

Clinical research in Finland and in Turku  
region - factors and initiatives taken to  
improve the environment and conditions for  
clinical research

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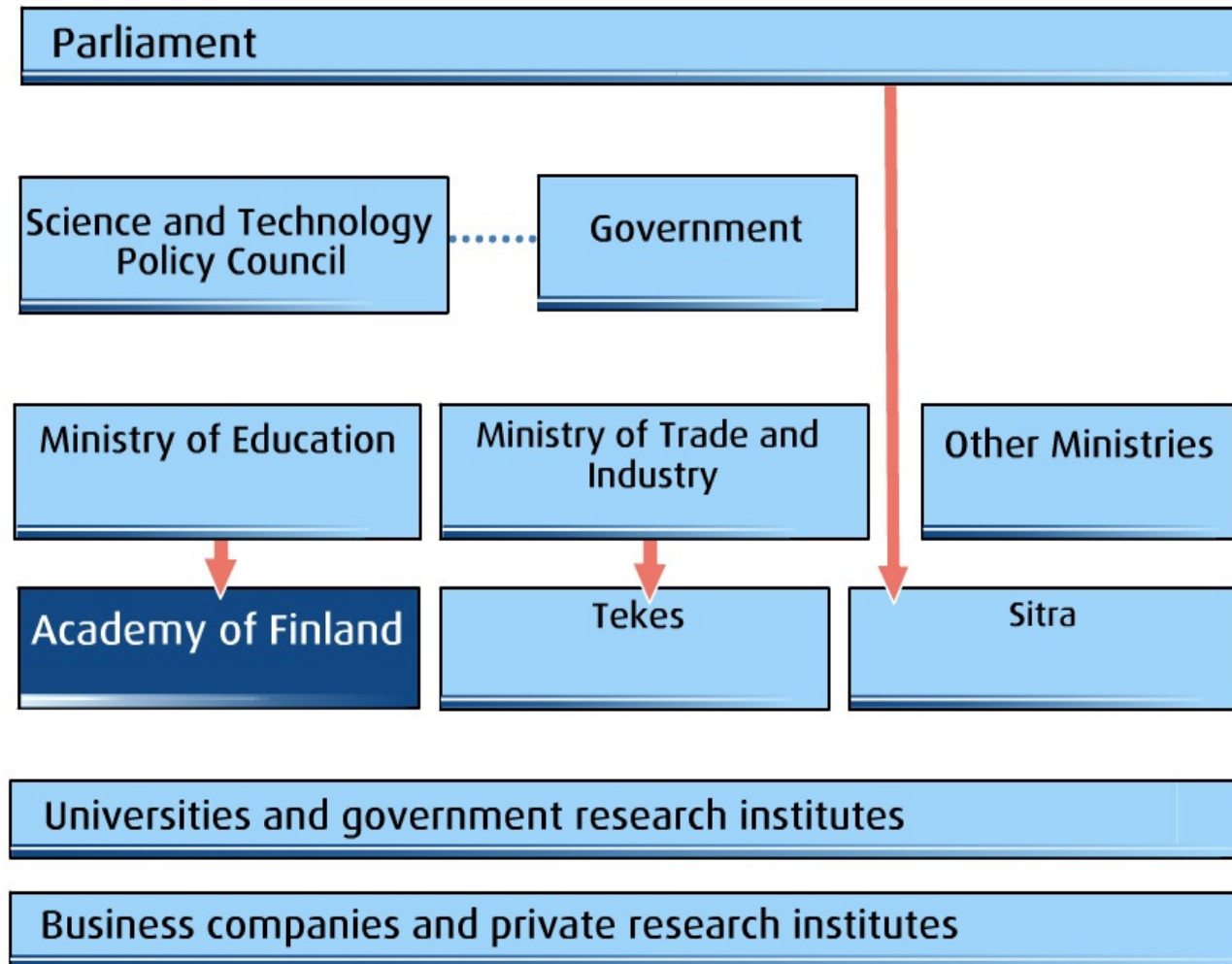
Chair of Health Research Council

Academy of Finland

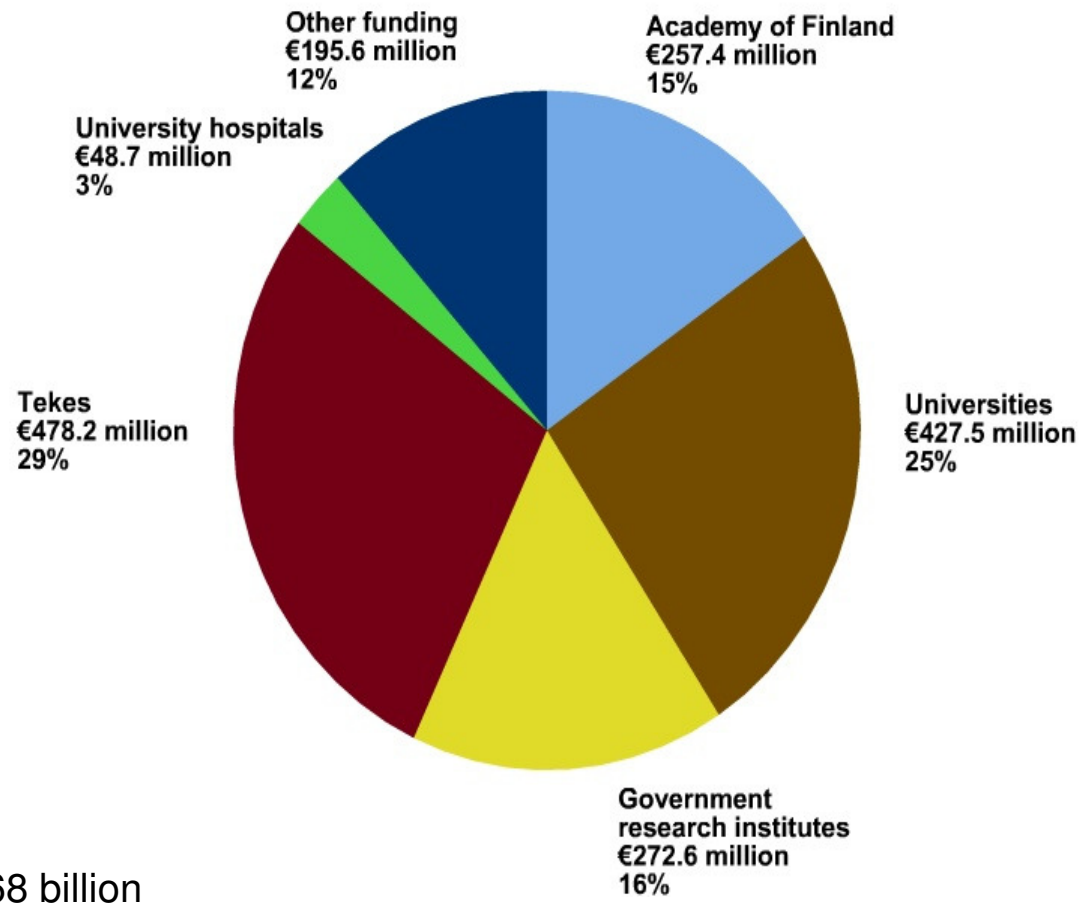
# Content

- Structure of research funding in Finland
- Comparison of some research indicators between Nordic countries
- Current major problems in clinical research
- Present national initiatives affecting medical research
- Our strategy in Turku region

## Finnish public research funding actors



## Government research expenditure 2006



Total €1.68 billion

## Organisation

### Academy Board

Research Council  
for Biosciences and  
Environment

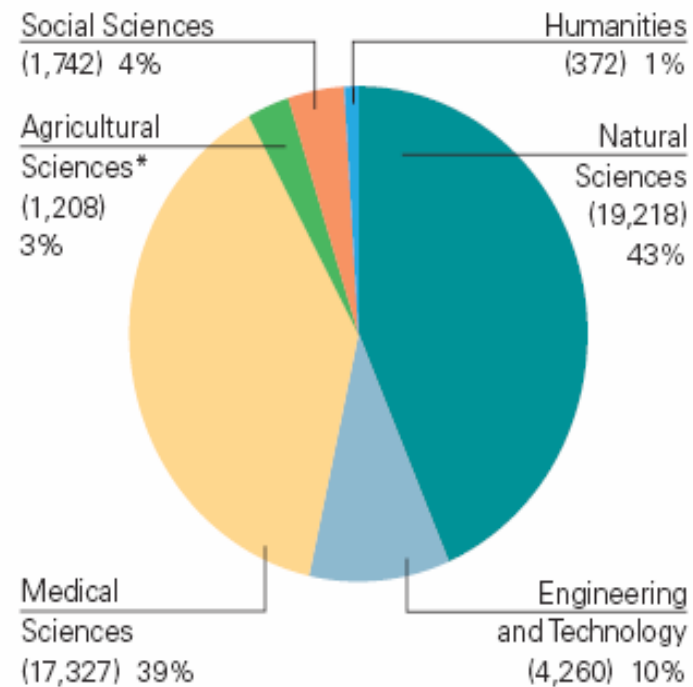
Research Council  
for Culture and  
Society

Research Council  
for Natural  
Sciences and  
Engineering

Research Council  
for Health

### Administration Office

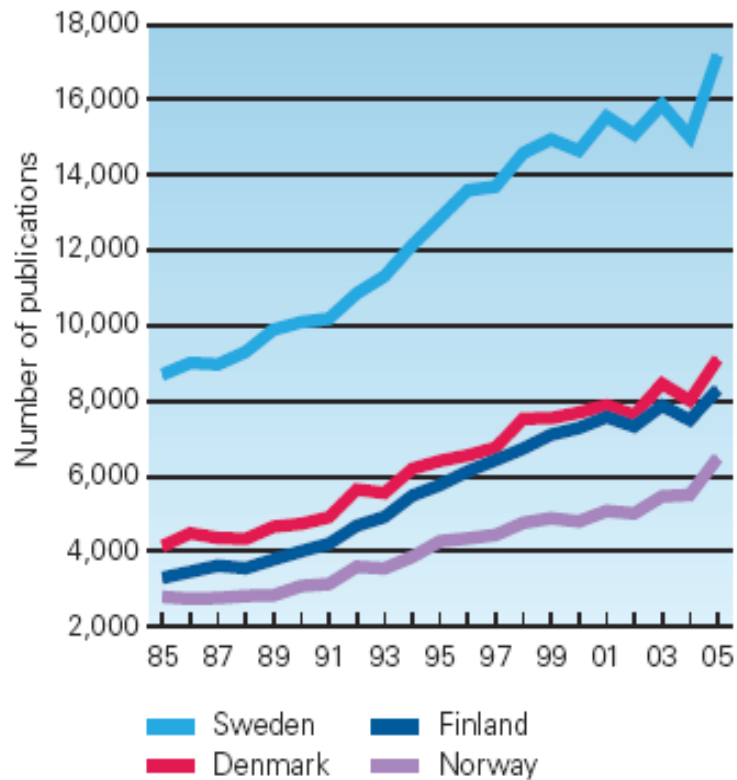
## Breakdown of Finnish publications by major field of science in 2001–2005.



\* Forestry sciences not included in agricultural sciences as they are divided in the NSI database between different natural sciences.

Source: Thomson Scientific, NSI 1981–2005.

Figure 27. Development of publication numbers in the Nordic countries\* in 1985–2005. Countries listed in order of the number of publications in 2005.

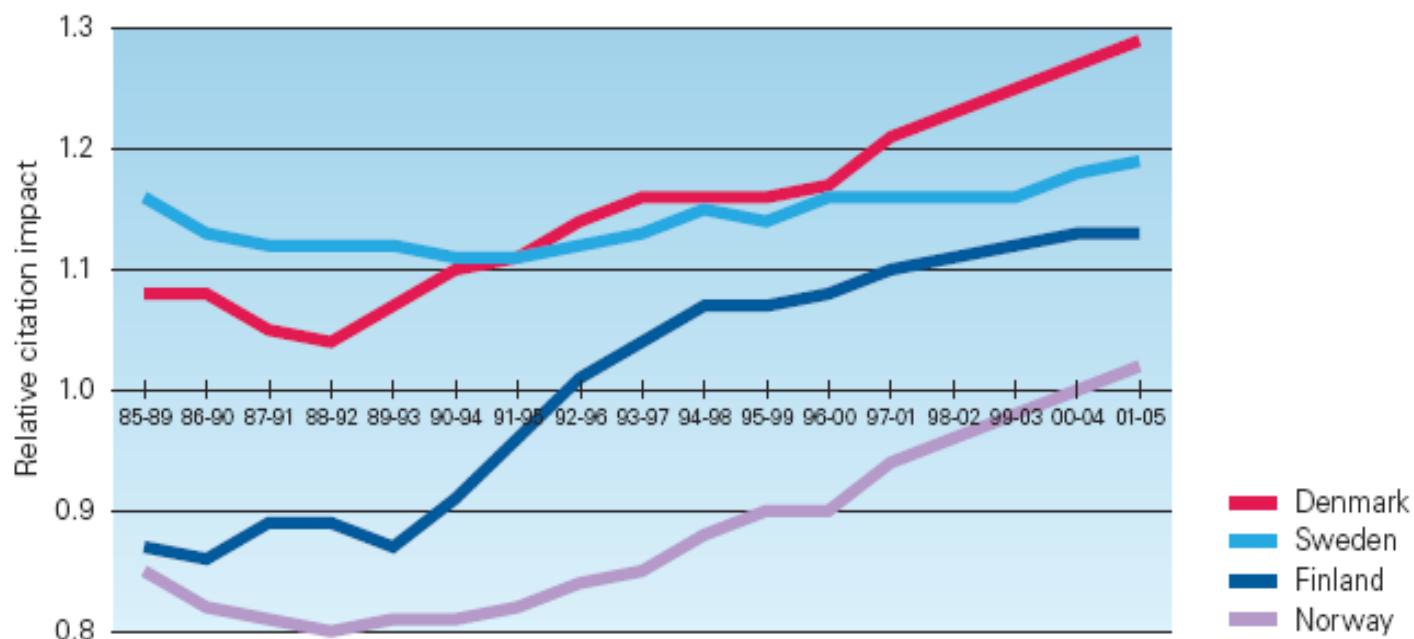


\* Data for Iceland missing because of the small overall number of publications.

Source: Thomson Scientific, NSI 1981–2005.

# Development of relative citation impacts<sup>a</sup> in the Nordic countries<sup>b</sup> in

1985\_2005



<sup>a</sup> Relative citation impact = impact factor e.g. for Finland (number of citations / number of publications) / impact factor for OECD.

<sup>b</sup> Data for Iceland missing because of the small overall number of publications.

Source: Thomson Scientific, NSI 1981–2005.

2001–2005	Natural Sciences		Engineering and Technology		Medical Sciences	
1	United States	1.30	Switzerland	1.50	Switzerland	1.36
2	Switzerland	1.30	Denmark	1.43	United States	1.30
3	Iceland	1.23	Netherlands	1.30	Iceland	1.29
4	United Kingdom	1.22	United States	1.21	Denmark	1.29
5	Netherlands	1.21	Austria	1.17	Belgium	1.26
6	Denmark	1.17	Germany	1.14	<b>Finland (6)</b>	<b>1.25</b>
7	Sweden	1.10	Belgium	1.12	Netherlands	1.24
8	Germany	1.08	Sweden	1.11	Canada	1.20
9	Austria	1.05	France	1.05	Sweden	1.17
10	Canada	1.00	<b>Finland (10)</b>	<b>1.01</b>	United Kingdom	1.17
11	Ireland	0.98	Norway	1.01	Norway	1.15
12	<b>Finland (12)</b>	<b>0.96</b>	Spain	0.99	Australia	1.06
13	France	0.94	United Kingdom	0.98	Italy	1.06
14	Belgium	0.94	Portugal	0.91	Germany	1.04
15	Australia	0.94	Italy	0.90	France	1.04
16	Norway	0.88	Ireland	0.90	Ireland	1.03
17	Italy	0.85	Japan	0.90	Luxembourg	1.01
18	Japan	0.83	Australia	0.89	Austria	1.01
19	Spain	0.80	Canada	0.89	Spain	0.95
20	Hungary	0.75	Czech Republic	0.88	New Zealand	0.94
21	New Zealand	0.74	New Zealand	0.88	Portugal	0.94
22	Portugal	0.70	Hungary	0.87	Hungary	0.93
23	Greece	0.65	Iceland <sup>c</sup>	0.84	Czech Republic	0.83
24	Luxembourg	0.65	South Korea	0.78	Japan	0.83
25	South Korea	0.64	Greece	0.76	Poland	0.78
26	Czech Republic	0.61	Slovakia	0.76	Slovakia	0.73
27	Poland	0.57	Mexico	0.71	Greece	0.66
28	Slovakia	0.53	Turkey	0.63	Mexico	0.64
29	Mexico	0.50	Poland	0.60	South Korea	0.59
30	Turkey	0.42	Luxembourg <sup>c</sup>	0.45	Turkey	0.33
1991–1995	<b>Finland</b>	<b>0.86</b>	<b>Finland</b>	<b>1.02</b>	<b>Finland</b>	<b>1.01</b>

Source: Thomson Scientific, NSI 1981–2005.

Agricultural Sciences <sup>b</sup>		Social Sciences		Humanities	
Finland (1)	1.56	United States	1.16	Greece	1.94
Iceland <sup>c</sup>	1.48	Hungary	1.12	Denmark	1.64
Denmark	1.42	Netherlands	1.08	Netherlands	1.60
United Kingdom	1.39	Canada	1.04	Iceland <sup>c</sup>	1.33
Norway	1.38	United Kingdom	1.00	Portugal <sup>c</sup>	1.29
Sweden	1.37	Belgium	0.98	New Zealand	1.29
Netherlands	1.31	Germany	0.96	United Kingdom	1.27
Ireland	1.22	Italy	0.94	Sweden	1.25
France	1.18	Sweden	0.91	Japan	1.19
United States	1.17	France	0.90	United States	1.17
Switzerland	1.15	<b>Finland (11)</b>	<b>0.88</b>	Australia	1.06
Belgium	1.13	Norway	0.87	Norway	1.01
Canada	1.07	Denmark	0.86	<b>Finland (13)</b>	<b>1.00</b>
Portugal	1.07	Switzerland	0.85	Italy	0.95
Australia	1.06	Australia	0.85	Mexico	0.93
New Zealand	1.04	Iceland <sup>c</sup>	0.81	Canada	0.93
Italy	1.03	New Zealand	0.77	Turkey	0.89
Luxembourg <sup>c</sup>	1.01	Austria	0.75	Austria	0.86
Spain	1.00	Mexico	0.70	Germany	0.81
Greece	1.00	Spain	0.68	Belgium	0.79
Germany	0.89	Ireland	0.68	Poland	0.77
South Korea	0.83	Poland	0.65	Ireland	0.64
Japan	0.81	South Korea	0.62	Switzerland	0.61
Austria	0.79	Japan	0.60	Hungary	0.58
Czech Republic	0.61	Luxembourg <sup>c</sup>	0.56	South Korea	0.54
Mexico	0.55	Portugal	0.53	Czech Republic	0.52
Slovakia	0.51	Turkey	0.53	Spain	0.51
Poland	0.45	Greece	0.50	France	0.49
Hungary	0.43	Czech Republic	0.28	Luxembourg <sup>c</sup>	0.49
Turkey	0.41	Slovakia	0.20	Slovakia <sup>c</sup>	0.27
<b>Finland</b>	<b>0.94</b>	<b>Finland</b>	<b>0.78</b>	<b>Finland</b>	<b>0.67</b>

Source: Thomson Scientific, NSI 1981–2005.

## Relative citation impact

<b>NATURAL SCIENCES (0.96)</b>	
Instrumentation / Measurement	1.49
Physics	1.33
Animal Sciences	1.30
Molecular Biology & Genetics	1.30
Environment / Ecology	1.26
Earth Sciences	1.25
Experimental Biology	1.17
Applied Physics / Condensed Matter / Materials Science	1.15
Biology	1.12
Spectroscopy / Instrumentation / Analytical Science	1.12
Animal & Plant Sciences	1.02
Mathematics	0.99
Biochemistry & Biophysics	0.97
Physical Chemistry / Chemical Physics	0.94
Microbiology	0.93
Optics & Acoustics	0.91
Aquatic Sciences	0.88
Chemistry & Analysis	0.86
Inorganic & Nuclear Chemistry	0.86
Plant Sciences	0.86
Cell & Developmental Biology	0.83
Organic Chemistry / Polymer Science	0.83
Computer Science & Engineering	0.82
Chemistry	0.79
Space Science	0.65
Entomology / Pest Control	0.63
Multidisciplinary <sup>d</sup>	0.30
<b>ENGINEERING AND TECHNOLOGY (1.01)</b>	
AI, Robotics & Automatic Control	1.31
Engineering Management/General	1.29
Engineering Mathematics	1.23
Information Technology & Communications Systems	1.19
Chemical Engineering	1.15
Electrical & Electronics Engineering	0.96
Mechanical Engineering	0.95
Environmental Engineering / Energy	0.93
Metallurgy	0.93
Materials Science & Engineering	0.92
Biotechnology & Applied Microbiology	0.77
Nuclear Engineering	0.75

## Relative citation impact

<b>MEDICAL SCIENCES (1.25)</b>	
General & Internal Medicine	3.13
Research/Lab Medicine & Medical Technology	1.83
Oncology	1.53
Neurology	1.51
Medical Research, General Topics	1.44
Pharmacology/Toxicology	1.42
Dermatology	1.38
Cardiovascular & Respiratory Systems	1.36
Reproductive Medicine	1.35
Clinical Immunology & Infectious Disease	1.34
Endocrinology, Nutrition & Metabolism	1.34
Oncogenesis & Cancer Research	1.28
Orthopedics & Sports Medicine	1.28
Medical Research, Diagnosis & Treatment	1.23
Endocrinology, Metabolism & Nutrition	1.20
Cardiovascular & Hematology Research	1.19
Urology & Nephrology	1.19
Gastroenterology & Hepatology	1.17
Surgery	1.17
Pediatrics	1.13
Environmental Medicine & Public Health	1.12
Rheumatology	1.10
Hematology	1.07
Dentistry / Oral Surgery & Medicine	1.06
Medical Research, Organs & Systems	1.04
Pharmacology & Toxicology	1.02
Public Health & Health Care Science	1.01
Radiology, Nuclear Medicine & Imaging	1.00
Anesthesia & Intensive Care	0.99
Immunology	0.99
Otolaryngology	0.99
Health Care Sciences & Services	0.95
Ophthalmology	0.94
Clinical Psychology & Psychiatry	0.93
Neurosciences & Behavior	0.93
Psychiatry	0.85
Physiology	0.84
<b>AGRICULTURAL SCIENCES<sup>e</sup> (1.56)</b>	
Food Science / Nutrition	1.59
Agricultural Chemistry	1.48
Agriculture / Agronomy	1.47
Veterinary Medicine / Animal Health	1.38
<b>SOCIAL SCIENCES (0.88)</b>	
Library & Information Science	1.66
Education	1.29
Environmental Studies, Geography & Development Management	0.96
Psychology	0.94
Economics	0.85
Sociology and Social Sciences	0.76
	0.61

Source: Thomson Scientific, NSI 1981–2005.

# Conclusions

- Nordic research, including medical research, has been doing rather well during last years
- However, rapid changes in our societies are clearly affected some areas of research more than others
- There are a lot of weak and stronger signals indicating that clinical research will be in increasing difficulties in the future if...

# Problems that we have identified

- Decreasing interest of medical students and young M.D.s in clinical research
- Present health care system is not as supportive as it used to be to the clinical research: environment for clinical research is not optimal
- No clear incentives could be seen in terms of salary and carrier plans
- Funding systems are too fragmented
- A lot of "paper work" included before you can do anything

# New initiatives to strengthen medical research in Finland

- Biocenter Finland: Five regional biocenters (Helsinki, Kuopio, Oulu, Tampere, Turku) "will act as one national biocenter", 2007
- FIMM (Finnish Institute of Molecular Medicine): EMBL affiliated, founded 2007
- It remains to be seen how these initiatives can support clinical research

# New national initiatives to support clinical research

- Academy of Finland has started a new targeted programme to encourage young clinical researchers: Two type of joint positions between Academy and University Hospitals: 20:80 and 50:50, 3 year terms.
- Center of Excellence Program includes now also clinical research groups
- Two new research programmes (about 20 million euros) under preparation
- Creation of Clinical Research Graduate Schools

# Graduate schools in clinical research

Academy supported national Graduate schools	Coordinator:	Academy funded positions
National Graduate School in Psychiatry	Helsinki	5
National Graduate School in Clinical Investigations	Helsinki	12
Clinical Drug Trials Graduate School	Helsinki	9
All 5 biocenters have a graduate school including clinicians		110
16 26/10/2007		

# Our strategy in Turku

- 1994 five biocenters were created by a specific funding programme → **Biocity Turku** → five research programmes and several core facilities. Specific attention was in doctoral training.
- CRST (Clinical Research Service Center)
- Clinical Research Center is still under debate
- Recently established TCDM (Turku Center for Disease Models)

# Our strategy in Turku

- We underwent a series of strategic discussions during 2005 and formulated our current strategy:
- Main aim is to create joint research platforms for clinicians and basic researchers, including also industrial partners with more emphasis in post-doctoral training positions

# The main business areas in BioTurku®



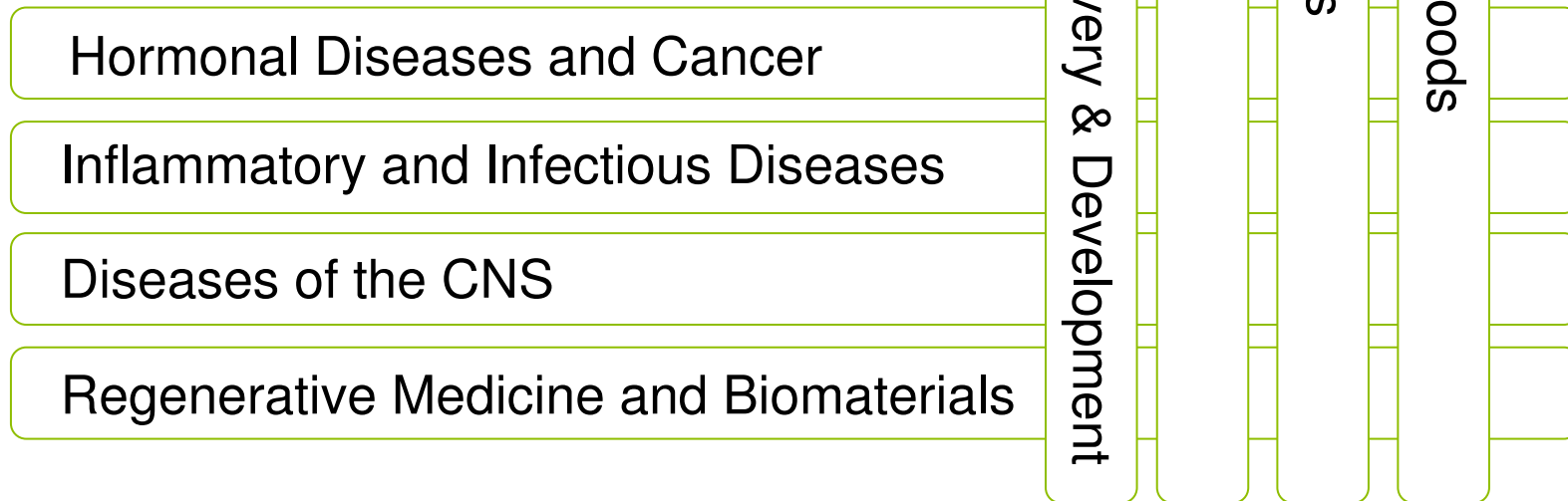
Drug Discovery & Development

Diagnostics

Biomaterials

Functional Foods

# The focus areas in BioTurku®



# Implementation

- Has turn out to be a very difficult process; main problem being present "financial crisis" of the University and University Hospital
- However, some encouraging results has been obtained (e.g. some new coalitions for EU-funding etc) and implementation will continue
- At least discussion between different parties has been increasing and "a new excitement for research" is emerging

# Three major challenges

- We must create a new model to integrate clinical research into present day health care system
- Responsibility for expenses of clinical research must be further clarified: health care system versus specific public and private funding agencies
- We must find new incentives to attract talented young clinical researchers