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# Regenerative medicine cell therapy financial market: how to finance potential innovations

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# Structure

- Introduction
- Theoretical framework
- Data and methods
- Findings
- Discussion



# Introduction

- Regenerative medicine (RM) aims to restore or regenerate human cells, tissues or organs
  - Third discipline beside surgery and medicine
- Aim of this study
  - Is to scrutinize global RM cell therapy financial market,
  - Its corresponding local financial market in Finland, and finally
  - How financial market affect locally to university's possibilities to commercialize technologies in Tampere, Finland
- Case background
  - Public investments in Tampere (Finland) to regenerative medicine "Human spare parts research program"
  - BioMediTech (joint institute a joint institute of University of Tampere and Tampere University of Technology, and which combines biosciences and medical technology from both universities)



## Some definitions

- Venture capital: “independently managed dedicated pools of capital that focus on equity or equity-linked investments in **privately held, high growth companies**” (Gompers and Lerner, 1999: 349)
- VC organization (here venture capitalist): organization that invests to privately held, high growth company between 1 and 5 years old (narrow definition) or between 1 and 10 years old (broad definition) (Avnimelech and Teubal, 2006)
- Private equity (PE) companies focus both high growth companies and mature companies either private or publicly traded (Avnimelech and Teubal, 2006).



# Competence bloc theory

Actors	Tasks	Function in infrastructure
Customer	Active, competent and resourceful. Products are never better than customers are capable to demand.	Demand
Innovator	Connects technical specialities	Creation
Entrepreneur	Selects commercially potential innovations.	Selection
Venture capitalist	Recognize and finance commercially viable opportunities.	Recognition
Industrialists, business leaders and financial experts	Bring new product full-scale production.	Exploitation
Exit-market	Expectation for reasonable or better profit for those who are successful.	Incentive

***Competence bloc theory is developed by Eliasson and Eliasson (1996)***



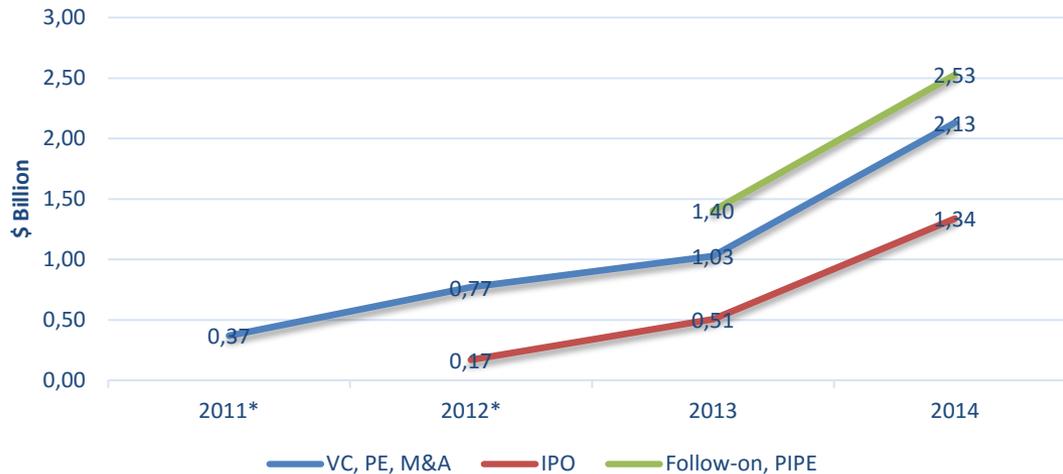
## Data and Methods

- Financial data
  - Alliance for Regenerative Medicine (ARM)
    - Annual reports (years 2011-2014)
    - Comparable numbers from 2013 and 2014
  - Finnish Venture Capital Association (FVCA)
    - pharmaceuticals and drug delivery, and drug development technologies sectors between 2007 and 2013
- Empirical case study
  - 24 interviews: 15 of interviewees were from BioMediTech, three of interviewees were from University hospital of Tampere, and the rest were from local and regional development agencies, Ministry of Employment and the Economy, TEKES, and a local firm
  - Themes: Research environment, finance, entrepreneurship, market, legislation, hospital environment, and end-value

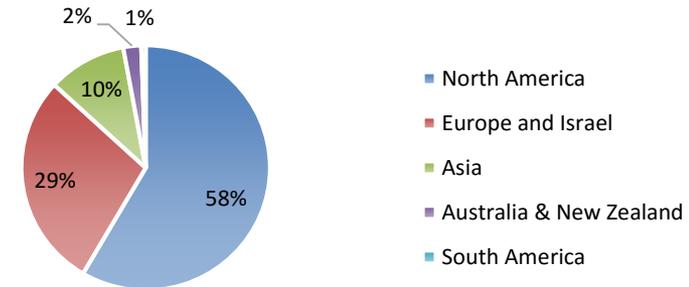


# Findings (1/3)

### Investments in RM cell therapy and gene therapy



### Distribution of leading companies

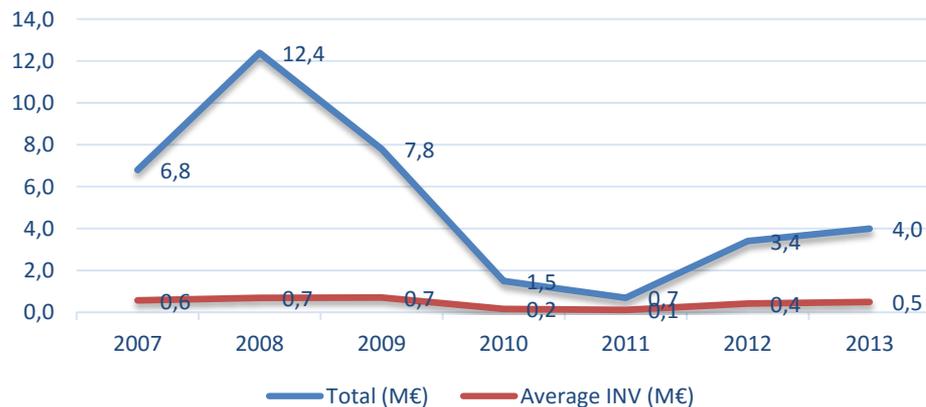


Partnership (announced) milestones grew from \$2,4B to \$8,9B (2013->2014)

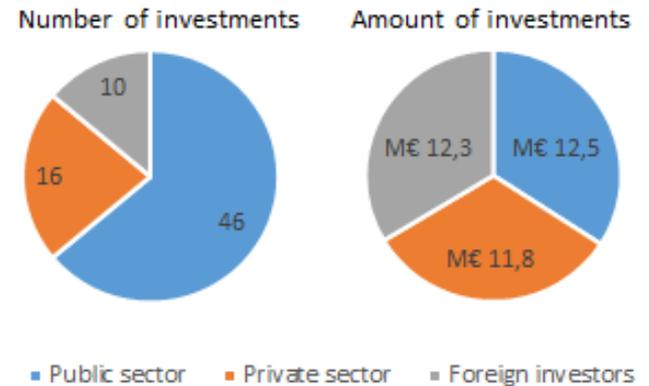


## Findings (2/3)

### Investments in Finnish pharmaceutical and drug development companies



### Distribution of investments



- Public: average investment size 0,27M€
- Private: average investment size is 0,74M€
- Foreign: average investment size is 1,23M€



	RM CELL THERAPY IN TAMPERE
<b>INNOVATORS</b>	<ul style="list-style-type: none"><li>- High level research</li><li>- Applications in cell therapy (Bone grow), technology, and tools</li><li>- Proof of Concept development</li><li>- Public financial market</li><li>- Experience from public hospitals (RM cell therapy)</li></ul>
<b>ENTREPRENEURS</b>	<ul style="list-style-type: none"><li>- Small companies, not focused to RM cell therapies</li><li>- No potential entrepreneurs identified in BioMediTech</li><li>- Local companies loosely integrated to BioMediTech</li><li>- Financial market does not support emergence of entrepreneurs</li></ul>
<b>VENTURE CAPITALIST</b>	<ul style="list-style-type: none"><li>- There are not specialized venture capitalists</li><li>- Limited connections to abroad</li><li>- Limited amount of VC available</li></ul>
<b>EXIT MARKET</b>	<ul style="list-style-type: none"><li>- In the history few IPOs to London and New York, even though not in RM cell therapy field</li><li>- Only few pharmaceutical companies in NASDAQ OMX in Finland</li></ul>
<b>INDUSTRIALIST</b>	<ul style="list-style-type: none"><li>- Few (if none) relevant industrialists in the ecosystem</li><li>- Partners has to be seek from abroad (EU, USA)</li></ul>



# Discussion

- According to Bonfiglio (2014), in product development
  - Estimated need for grants is \$5-10 Millions for academic research
  - The need for venture investments is
    - Phase I: \$10-15 Millions
    - Phase II: \$20-25 Millions
    - Phase III: \$50-75 Millions
  - IPO or partnership deals should provide \$75-100 Millions.
  - Total amount of needed venture investments + IPO is between \$155 - \$215 Millions
- Drip-feeding might be a big problem (average investment sizes: 0,27M€; 0,74M€; 1,23M€)
- If drug development numbers are used as a reference, it is very unlikely that Finland could provide stem cell therapies
- However, there might be a possibility for early development of these therapies (collaboration with hospitals)



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**Thank you!**