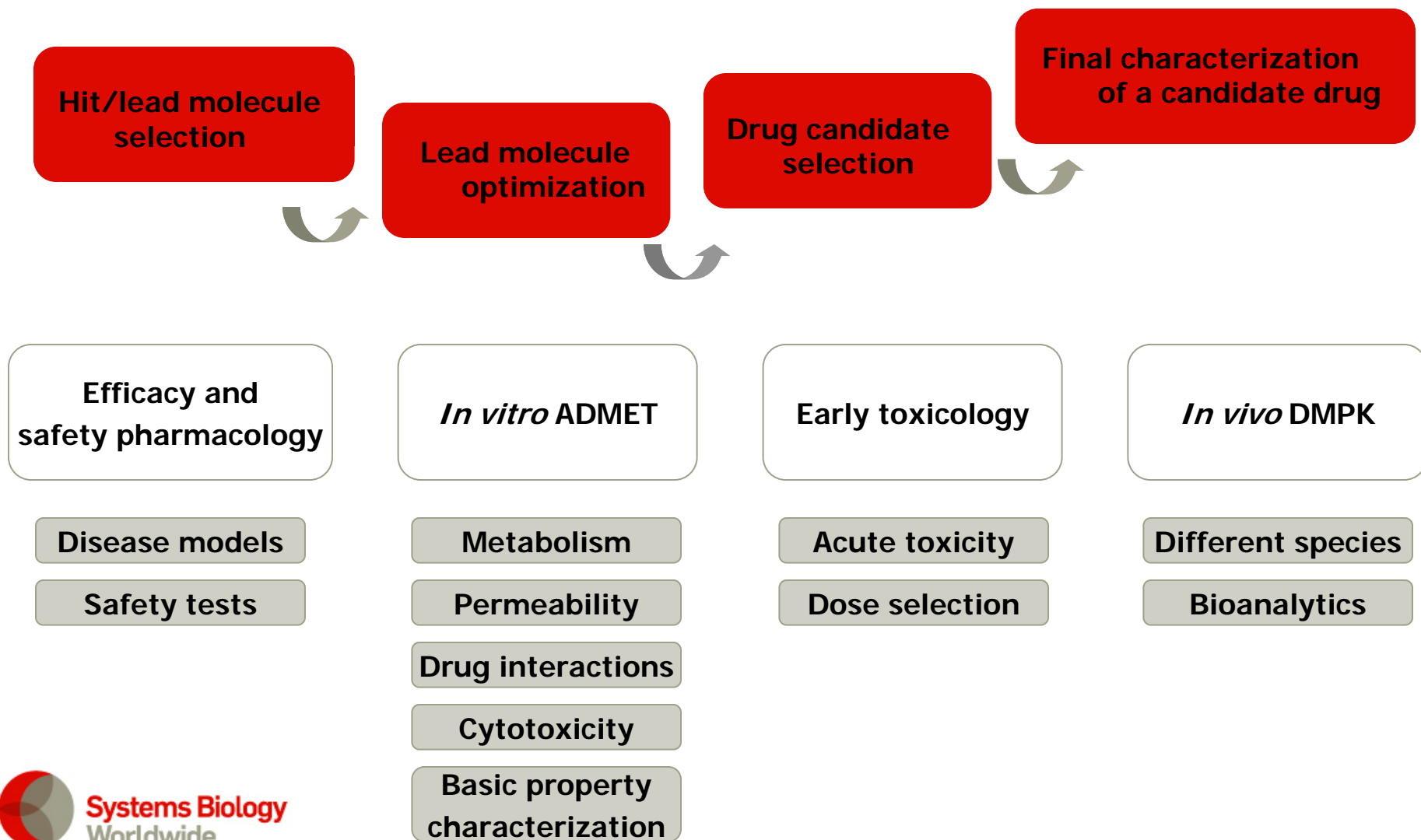


**Systems Biology**  
Worldwide

**Enhance and increase the accuracy of your decision making process by ITS.**

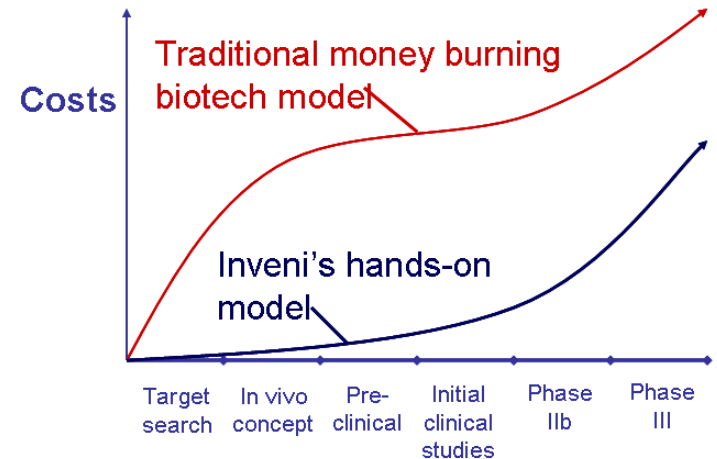
**Improve your success rate in regulatory preclinical by selecting validated drug candidates using ITS.**

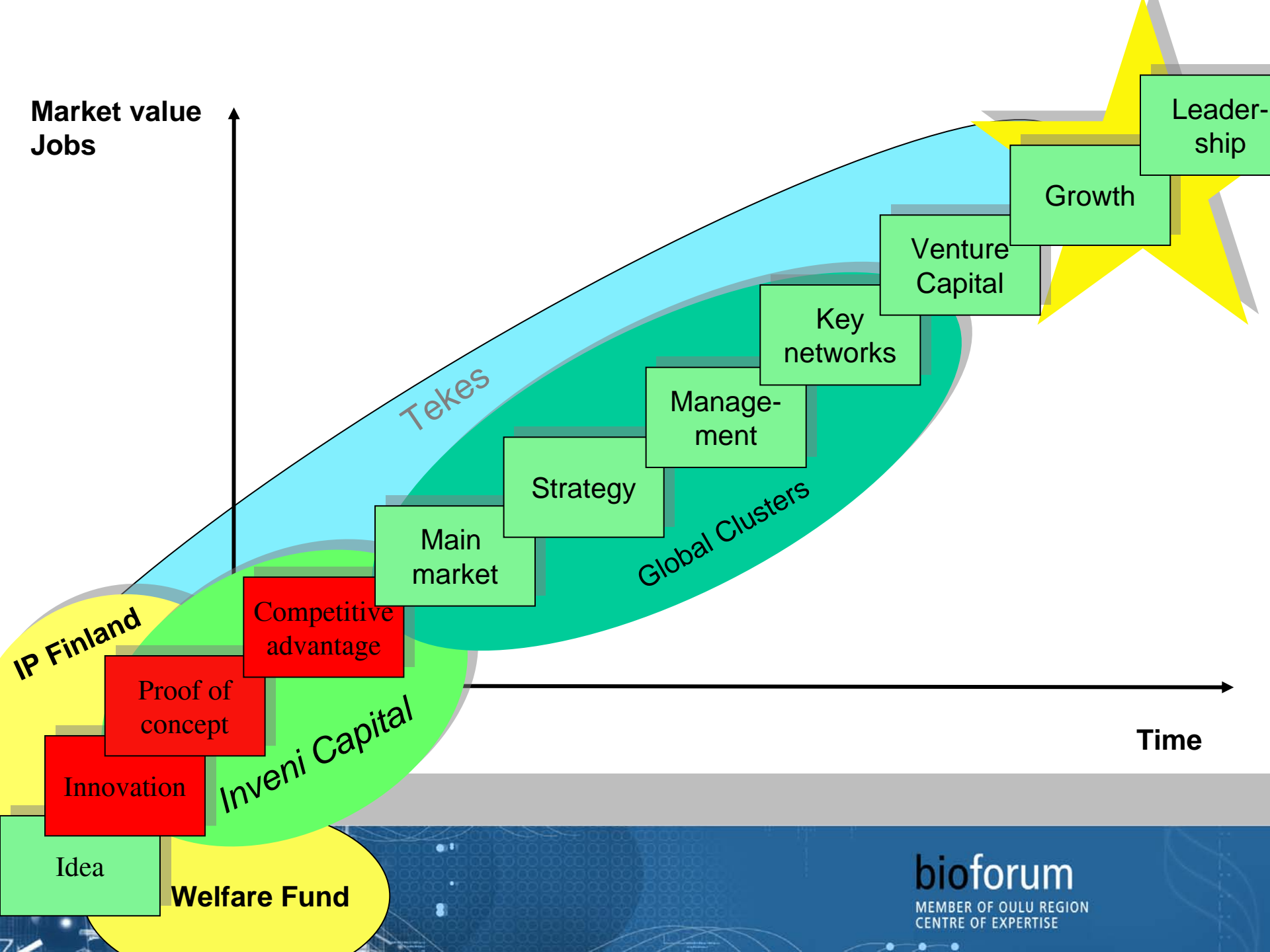
# Full range of services for drug candidate validation



# Case: BioSilta

- Breakthrough technology for the development and optimisation of production processes of biomolecules in the areas of biopharmaceuticals, diagnostic tools and industrial enzymes
- Established June 2007
- VC Investment February 2008
- Beta customer cases 2008



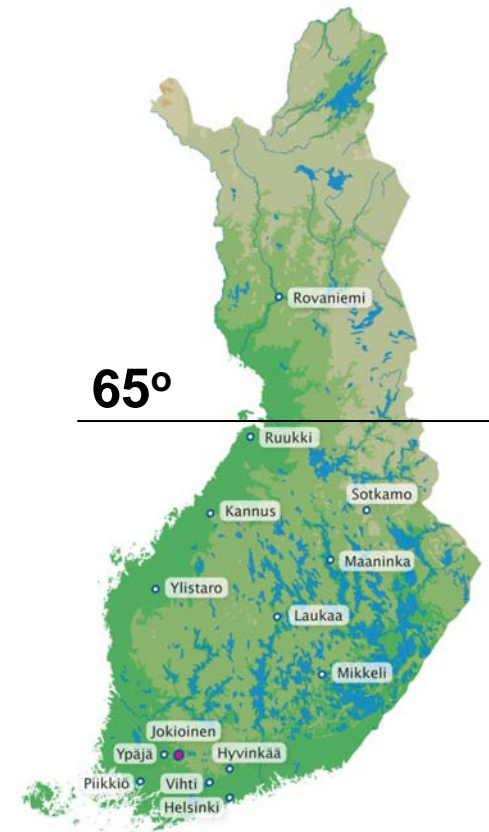


# Case: Medipolis GMP

- GMP production plant
- from the preclinical phase to commercial production of active biopharmaceutical ingredients
- the main owner Marvel Life Science UK, a flagship company of the M J Group of companies (India)
- new molecules
- R&D collaboration

# Case: Seed Potato

- Need for healthy seed potatoes is increasing due to warming of climate (the increase in of plant diseases) and growing markets (China, India etc.)
- The Oulu region is a high-grade seed potato production area: soil optimal, long day and cold winter
- Healthy and good quality seed potatoes give better yields and preserve better in storage.
- an increasing collaboration with international potato breeding companies in R&D and marketing and sales
- R&D collaboration: bioreactors, micro chips, gene expression profiles, plant diseases diagnostics, ePotato (quality, safety and traceability in the value chain), cross-disciplinary collaboration



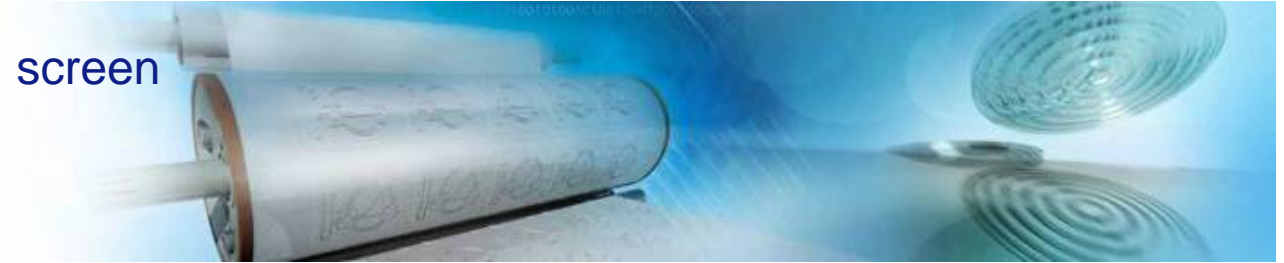
# Case: New generation diagnostics – Lab in Pocket

- consumer-driven diagnostics / analytics with low cost, easy-to-use, point-of-care analysis, short analysis time, integrated sample preparation
- technology as an enabler – combining expertise: roll-to-roll production, printed electronics / diagnostics / intelligence, microfluidistics, modified antibodies, wireless communication etc.
- VTT Technical Research Center of Finland
- At present, customer-need based applications are searched to develop technology optimal for diagnostics.



## Methods towards roll-to-roll produced biosensors

- Gravure, flexo, offset, screen
- Ink-jet
- Hot-embossing



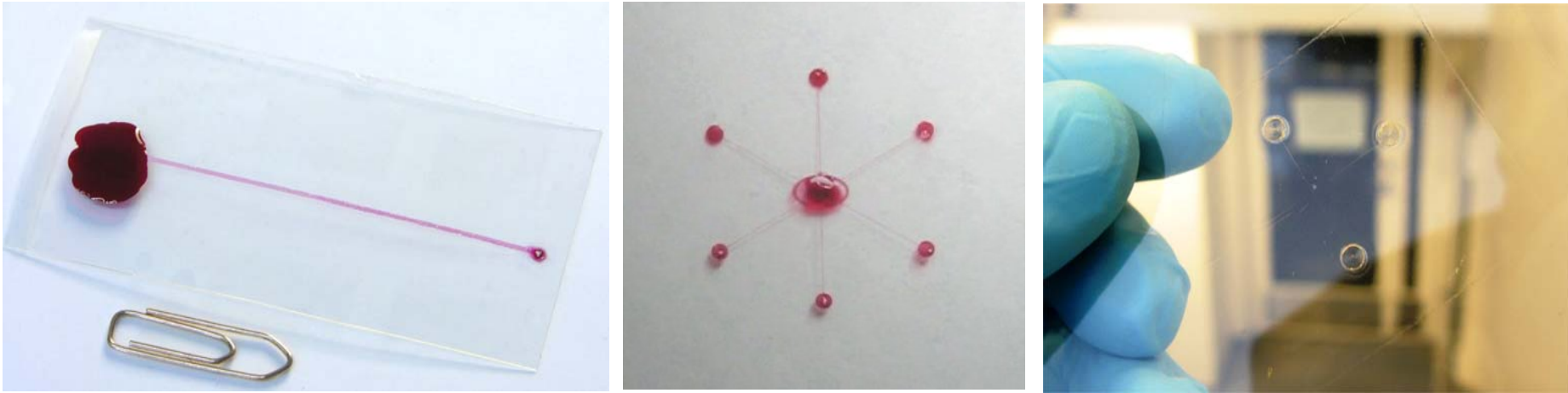
Flat-bed embosser



Roll-to-roll pilot printing machine Pico

Markku Käsäkoski: [markku.kansakoski@vtt.fi](mailto:markku.kansakoski@vtt.fi)

## Methods towards roll-to-roll produced biosensors



*Roll-to-roll hot embossed microfluidic channels*



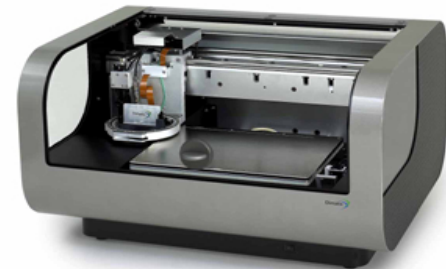
*Capillary flow in microfluidics*

# Methods towards roll-to-roll produced biosensors

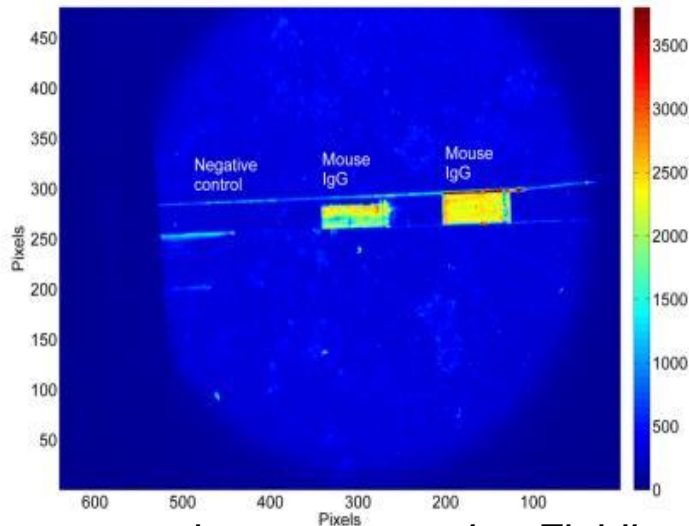
## Inkjet printed biomolecules



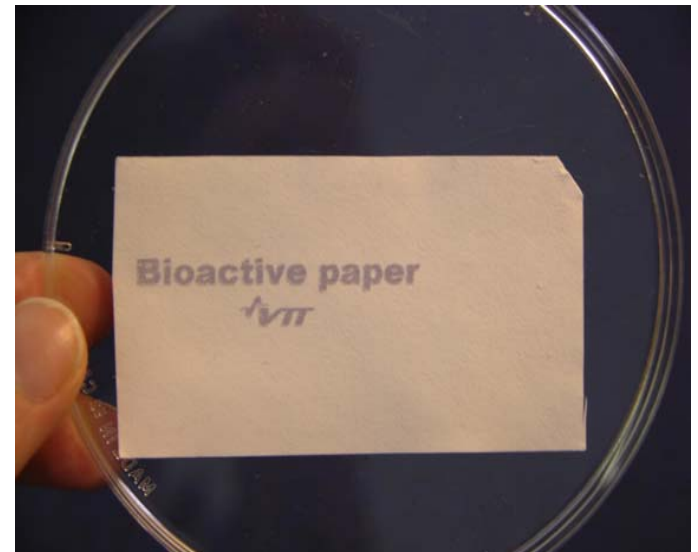
*Fluorescence immunoassay on plastic film*



*Dimatix Materials Printer DMP-2831*



*Fluorescence immunoassay in  $\mu$ Fluidic channel*



*Enzymatic color reaction on paper*

**BMNIT 2008**  
**Bio Meets Nano and IT Conference**  
**December 9-11, 2008 Oulu, Finland**

**International conference enhancing international and interdisciplinary collaboration and business in the fields of Life Sciences, micro and nanotechnology and information technology.**

**The specific event website published in April: [www.bmnit2008.com](http://www.bmnit2008.com)**

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# Potential Collaboration Topics

## 1) Seed potato

- The Oulu region is a high-grade seed potato production area.
- The importance is increasing due to the increase in the incidence of plant diseases.
- Healthy (meaning non-infected, good quality, safe and also otherwise wellbeing) seed potatoes give better yields. In addition, the potatoes preserve better in storage.
- This, naturally, has a major business impact when you consider the quantities consumed annually globally.
- There is an increasing collaboration between our companies and potato breeding companies
- They together are establishing subsidiaries to collaborate in different markets.
- If wished there could also be possibilities of collaboration at the research level.
- In addition, if there were real practical needs on special types of diagnostic (or analytical) tools for a specific condition – weather, soil, water, air, gene activity, proteins, microbes, plant diseases, indicators of soil, indicators of wellbeing of a potato - to be done analysed either in lab or point-of-“Care” (for instance on the farm), this interests us.

# Potential Collaboration Topics

## 2) GMP biopharmaceuticals / biosimilars and production processes

- We have in Oulu a GMP facility for biopharmaceuticals (Medipolis GMP) and a new expertise (Biosilta and Research group: Prof. Peter Neubauer) to optimise larger scale pharmaceutical processes on the microtiter plate format.
- The technology is totally new and is already interesting for pharmaceutical companies.
- Medipolis GMP has a connection to a UK based marketing company Marvel LifeScience and to M J BioPharm (Mumbai, India).
- In addition, new molecules in general could be of interest.
- Also collaboration on biosimilars for global market is of interest.
- We have also production facilities for small molecules, Pharmatory and Fermion (a subsidiary of Orion) – both doing also CRO work.



# Potential Collaboration Topics

## 3) Biodiversity and drug discovery & development services:

- We have a Finnish – Indian joint-venture (Novamass, Systems Biology Worldwide, Toxis) and linked network (both companies and research) to provide intelligent throughput services for molecule characterisation, lead optimisation, selection, administration, distribution, metabolism, excretion, toxicological and other non-clinical studies.
- The service package is not yet ready but in the process being updated all the time.
- Idea: we could try to work on your “molecule library” together to identify potential leads for new pharmaceuticals – small molecules or biopharmaceuticals and thereby increase commercial value of selected molecules.

# Potential Collaboration Topics

## 4) Enzymes:

- we have a company looking for new enzymes for molecular medicine research (PCR, Reverse transcriptases, etc.).
- In the Oulu region there are a few other companies likely to be interested in enzymes Chempolis, MZymes and potentially also our forest industry companies, such as Stora Enso.

# Potential Collaboration Topics

## 5) **Bio meets Nano and IT 2008, Oulu: 9.-12.12.2008**

- The above topics are discussed during the meeting in more detail (plus others - for instance bio related products for elderly and proactive healthcare).
- In addition, if you feel that you could suggest a speaker for the event, please, do (biodiversity?).
- BMNIT will have sessions for pharma, technology, welfare, diagnostics and agro biotech.
- The event is also a concrete sign of the collaboration between City of Oulu and Cities of Halle and Leverkusen (in Germany).
- The City of Oulu and Tshwane have also signed a collaboration agreement