

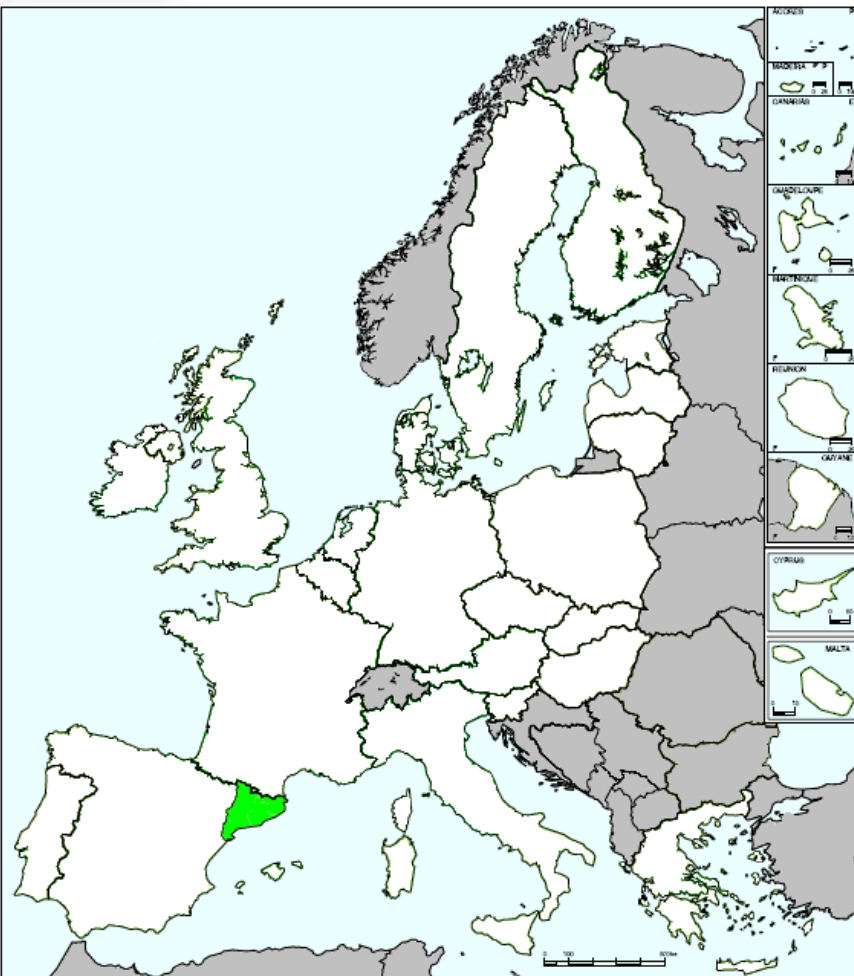


Generalitat de Catalunya
**Departament d'Innovació,
Universitats i Empresa**

RESEARCH IN CATALONIA: OPPORTUNITIES AND FUTURE CHALLENGES

Ramon Noguera
Research Centres of Catalonia (CERCA)

Basic figures



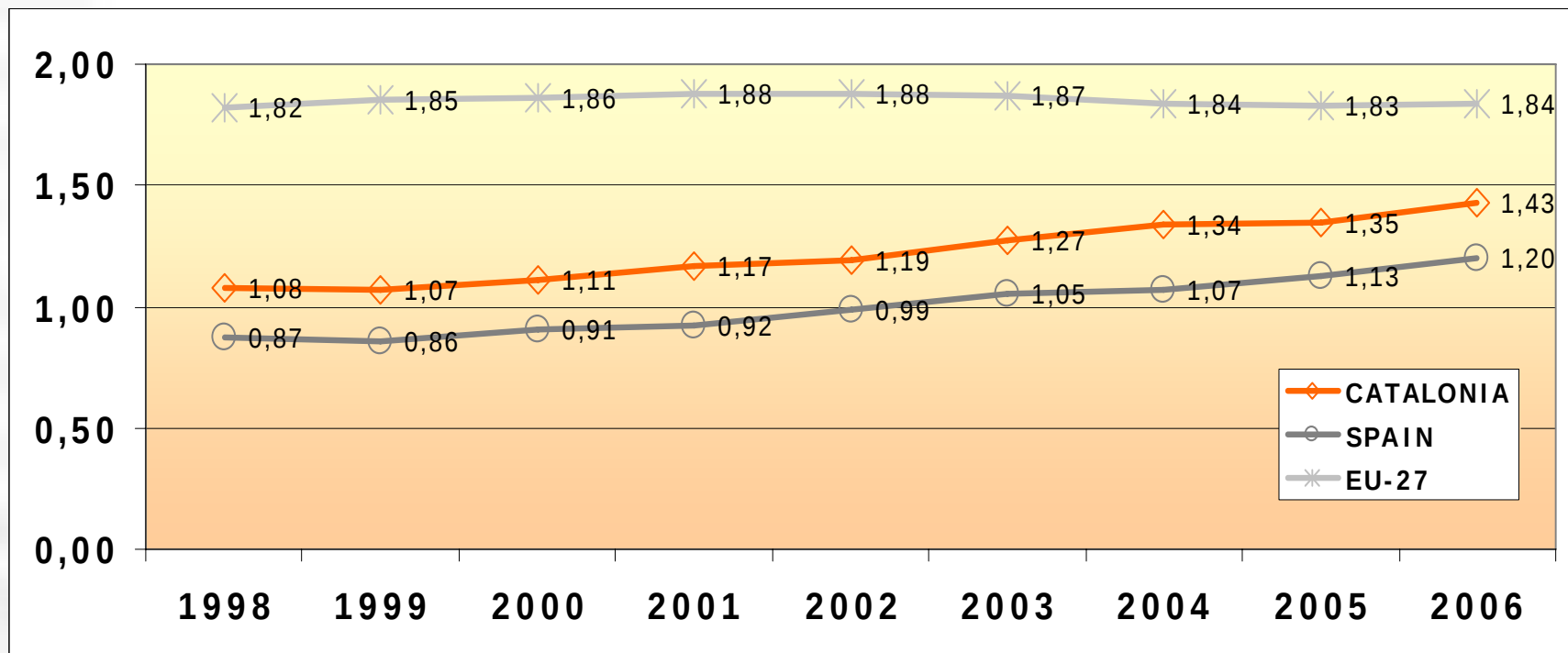
	CATALONIA	SPAIN	EU-27
Surface [km ²]	32,000	506,000	4,215,100
Population [millions] [% of EU population]	6.8 1.4%	43.8 8.9%	493.0 100%
Density [inhabitants/km ²]	212.5	86.6	117.0
GDP [M€]	183,821	980,954	11,626,329
GDP /inhabitant [€]	26,300	22,300	23,600

Data: 2006. Source: Eurostat, INE, Idescat



Generalitat de Catalunya
Departament d'Innovació,
Universitats i Empresa

R & D expenditure [% GDP]



Source: Eurostat, INE



Generalitat de Catalunya
Departament d'Innovació,
Universitats i Empresa

R & D expenditure by source of funds [% GDP]

	2002	2003	2004	2005
Government and Higher Education				
Catalonia	0.33	0.39	0.44	0.48
Spain	0.43	0.48	0.48	0.53
EU-27	0.65	0.67	0.65	0.65
Private sector (BES and PNP)				
Catalonia	0.80	0.84	0.85	0.81
Spain	0.49	0.51	0.52	0.53
EU-27	1.06	1.04	1.04	1.03
Abroad				
Catalonia	0.06	0.04	0.05	0.06
Spain	0.07	0.06	0.07	0.07
EU-27	0.17	0.16	0.15	0.15
Total				
Catalonia	1.19	1.27	1.34	1.35
Spain	0.99	1.05	1.07	1.13
EU-27	1.88	1.87	1.84	1.83

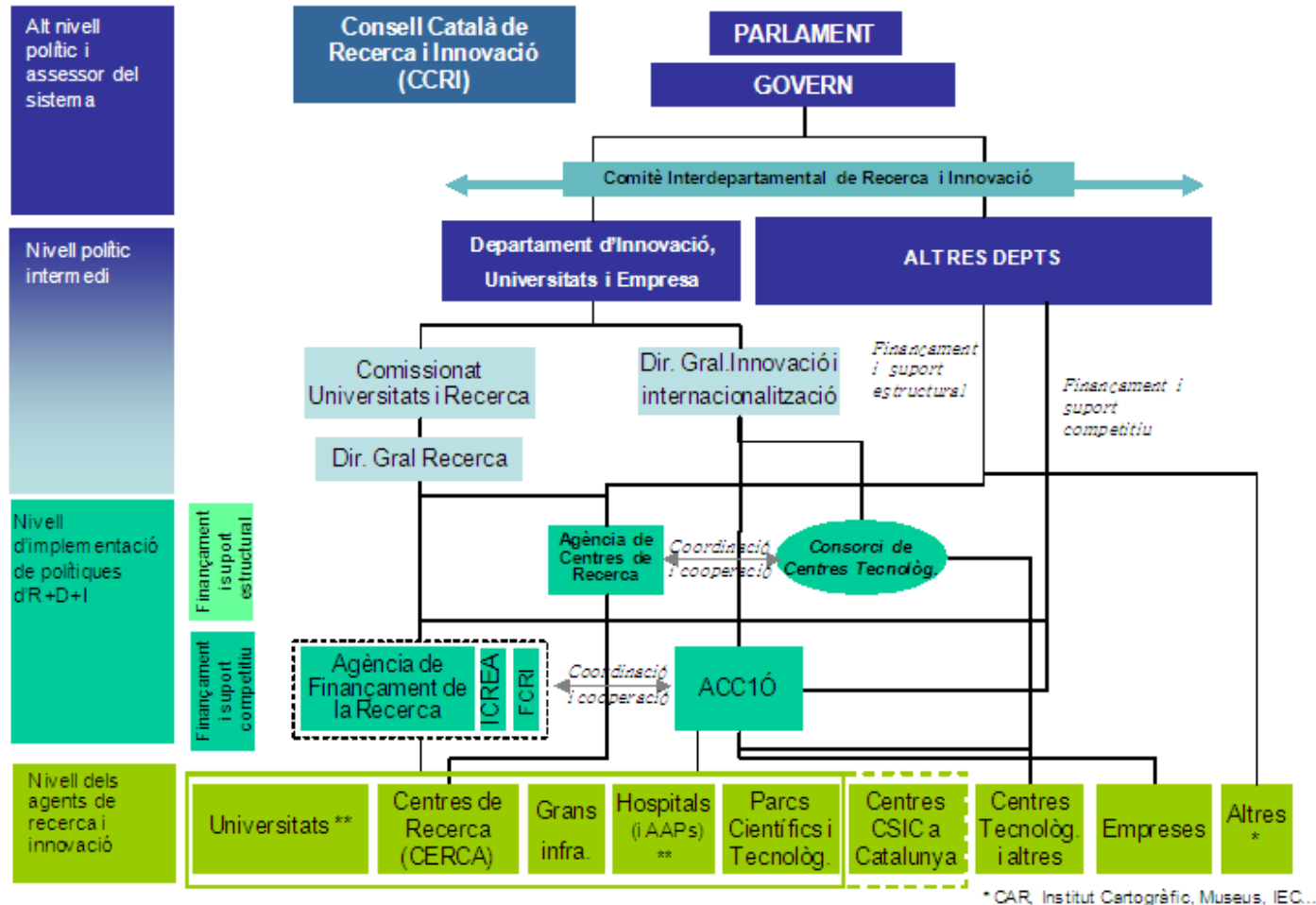
Source: Eurostat, INE, Idescat



Generalitat de Catalunya
Departament d'Innovació,
Universitats i Empresa

The S & T Catalan system

ORGANIGRAMA FUTUR DEL SISTEMA RECERCA I INNOVACIÓ CATALÀ



Generalitat de Catalunya
Departament d'Innovació,
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R & D Planning

❑ Research Plans and Innovation Plan

- I Research Plan (1993-1996)
- II Research Plan (1997-2000)
- III Research Plan (2001-2004) + I Innovation Plan (2001-2004)
- I Research and Innovation Plan (PRI, 2005-2008) (*current Plan*)
- II Research and Innovation Plan (PRI, 2009-2012) (*in progress*)

❑ National Agreement on Research and Innovation

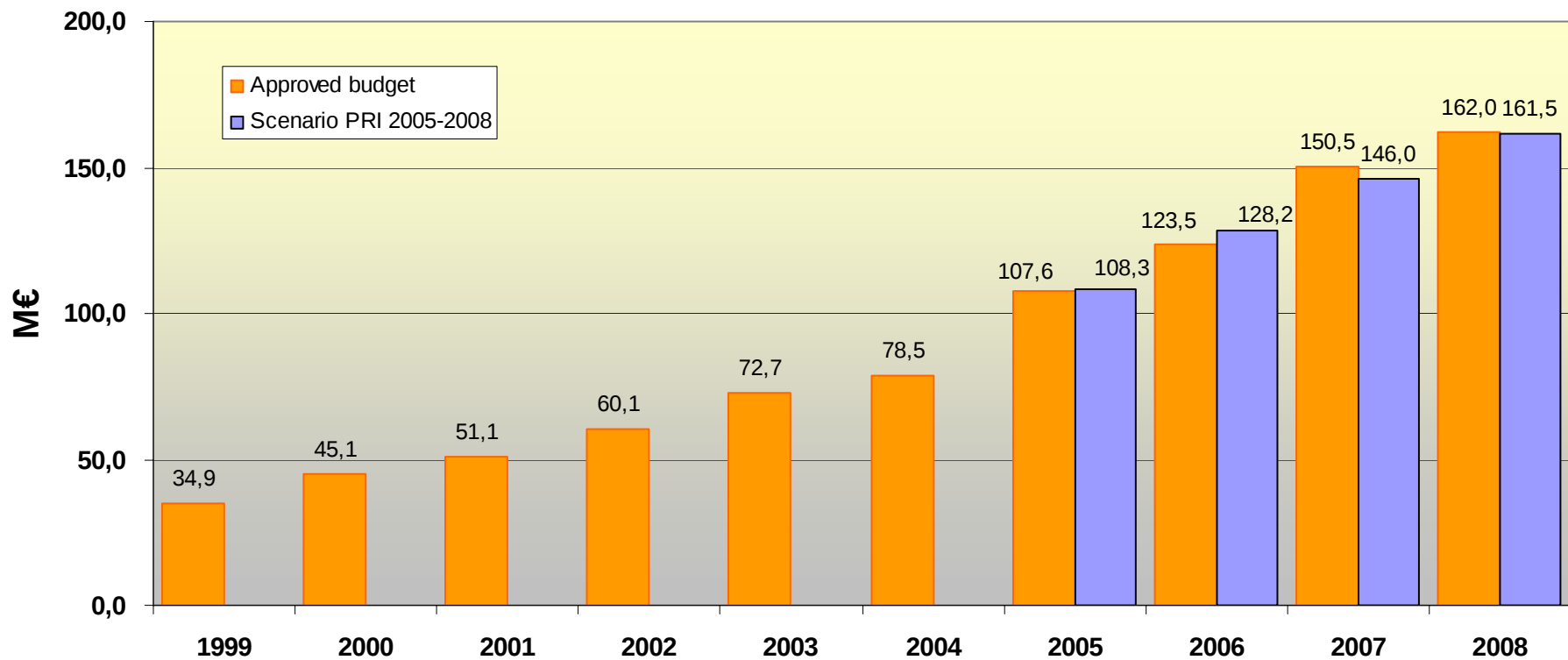
- Government, political parties, universities, business enterprise sector, unions...

❑ Goals

- Lisbon strategy
- Contribute to the ERA
- Becoming a leader in Science, Technology and Innovation by 2010



DGR's budget: evolution 1999-2008



Research Policies

- ☐ Research Centres
- ☐ Researchers' Career
- ☐ Research Support
- ☐ Large Facilities and ICTS
- ☐ BES R&D and Knowledge Transfer
- ☐ Mobility, Cooperation and Internationalisation
- ☐ Scientific Dissemination



Research Policies: DGR's budget 2005-2008 [k€]

	2005	2006	2007	2008	2005	2006	2007	2008
Research Centres	35,834	48,275	56,736	63,932	33.3%	39.0%	37.7%	39.5%
Researcher's Career	26,743	30,578	36,418	44,118	24.9%	24.8%	24.2%	27.2%
Research Support	27,984	29,778	37,331	34,350	26.0%	24.1%	24.8%	21.2%
Large Facilities and ICTS	8,214	6,936	8,560	9,887	7.6%	5.6%	5.7%	6.1%
BES R&D and Knowledge Transfer	3,065	3,160	5,482	4,288	2.8%	2.6%	3.6%	2.6%
Mobility, Cooperation and Internatinalisation	3,912	3,207	3,837	3,659	3.6%	2.6%	2.6%	2.3%
Scientific Dissemination	1,136	1,342	1,447	1,476	1.1%	1.1%	1.0%	0.9%
Others	675	197	650	269	0.6%	0.2%	0.4%	0.2%
AGGREGATE	107,563	123,473	150,461	161,979	100 %	100 %	100 %	100 %
ANNUAL INCREASE	37.0 %	14.8 %	21.9 %	7.7 %				



Research Policies: Programmes

☐ **Research Centres**

- ☐ Researchers' Career
- ☐ Research Support
- ☐ Large Facilities and ICTS
- ☐ BES R&D and Knowledge Transfer
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Research Centres (1): overview

- ❑ 36 Centres participated by Generalitat.
- ❑ 9 Hospital Institutes
- ❑ 19 CSIC Centres (Spanish Government)
- ❑ Institutes and University Departments
- ❑ R & D Enterprise Units



Research Centres (2): growing pace

- ❑ 36 Centres participated by Generalitat
 - 10 Biomedicine and Health Sciences
 - 21 Science and Engineering
 - 5 Humanities and Social Sciences

- ❑ 23 of them created between 1984 and 2003
 - 3 Biomedicine and Health Sciences
 - 17 Science and Engineering
 - 3 Humanities and Social Sciences

- ❑ 13 of them created since 2004
 - 7 Biomedicine and Health Sciences
 - 4 Science and Engineering
 - 2 Humanities and Social Sciences

- ❑ 7 Centres in progress
 - 2 Science and Engineering
 - 5 Humanities and Social Sciences



Research Centres (3): CERCA, the Programme for Research Centres

□ Aims:

- An R & D system based upon excellence
- Moving towards a knowledge based economy
- Improving economic competitiveness and social welfare



Research Centres (4): the CERCA model

- ❑ Independent centres with their own legal personality
- ❑ Private management model with upmost flexibility
- ❑ Efficient governance (top down)
- ❑ Brain gain policy
- ❑ Achieve the critical mass for international impact
- ❑ Structural funding through contract programmes
- ❑ Frontier research



Research Centres (5): Biomedicine and Health Sciences

Centre	Legal personality	Created on	Participants
Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS)	Consortium	1996	IU (GC), UB, HCPB, CSIC
Centre de Regulació Genòmica (CRG)	Foundation	2000	IU (GC), SA (GC), UPF
Institut Català de Ciències Cardiovasculars (ICCC)	Consortium	2000	IU (GC), SA (GC), UAB, HSCSP
Centre de Medicina Regenerativa de Barcelona, (CMRB)	Foundation	2004	IU (GC), SA (GC), UB, UAB, UPF, Ajuntament de Barcelona, CSIC, ISCIII
Centre de Epidemiologia Ambiental (CREAL)	Foundation	2005	IU (GC), SA (GC), MA (GC), UPF, IMAS
Institut de Recerca Biomèdica (IRB)	Foundation	2005	IU (GC), SA (GC), PCB
Institut de Bioenginyeria de Catalunya (IBEC)	Foundation	2005	IU (GC), SA (GC), UB, UPC
Centre de Recerca en Salut Internacional de Barcelona (CRESIB)	Foundation	2006	IU (GC), SA (GC), UB, IDIBAPS, HCPB
Institut de Medicina Predictiva i Personalitzada del Càncer (IMPPC)	Foundation	2006	IU (GC), SA (GC), UAB, HGTP, IICSGTP, Ajuntament de Badalona, CSIC
Institut d'Investigació Oncològica Vall d'Hebron (VHIO)	Foundation	2006	IU (GC), SA (GC), UAB, HUVH, Fund. FERRO, Fund. CELLEX



Research Centres (6): Sciences and Engineering

Centre	Legal personality	Created on	Participants
Centre de Recerca Matemàtica (CRM)	Consortium	1984	IU (GC), IEC
Institut de Recerca i Tecnologia Agroalimentàries (IRTA)	Public Enterprise	1985	GENERALITAT
Centre de Recerca Ecològica i Aplicacions Forestals (CREAF)	Consortium	1987	IU (GC), AG (GC), MA (GC), PO (GC), UB, UAB, IEC
Centre Internacional de Mètodes Numèrics en Enginyeria (CIMNE)	Consortium	1987	IU (GC), UPC
Institut de Física d'Altes Energies (IFAE)	Consortium	1991	IU (GC), EC (GC), UB, UAB
Centre Internacional d' Investigació en Recursos Costaners (CIIRC)	Consortium	1993	IU (GC), AG (GC), MA (GC), PO (GC), UPC, IFIAS
Centre de Visió per Computador (CVC)	Consortium	1994	IU (GC), UAB
Observatori de l'Ebre (OE)	Fundación	1994	IU (GC), URL, Diputació de Tarragona, Ajuntament de Tortosa, Ajuntament de Roquetes, CSIC, IGN, Companyia de Jesús
Institut d' Estudis Espacials de Catalunya (IEEC)	Foundation	1995	IU (GC), FCRI, UB, UAB, UPC, CSIC
Centre Tecnològic Forestal de Catalunya (CTFC)	Consortium	1995	IU (GC), AG (GC), FCRI, UdL, Consell Comarcal Solsonès, Diputació de Lleida
Institut de Geomàtica (IG)	Consortium	1997	IU (GC), PO (GC), UPC
Centre de Recerca en Sanitat Animal (CReSA)	Foundation	1999	IRTA, UAB
Institut Català d'Investigació Química (ICIQ)	Foundation	2000	IU (GC), URV
Centre Tecnològic de Telecomunicacions de Catalunya (CTTC)	Foundation	2001	IU (GC), UPC, URL
Institut de Ciències Fotòniques (ICFO)	Foundation	2002	IU (GC), UPC
Institut Català de Nanotecnologia (ICN)	Foundation	2003	IU (GC), UAB, CSIC
Centre de Recerca en Agrigenòmica (CRAG)	Consortium	2003	IRTA, UAB, CSIC
Fundació Centre UdL-IRTA	Foundation	2005	IRTA, UdL
Institut català de Recerca de l'Aigua (ICRA)	Foundation	2006	IU (GC), ACA, UdG
Institut Català de Paleontologia (ICP)	Foundation	2006	IU (GC), UAB
Institut de Recerca en Energia de Catalunya (IREC)	Foundation	2008	IU (GC), EC (GC), UB, UPC, URV, IDAE, CIEMAT



Research Centres (7): Humanities and Social Sciences

Centre	Legal personality	Created on	Participants
Centre d'Estudis Demogràfics (CED)	Consortium	1985	IU (GC), UAB
Centre de Recerca en Economia Internacional (CREI)	Consortium	1994	IU (GC), PR (GC), UPF
Institut Català d'Arqueologia Clàssica (ICAC)	Consortium	2000	IU (GC), CIC, URV
Institut Català de Paleoecologia Humana i Evolució Social (IPHES)	Foundation	2004	IU (GC), URV, Ajuntament de Tarragona
Institut Català de Recerca en Patrimoni Cultural (ICRPC)	Foundation	2006	IU (GC), UdG



Research Centres (8): centres in progress

❑ Science and Engineering

- Institut de Ciències del Clima de Catalunya (IC3)
- Centre de Visualització, Realitat Virtual i Interacció Gràfica (ViRVIG)

❑ Humanities and Social Sciences

- Markets, Organisations and Votes on Economics (MOVE)
- Centre de Recerca d'Història de Catalunya (CRHisCat)
- Institut de Recerca en Turisme de Catalunya (IRTUCA)
- Institut de Recerca en Gestió de Plurilingüisme (GPLU)
- Centre de Tecnologia Lingüística (LinTec)



Research Centres (9): Hospital Institutes

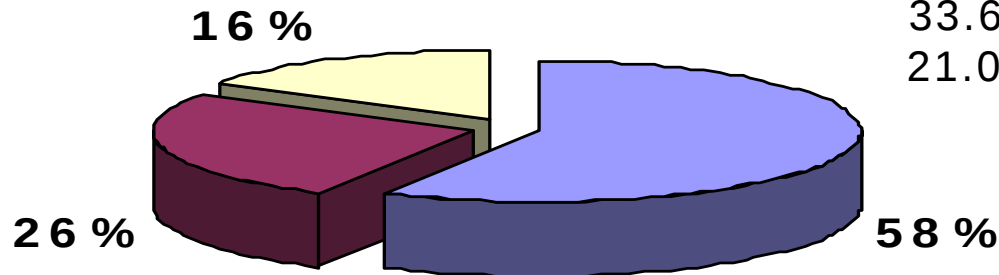
- ❑ IDIBAPS (HCPB – UB) [CERCA Centre]
- ❑ IRBVH (HUVH – UAB)
- ❑ IRB Sant Pau (HSCSP – UAB)
- ❑ Institute IMAS-IMIM-PRBB (HMar – UAB-UPF)
- ❑ IDIBELL (HBellvitge – UB)
- ❑ IICSGTiP (HUGTiP – UAB)
- ❑ IdIBGi (HUJT – UdG)
- ❑ IRBRV (H Joan XXIII i SJ Reus – URV)
- ❑ IRB-Lleida (HUAV – UdL)



Research Centres (10): source of funding

Running expenses: 130.1 M€:

- 75.5 M€ contracts and competitive funds
- 54.6 M€ from Generalitat:
 - 33.6 M€ DIUE (DGR).
 - 21.0 M€ Other Ministries



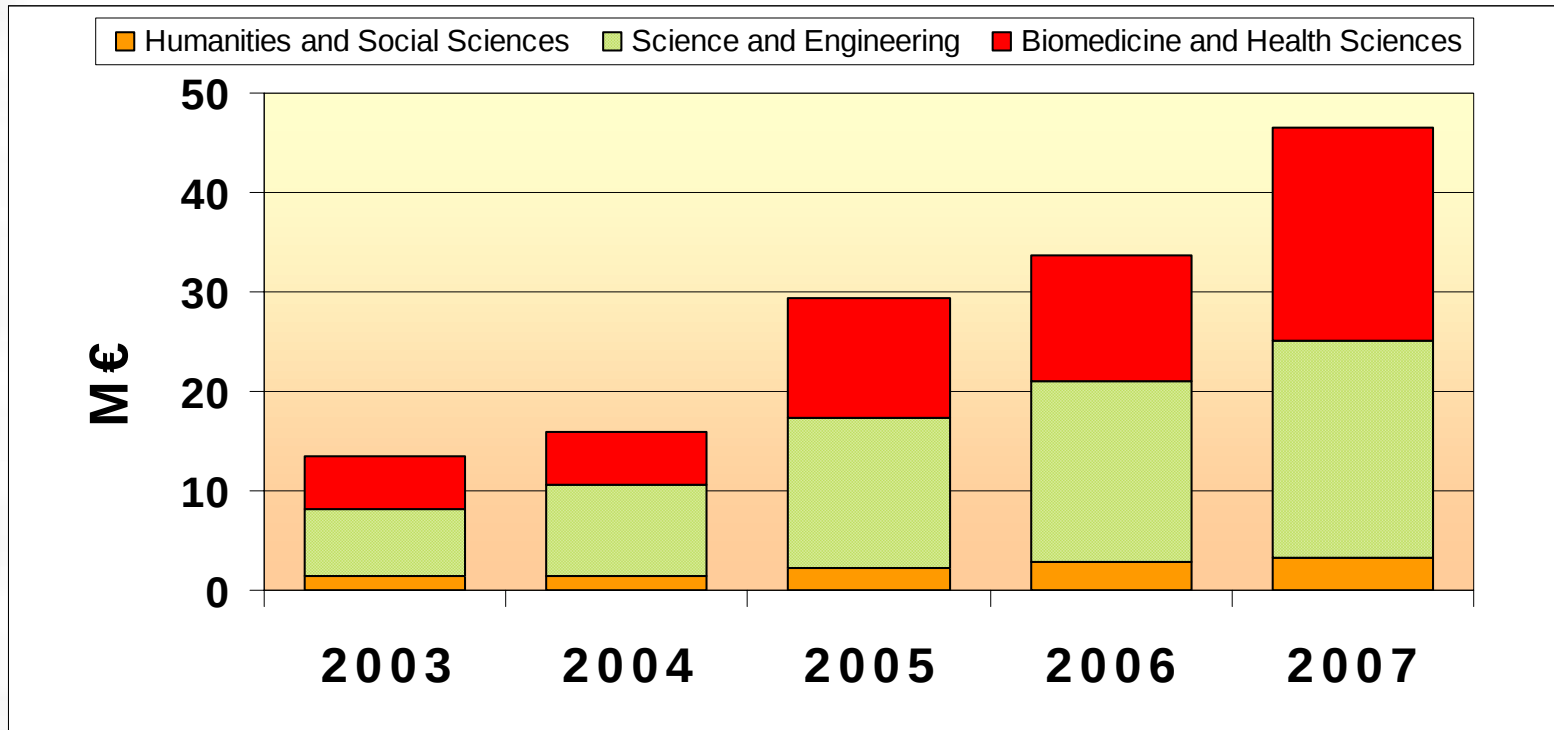
■ Contracts and competitive funds
■ DIUE (DGR)
■ Other Ministries

Data: 2006



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Research Centres (11): DIUE funding by sector



	2003	2004	2005	2006	2007	2003-2007
Biomedicine and Health Sciences	5,35	5,43	12,09	12,67	21,44	56,98
Science and Engineering	6,69	9,24	15,03	18,23	21,79	70,98
Humanities and Social Sciences	1,40	1,35	2,29	2,87	3,27	11,17
AGGREGATE	13,45	16,02	29,40	33,77	46,49	139,13

Amounts in M€



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Research Policies: Programmes

- ☐ Research Centres
- ☐ **Researchers' Career**
- ☐ Research Support
- ☐ Large Facilities and ICTS
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- ☐ Scientific Dissemination



Researchers' Career (1): indicators on researchers

	Researchers [FTE]	% on the private sector	% active population
Catalonia	20,747.4	42.6%	0.89%
EU-25	1,217,523.7	50.3%	0.83%
Spain	100,994.0	31.9%	0.84%
Finland	41,004.0	58.0%	1.98%
USA [*]	1,334,628.0	79.9%	0.99%
China (excluding Hong Kong)	926,252.0	57.1%	0.12%
Japan	677,206.0	67.3%	1.25%

Source: Eurostat, OECD

All data refer to 2004 except for [*] (year 2002)



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Researchers' Career (2): goals

❑ Increasing the number of researchers

- Goal PRI: 24,000 researchers by 2008
- Latest figure: 24,477 researchers on 2006 (source: INE)

❑ Rising the rate of researchers on the private sector

- Goal PRI: 45.0% by 2008
- Latest figure: 41.9% on 2006 (source: INE)

❑ Easing professional prospects and labour continuity for Doctors

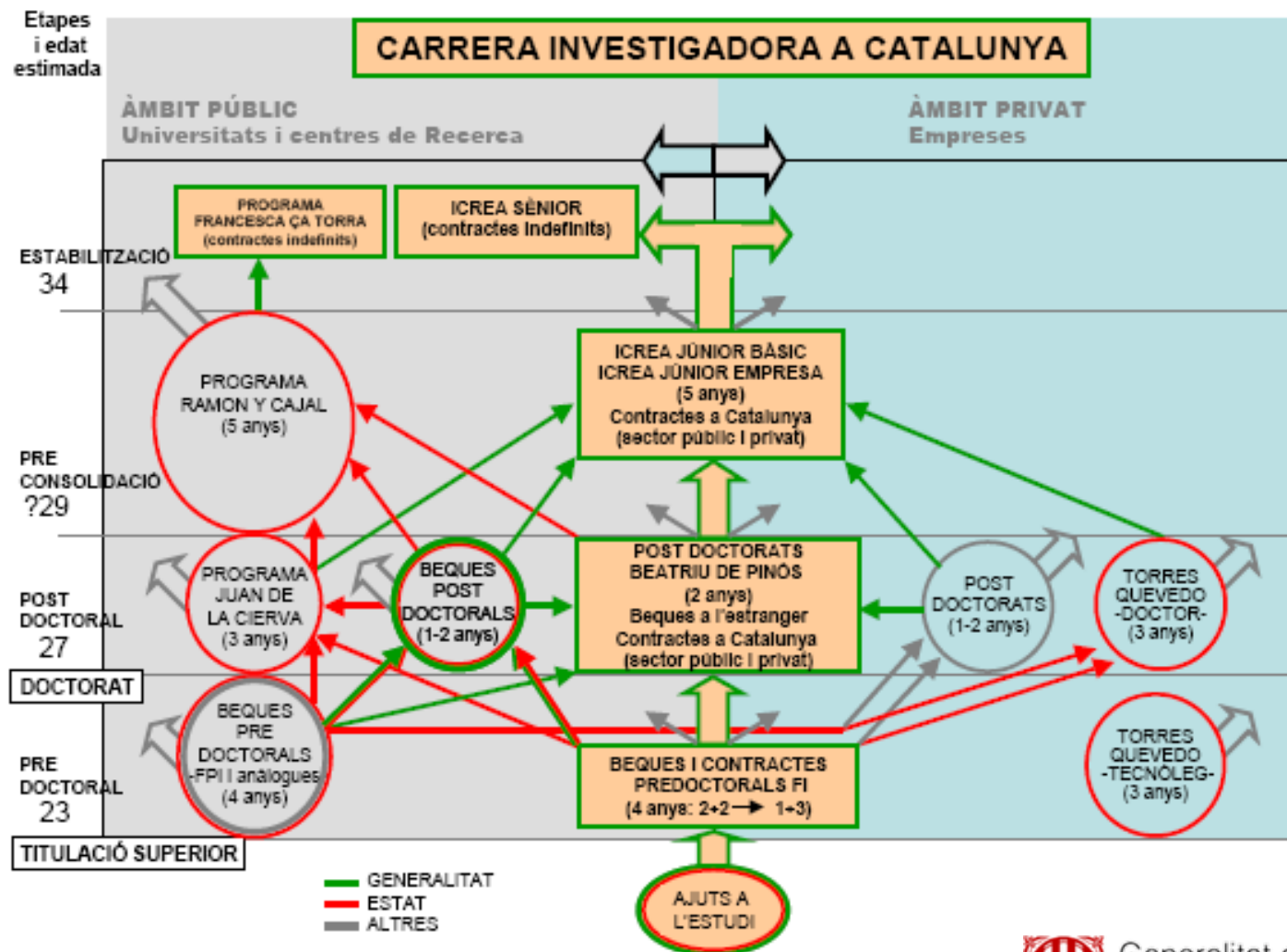
- Promoting the recognition of research activity

❑ Fostering mobility between public and private sectors

- Allow to combine academic with private activities



Researchers' Career (3): diagram

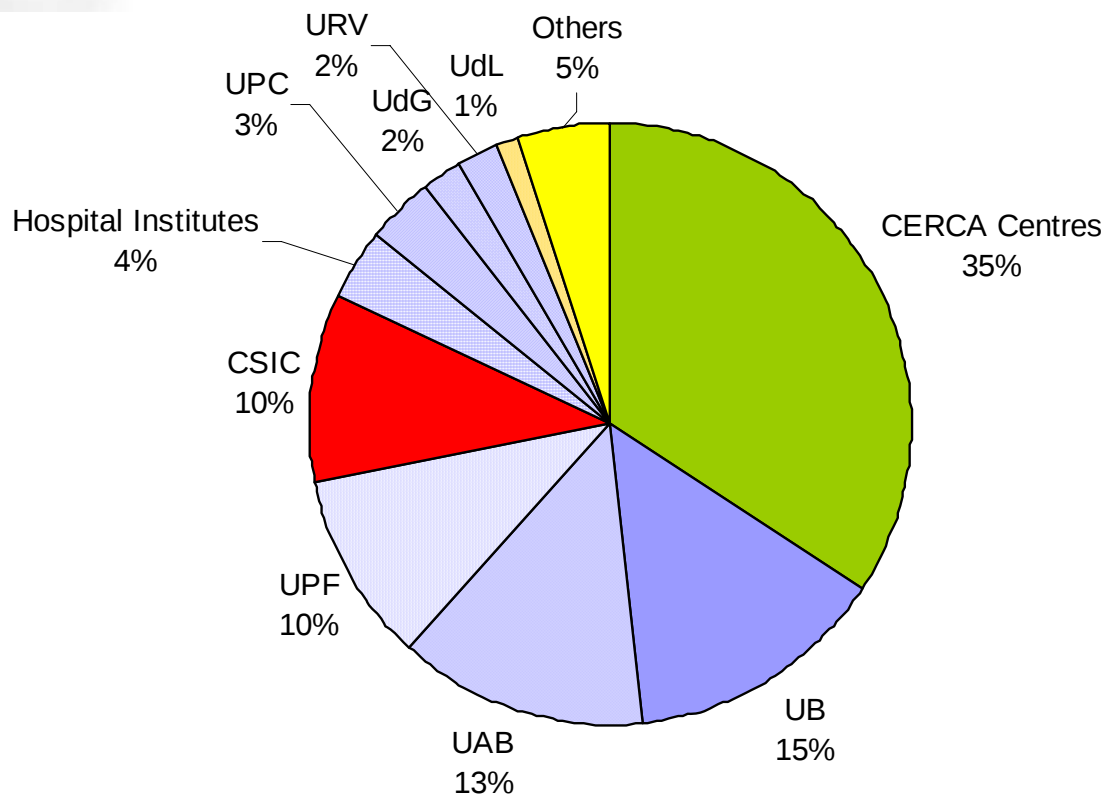


Researchers' Career (4): main Calls

	2005	2006	2007
AGAUR:	398	403	416
Predoc FI	270	252	252
Predoc FI-enterprise	23	45	44
Postdoc BP	76	79	90
Postdoc BP-enterprise	29	27	30
ICREA (*):	44	62	53
Senior researchers	25	24	22
Junior researchers	18	23	16
Enterprise researchers	1	15	15
(*) One third of ICREA researchers carry out their activity at Research Centres			
AGGREGATE NEW AWARDS	442	465	469



Researchers' Career (5): allocation of ICREA researchers



Research Centres	62
UB	25
UAB	24
UPF	18
CSIC Centres	18
Hospital Institutes	7
UPC	6
UdG	4
URV	4
UdL	2
Others	9

AGGREGATE 178

Data: 20007. Source: ICREA



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Researchers' Career (6): other activities

- ❑ Stages for future Doctors (“jornades doctorials”)
Goal: promoting careers in the private sector

- ❑ Collaboration with MEC

- Ramón y Cajal Call
Cofunded with Universities and Research Centres
655 RyC (55 of the 2007 Call) [CSIC Researchers not included] .
- I3 Call (intensification)
Cofunded with Universities and Research Centres
119 awards on the 2006 Call [UPF pending resolution]

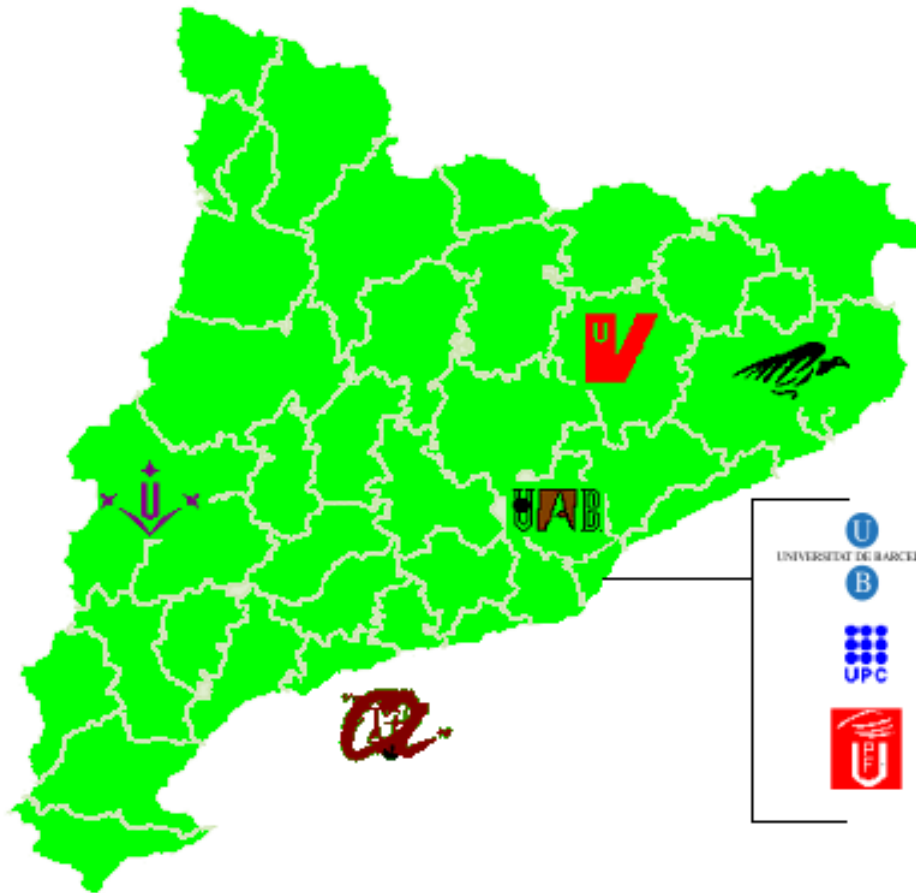


Research Policies: Programmes

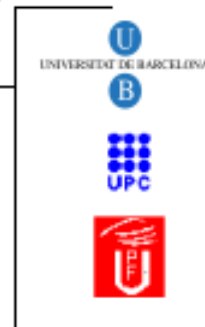
- ☐ Research Centres
- ☐ Researchers' Career
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Research Support (1): University research



7 Public Universities
4 Private Universities
1 Open University



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Research Support (2): reference networks

- ❑ XREA (analytical economic)
- ❑ XaRTA (food technology)
- ❑ XaRMAE (advanced materials for engineering)
- ❑ XaRTAP (production advanced technology)
- ❑ XRAq (aquiculture)
- ❑ XaRB (biotechnology)
- ❑ XRQTC (computer theoretical chemistry)
- ❑ XREAp (applied economy)
- ❑ XREPP (economy and public policies)



Research Support (3): Science and Society

- ❑ Research and innovation projects on education (ARIE)
- ❑ Networks on pedagogical research (XIRE)
- ❑ Research projects of local or county scope (ACOM)
- ❑ Applied research and university training on immigration (ARAI)
- ❑ Research projects on Humanities or Social Sciences (PBR)
- ❑ PhD programmes on Humanities or Social Sciences (ADQUA)
- ❑ Studies on gender differences at university or scientific areas (RDG)



Research Policies: Programmes

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Large Facilities and ICTS (1): ICTS participated by DIUE

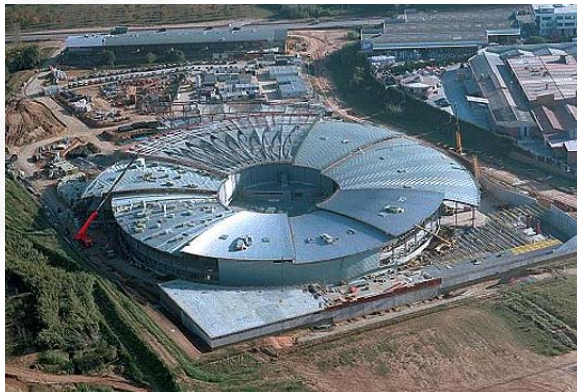


❑ **CESCA**

- Consortium (1991)
- DIUE (GC), FCRI, UB, UAB, UPC, UPF, UdG, UdL, URV, UOC, CSIC

❑ **BSC-CNS**

- Consortium (2005)
- DIUE (GC), UPC, MEC



❑ **Beam BM16 (ESRF, European Synchrotron Radiation Facility)**

- DIUE (GC), MEC

❑ **CELLS (ALBA synchrotron)**

- Consortium (2003)
- DIUE (GC), MEC



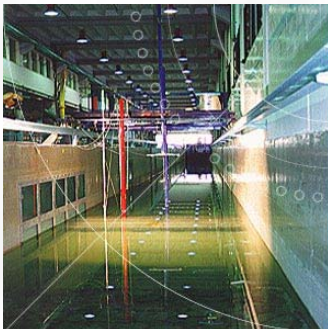
Large Facilities and ICTS (2): ICTS not participated by DIUE



- ❑ Nuclear Magnetic Resonance Laboratory (RMN)
 - Mixed platform SCT (UB) – PCB



- ❑ White room (CNM, Microelectronics National Centre)
 - CSIC



- ❑ Wave flume of the Marine Engineering Laboratory (CIEM)
 - UPC



Large Facilities and ICTS (3): ICTS in progress



❑ Structural and Proteomics Biology Platform

- DIUE (GC), MEC
- UAB, CSIC, Consortium ALBA

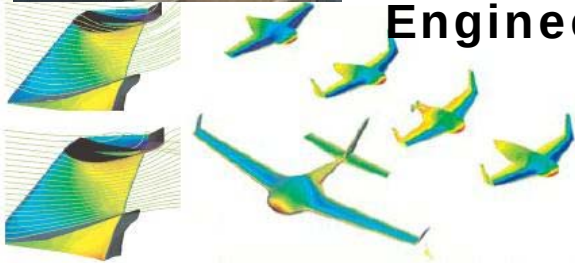


❑ Mouse clinic

- Animal Biotechnology and Gene Therapy Centre (CBATEG)
- DIUE (GC), DSALUT (GC), MEC, UAB

❑ International Center for Numerical Methods in Engineering (CIMNE)

- DIUE (GC), DPTOP (GC), UPC
- MEC



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Fostering technology transfer (1): S & T Parks at public Universities

- ❑ **UB:** Parc Científic de Barcelona.
- ❑ **UAB:** Parc de Recerca.
Parc Salut Sabadell.
- ❑ **UPC:** Parc Tecnològic de Barcelona.
Parc Científic i Tecnològic de Vilanova i la Geltrú.
Parc Científic i Tecnològic de Terrassa.
Parc Mediterrani de la Tecnologia.
- ❑ **UPF:** Parc de Recerca Biomèdica.
Parc Barcelona Media.
- ❑ **UdG:** Parc Científic i Tecnològic de Girona.
- ❑ **UdL:** Parc Científic i Tecnològic Agroalimentari de Lleida.
- ❑ **URV:** Parc Científic i Tecnològic de Tarragona.
Parc del Turisme i Oci de la Costa Daurada.
Parc Científic i Tecnològic de la Indústria Enològica
TecnoParc.



Fostering technology transfer (2): other activities

❑ S & T Parks. Private Universities

- URL: Parc d'Innovació La Salle.

❑ Others

- Parc Tecnològic del Vallès (PTV).
- Tecno Campus Mataró (TCM).
- Parc Tecnològic de la Catalunya Central.
- Biopol (bio cluster).
- 22@Barcelona.
- B_TEC Barcelona Innovació Tecnològica.
- Parc Tecnològic Barcelona Nord (Barcelona Activa).
- Ciutat Aeroespacial i de la Mobilitat (Viladecans).



Research Policies: Programmes

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Mobility, cooperation and internationalisation

□ Mobility

- BE Fellowships. Stays Research abroad

□ Cooperation

- BCC Fellowships. 50% cofunded by Ministry of Governance and Public Administration
- CTP Grants. Mobility, R & D projects and consolidation of thematic networks
- UNESCO Chairs. 18 Chairs. Support developing countries
- PICS Programme. Cooperation with CNRS.

□ Internationalisation

- BBI Fellowships. Cofunded by DIUE, UCI and Balsells Fellowship Fund
- Engineering Innovation Programme. Collaboration with the University of California, Irvine
- Fulbright – BFUL postdoc fellowships. Projects in USA universities or centres
- Fulbright – visiting professors. USA faculty in Catalonia
- Visiting Professors Call (PIV)



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Scientific Dissemination

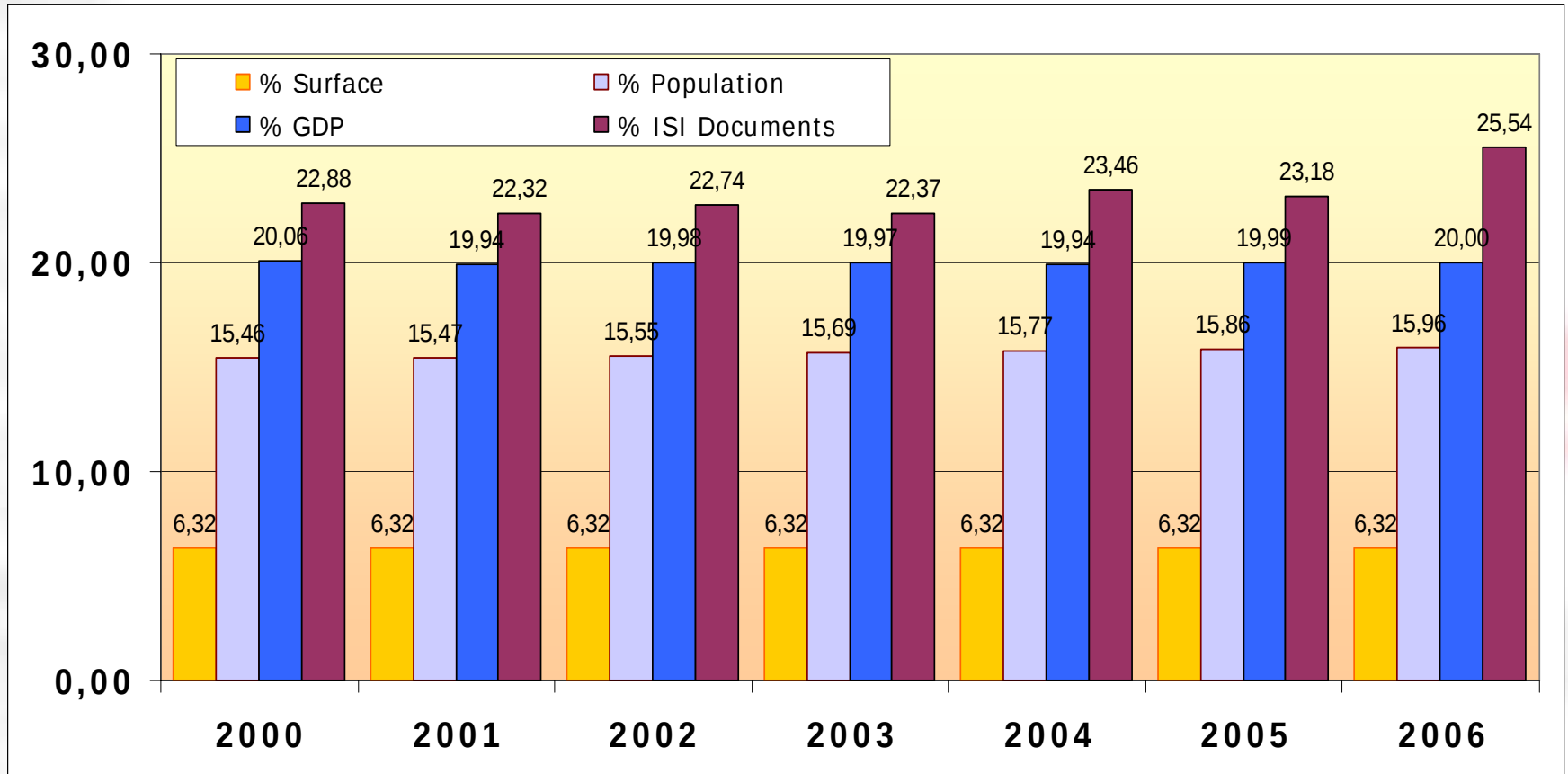


- ❑ ACDC Calls
- ❑ Awards Narcís Monturiol.
- ❑ Publications:
 - Ictineus.
 - Temes de Recerca i Innovació.
 - Omnis cellula.
 - Recercat.
 - Short stories for children
 - Guide “100 llibres de ciència”.
- ❑ CIRIT awards
- ❑ Other activities:
 - Circuits!
 - Accions CAT
 - Press collaboration



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Catalan relative weight within Spain

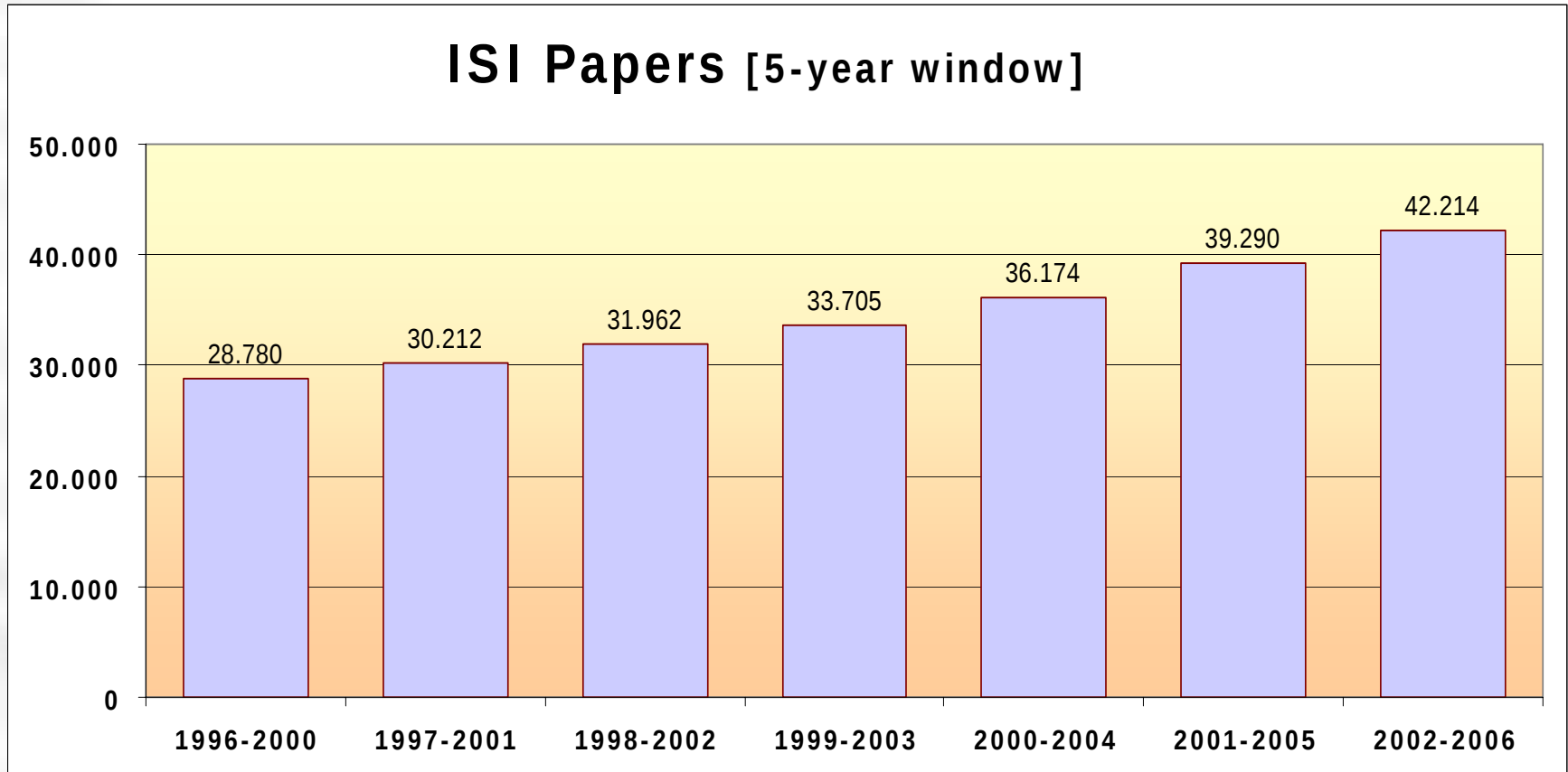


Source: <http://bibliometria.prbb.org/nrcat06>



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Scientific output: ISI papers

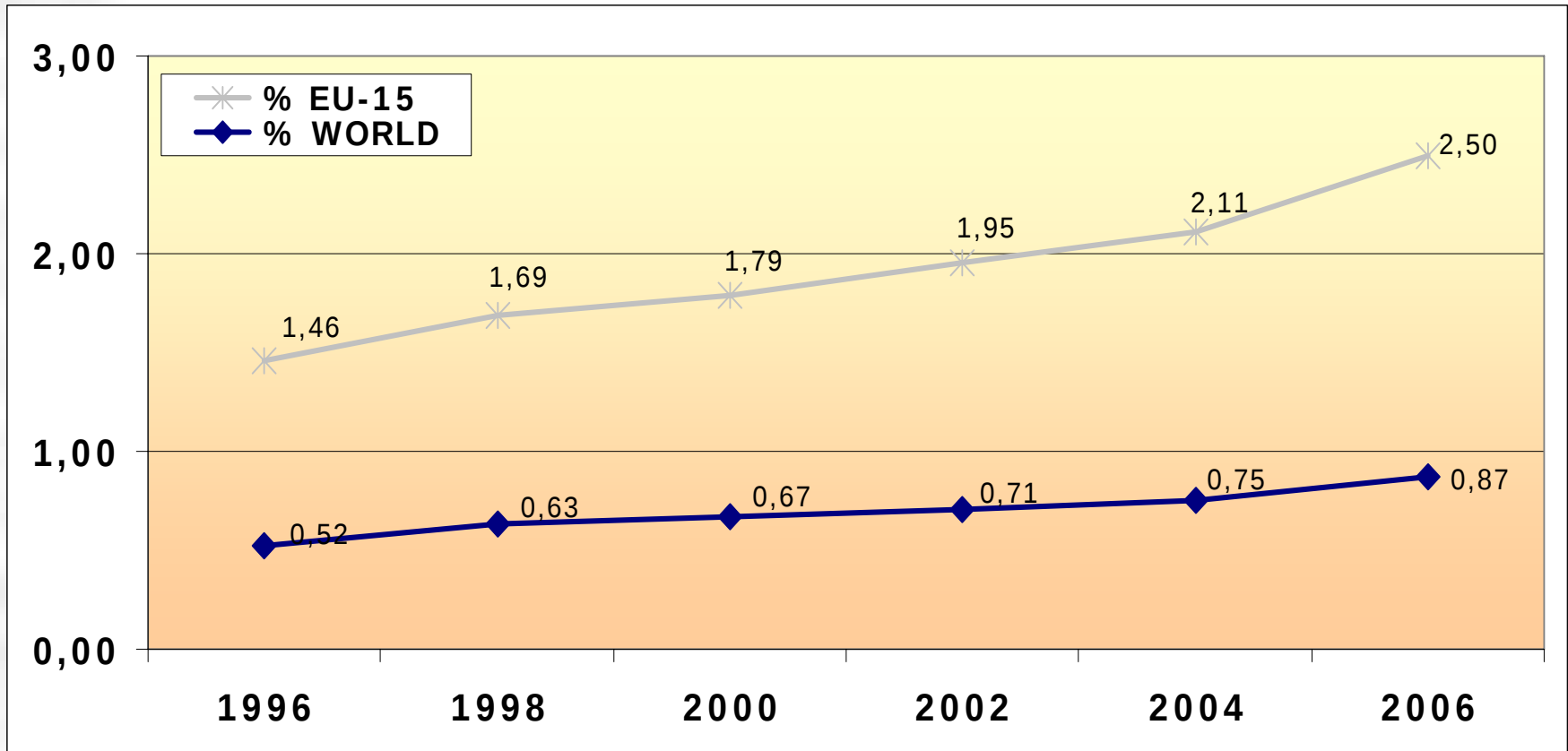


Source: <http://bibliometria.prbb.org/ncrcat06>



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Catalan contribution to ISI documents



Source: <http://bibliometria.prbb.org/ncrcat06>



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Competitive funds (1): 6th FP (2002-2006)

- ❑ 23.2% of the funds obtained by Spain (217.45 M€)
- ❑ 4 Catalan Universities among the Spanish top 5 Universities
[But all Universities below CSIC numbers]



Competitive funds (2): Spanish R & D Plan

❑ 27.0% of the 2000-2003 total funds

❑ Calls 2005:

Projects

	Grants [M€]	Credits [M€]
1,595 Projects (23%)	187.8 (26%)	144 (34%)
417 Complementary measures (21%)	9.4 (20%)	0.05 (1%)

Personnel, infrastructures and support to innovation

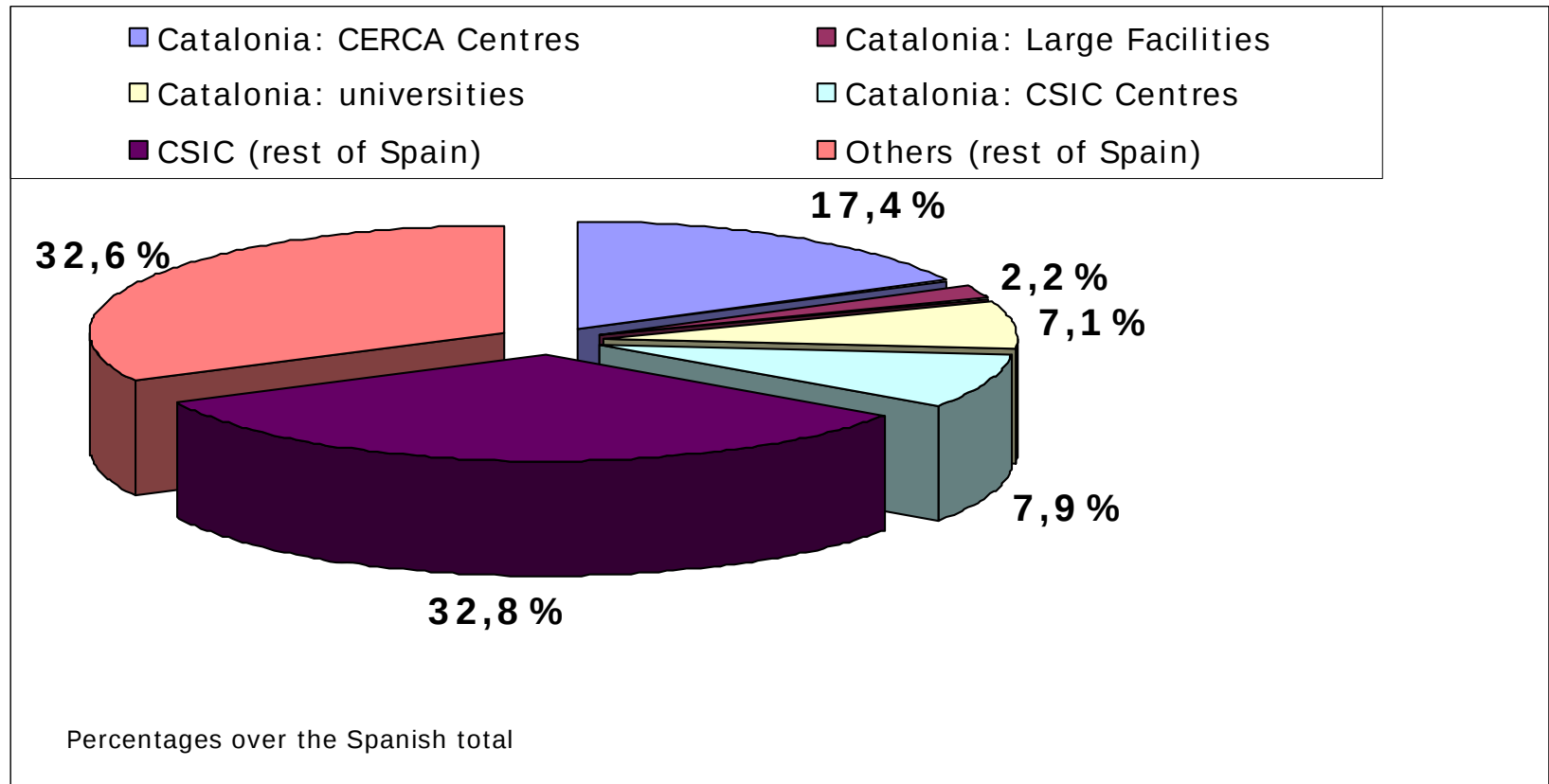
2,166 Fellowships, contracts...	64.8	-
487 Measures to support competitiveness (21%)	4.3 (9%)	175.8 (23%)
128 Infrastructure measures (11%)	3.2 (16%)	110.9 (27%)

In brackets, percentages over the Spanish total



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Competitive funds (3): Consolider Calls 2006-2007



Competitive funds (4): Starting Independent Research Grants (ERC)

- ❑ 300 awards (9,167 applications) overall
- ❑ 16 awards for Researchers in Catalonia
 - 7 in CERCA Centres (3 CRG, 2 ICN, 1 IBEC, 1 IRB)
 - 9 ICREA researchers
 - 5.3% of European awards (16 over 300)
 - 64% of Spanish awards (16 over 25)



New Priorities of the DGR

- ☐ Evaluation of research centres
- ☐ Agency for research centres
- ☐ Interface between research centres and universities
- ☐ Scientific and technical services
- ☐ Obtaining more competitive funds
- ☐ Collaboration with MEC (Spanish Government)



Thank you very much for your attention!



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