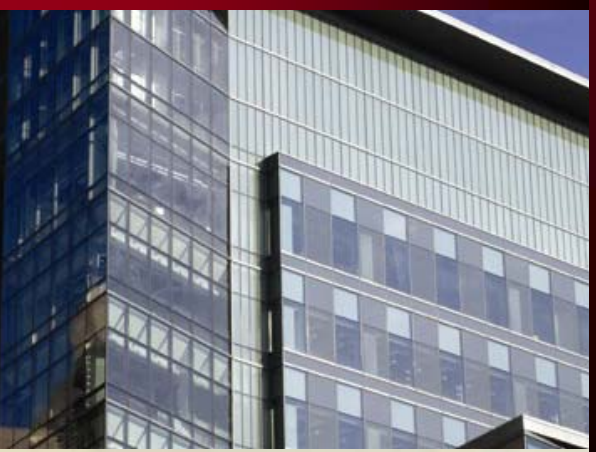


One World, One Medicine

Harvard Medical International

Lisbon, Portugal

April 16, 2007

Robert K. Crone, MD

HARVARD MEDICAL INTERNATIONAL

Guiding Philosophy

- **Every** citizen of the world should have access to **high quality, cost-effective health care** of a world standard

  Clinical Care
  Education
  Research

Integrated and Well-Managed
With a Culture of Quality

Background

- Established 1994
- Non-profit subsidiary, self-supporting corporation of Harvard University
  - **Interlocking board with Harvard Medical School and Harvard University**
- 40 Programs in 30 Countries
- 60 Staff
- Commitment to infrastructure building and long-term partnerships & collaborations

Structure at Harvard University

Harvard Non Profit Corporation: 7 Members

Harvard Schools

- **Medical School**
- Dental School
- School of Public Health
- Business School
- Kennedy School of Government
- School of Education
- School of Design
- School of Divinity
- Faculty of Arts & Sciences
- Extension School
- Law School

HMI Board

HARVARD MEDICAL INTERNATIONAL

Global Network

30+ International Institutions

HMI Gulf

Harvard Medical School

- Established 1782
- Private, Non-Profit
- 9000 + Faculty
- 7,235 Post Graduate Trainees
- 739 MD, 580 PhD Students
- Annual Budget $500 M
- Campus-Wide Research

  Approx $2B
- Endowment $2.8 B

HMS Quadrangle - 1906

New Research Building - 2004

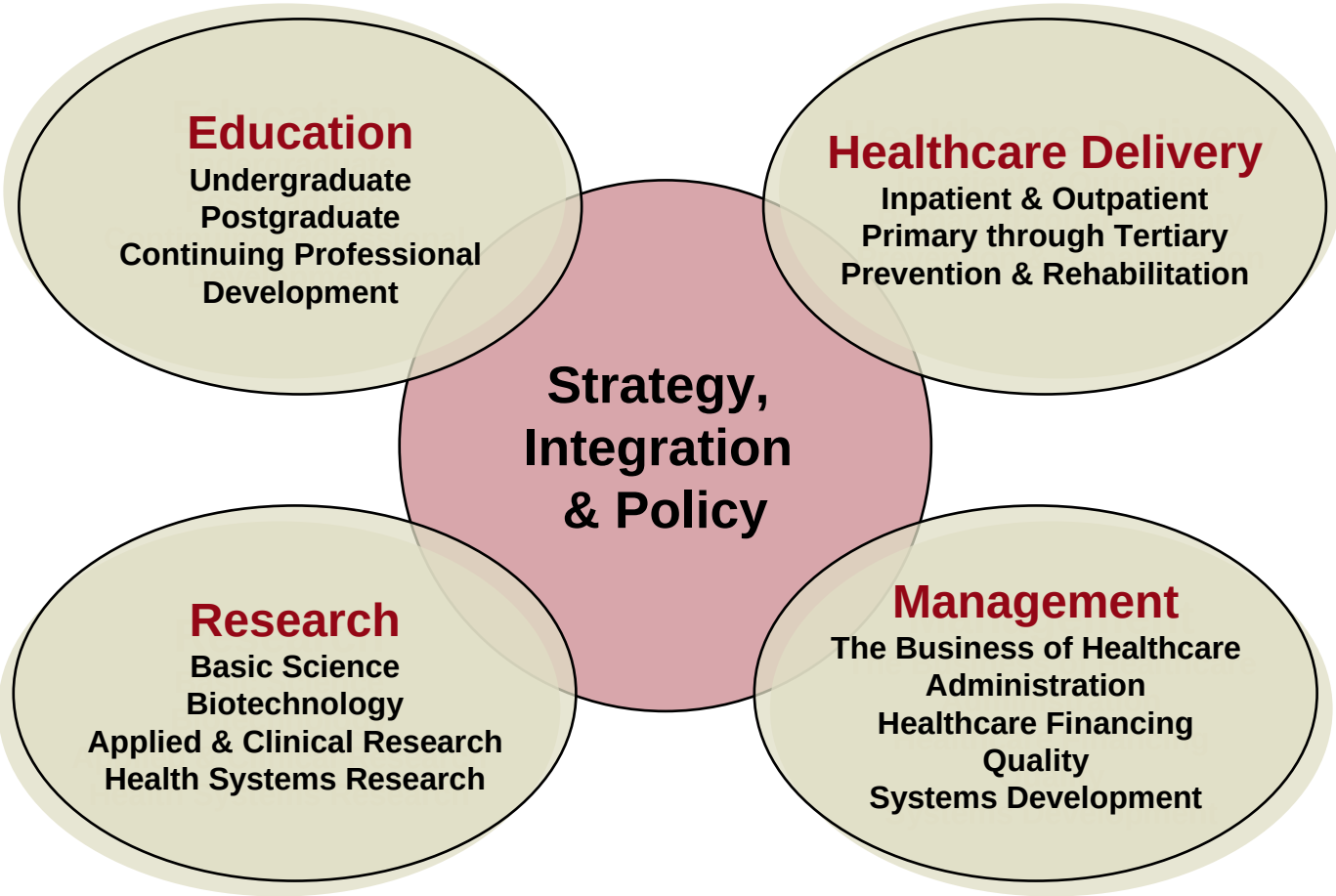
17+ Harvard-Affiliated Medical Institutions

- 17 Major teaching hospitals
- 100 Primary care centers
- 7,000+ Faculty
- 3,000+ Beds
- 1 HMO = 2 million covered

Beth Israel-Deaconess Medical Center
Brigham and Women's Hospital
Children's Hospital
Dana Farber Cancer Institute
Harvard Pilgrim Health Care
Joslin Diabetes Center

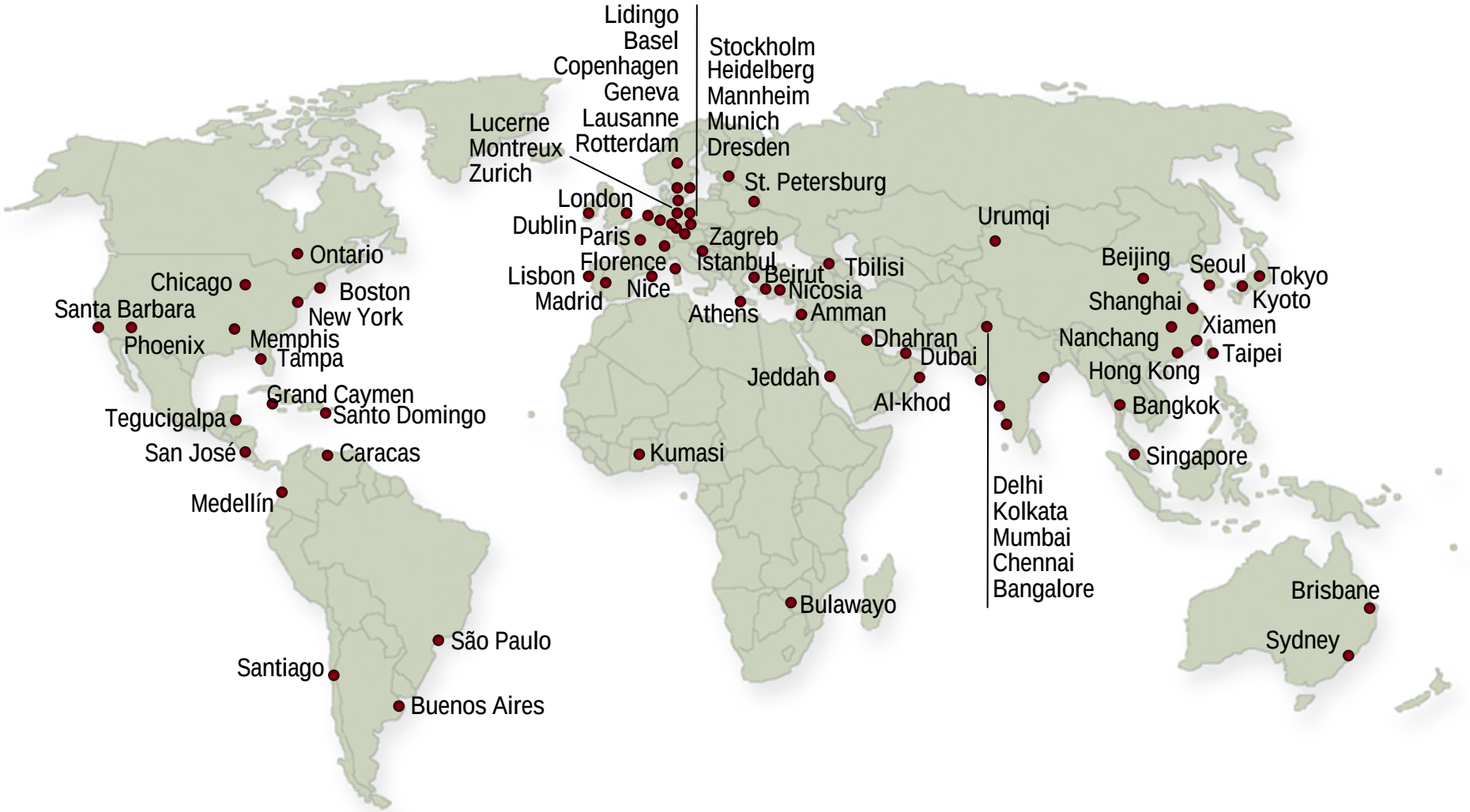
Massachusetts Ear and Eye Infirmary
Massachusetts General Hospital
McLean Hospital
Spaulding Rehabilitation Hospital

HMI's Programs



Provides Access to the Faculty and Infrastructure of Harvard Medical School and Harvard University

HMI's Program Sites 2001-2006



HMI's Medical School Collaborations

- Heidelberg University *
- Munich University
- Mannheim Faculty of Medicine *
- Dresden University *
- Tokyo Medical & Dental University *
- Hong Kong University
- Sri Ramachandra Medical College, Chennai, India *
- O & M University, Dominican Republic
- Xinjiang University, China
- National University of Taiwan *
- National University of Singapore
- Cornell-Qatar Medical School
- Karolinska Institute, Sweden
- Al Faisal University, KSA
- University of Zagreb, Croatia *
- Ulsan University College of Medicine, Korea *
- University of Tikrit College of Medicine
- Kuwait University College of Medicine
- University of Nice
- Peking Union Medical College
- Catholic University of Lisbon
- St Mathews Medical College
- Royal College of Surgeons of Ireland
- Lebanese American University of Beirut
- University of Laussane
- Al Ain University, UAE
- Gulf Medical College, UAE

Developing Health Care Systems

- Strategic Planning
- Clinical Program Planning
- Business Planning
- Facilities & Capital Equipment Planning
- Technology & Systems Development
- Professional Staff Development
- Quality Management
- Network Development

Mumbai

Shanghai

Bangkok

Shanghai

Istanbul

Goals of HMI's Programs

- **Create** institutions that meet global, regional and local needs, present and future
- **Design** facilities that are flexible, meet present and future programmatic needs
- **Integrate** education with the research, clinical and societal mission of academic medical centers cost-effectively
- **Support** faculty, physicians, researchers and students in the biomedical sciences
- **Monitor** educational and clinical benchmarks to assure world-class quality
- **Foster** collaboration through global networks, sharing ideas & information, for innovation

cla | Conselho dos Laboratórios Associados

?

cla | Conselho dos Laboratórios Associados

Associate Laboratories

The Associate Laboratories are research institutions highly recognized by external evaluations, according to international quality criteria, which have achieved their status after presenting a request to the Minister of Science and Technology.

The capacity for cooperation, in a steady, competent and effective way, pursuing the specific aims of the national policy for science and technology is a determinant aspect in the evaluation of the Associate Laboratories.

cla | Conselho dos Laboratórios Associados

The status of Associate Laboratory was given for the first time in November 2000 to four institutions, which incorporated, through partnerships, a total of seven research units that were classified as *Excellent* by panels of foreign scientists, within the evaluation of research units promoted by FCT in 1999.

In December 2006, there were 25 research units that had achieved the status of Associate Laboratory, integrating almost 2500 doctorates, in a total of about 5500 researchers.

cla | Conselho dos Laboratórios Associados

The main objectives of the scientific policy are:

- Complement the research institutions at the state service with a set of highly international competence institutions
- Proceed with the reinforcement of the scientific and technological institutions introducing a more exigent and steady institutional framework
- Orient the institutions' activities for a precise set of thematic guidelines
- Stimulate the integration of research, scientific education and transfer of knowledge and technology for non academic sectors, and the construction of bridges between disciplines, institutions and other sectors
- Promote the transdisciplinarity of the internal organization and evolve for organization and management forms more adequate to the new forms of production of knowledge
- Reinforce the opportunities for scientific jobs with high demands and qualifications

CIENCIA VIVA

Ciência Viva

AGÊNCIA NACIONAL PARA A CULTURA CIENTÍFICA E TECNOLÓGICA

PAVILHÃO DO CONHECIMENTO CIÊNCIA VIVA

A Portuguese initiative for scientific and technological culture

OUR MISSION

CIENCIA VIVA IN SCHOOLS

Science Education, practical work in partnership with research institutions

NATIONAL SCIENTIFIC AWARENESS CAMPAIGNS

Conferences, exhibitions, scientific film festivals...

CIENCIA VIVA SCIENCE CENTRES

A national network of interactive science centres

CIENCIA VIVA NETWORK OF SCIENCE CENTRES

REDE NACIONAL
DE CENTROS
CIÊNCIA VIVA

OUR MISSION

HEALTH IN THE XXI CENTURY
A vision from the European Youth
(Year 2000)

THE HUMAN GENOME PROJECT
Perspectives for Public Health
(Year 2001 – 2004)

VOLVOX PROJECT
(Year 2006-2007)

Health in the XXI Century: a vision from the European Youth

Health in the XXI Century
a vision from the European Youth

Students learn recent developments in Science and Technology in the area of Health Sciences:

Developed in the year 2000 with 22 Portuguese and German high schools

Scientific community support:

22 researchers from 6 research institutions and one learned society:

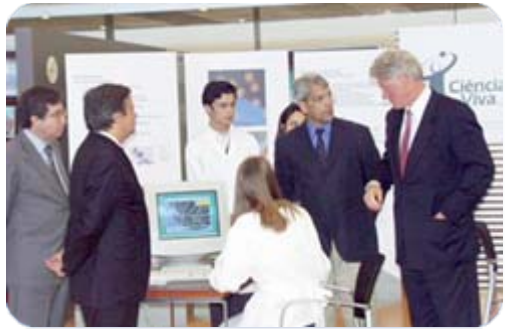
CMDT, IBMC, IPATIMUP, CNC, IBILI, IGC, Portuguese Society of Neurosciences

Project also supported by journalists and it was presented in Hannover (Pavilion of Portugal, EXPO 2000)

Students' Activities:

- Visits to laboratories
- Interviews to researchers
- Articles on recent scientific research and technological developments on health issues

Health in the XXI Century: a vision from the European Youth



Student in the project talks to Bill Clinton

Malaria research presented by a scientist and students

EXPO Hannover: Portuguese and German students present their work in the project

The Human Genome : Perspectives for Public Health

The Human Genome
Perspectives for Public Health

An international project on prevention, diagnosis and treatment of genetic diseases in light of the research into the Human Genome.

- High schools Portugal, Germany, Mozambique and Sweden.

- researchers from 14 scientific institutions

- science journalists

- 4 different editions (from 2001 to 2004).

Videoconference with Brazil

The Human Genome : Perspectives for Public Health

The Human Genome
Perspectives for Public Health

Groups from different schools:

- visited scientific institutions, interviewed researchers and created articles on genetic diseases.
- created science fiction texts under the topic Genetics in the Year 2020 (collaboration with language teachers)
- carried out experiments based on a science Kit produced by NCBE (Portuguese version provided by Ciência Viva) and shared results.
- ask a scientist
- videoconference between Portuguese and Brazilian students on genetics during the S&T Week.
- discussion forum: Controversial aspects of the Human Genome research.The forum is still online.

The Human Genome : Perpectives for Public Health

The Volvox project

An ongoing European project for the creation of materials to encourage good practice in bioscience education in European schools

Participants: Biologists and teachers of Biology from nine European countries

Involvement of Portuguese health science institutions:

1. Institute of Molecular Medicine (IMM)

Daily threats to our genome: mutagenic effects of tobacco

2. Immunology Department, Medical Science Faculty

Imunology

CIENCIA VIVA

Ciência Viva

AGÊNCIA NACIONAL PARA A CULTURA CIENTÍFICA E TECNOLÓGICA

PAVILHÃO DO CONHECIMENTO CIÊNCIA VIVA

A Portuguese initiative for scientific and technological culture

Portugal and Harvard

1. Health publications for the general public
2. Training programs in clinical research

Health Information for Public

- ***Books and monographs:*** **75 published**
- ***Newsletters:*** **5 monthly newsletters**
- ***Magazines:*** ***Newsweek, Better Homes & Gardens***
- ***Weekly Newspaper column:*** **In 60 newspapers, worldwide**
- **Total of 6 million words of information, and thousands of pictures**

Portugal-Harvard

Health Publications for the General Public:

In the Doctor's Office

Centro de Educação de Pacientes

Portugal-Harvard

Health Publications for the General Public:

On the Internet

Content on Internet Translated into Portugese

- **Healthy lifestyle: Nutrition, exercise, stress management, addictions**
- **Adult Diseases: Over 500 diseases**
- **Children's Health (Growth and development, diseases)**
- **Symptom decision guides (for the 100 most common symptoms in adults and children)**

Content on Internet
For People Who Cannot Read

- The Internet allows information to be delivered by voice and pictures. This is a way to reach people who cannot read.
- Such information could be delivered on cell phones with Internet connections. Does not require a computer.
- An increasing number of people who cannot read have such cell phones.

Harvard's Training Program

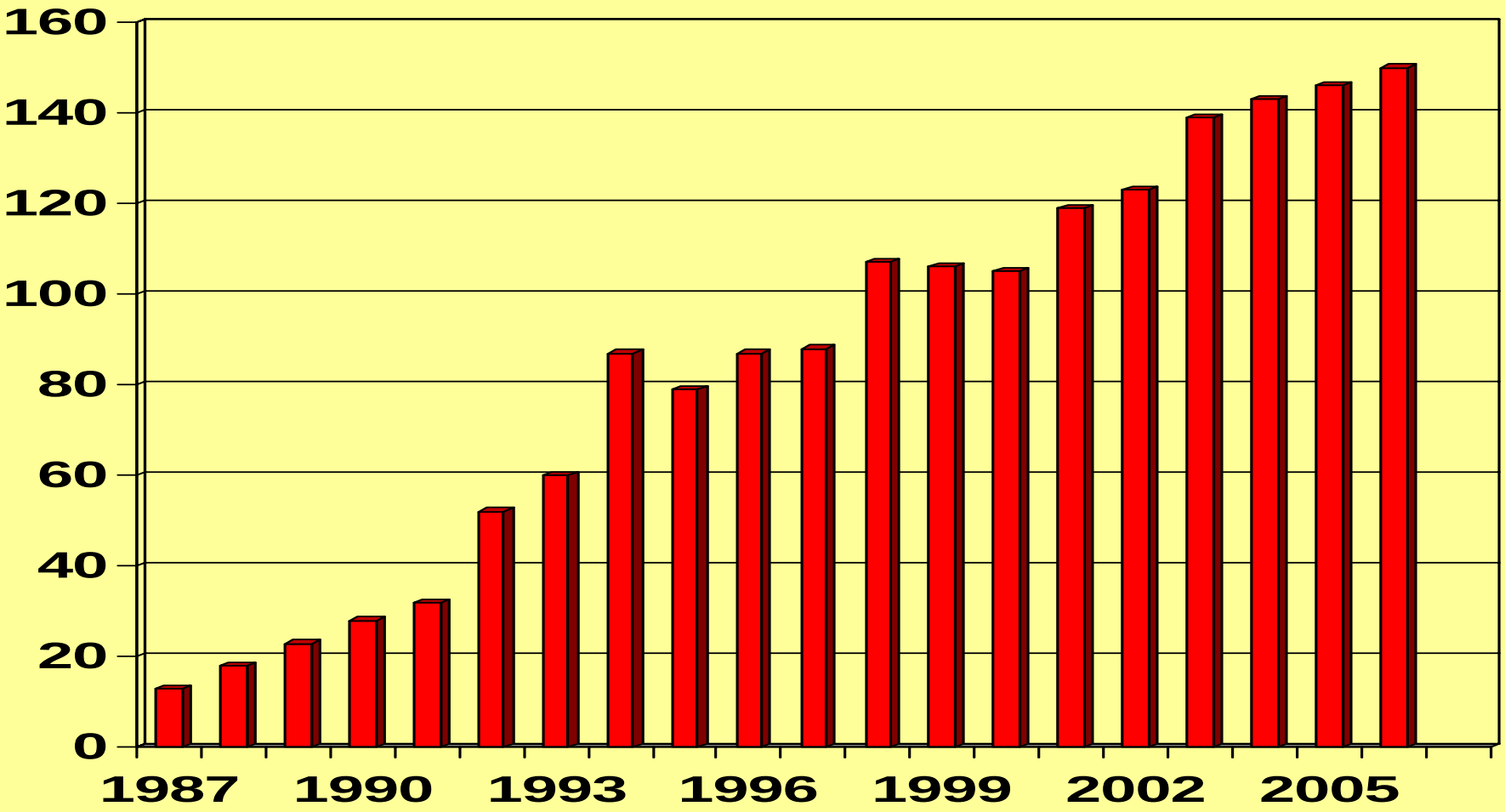
For Clinical Research:

Program in Clinical Effectiveness

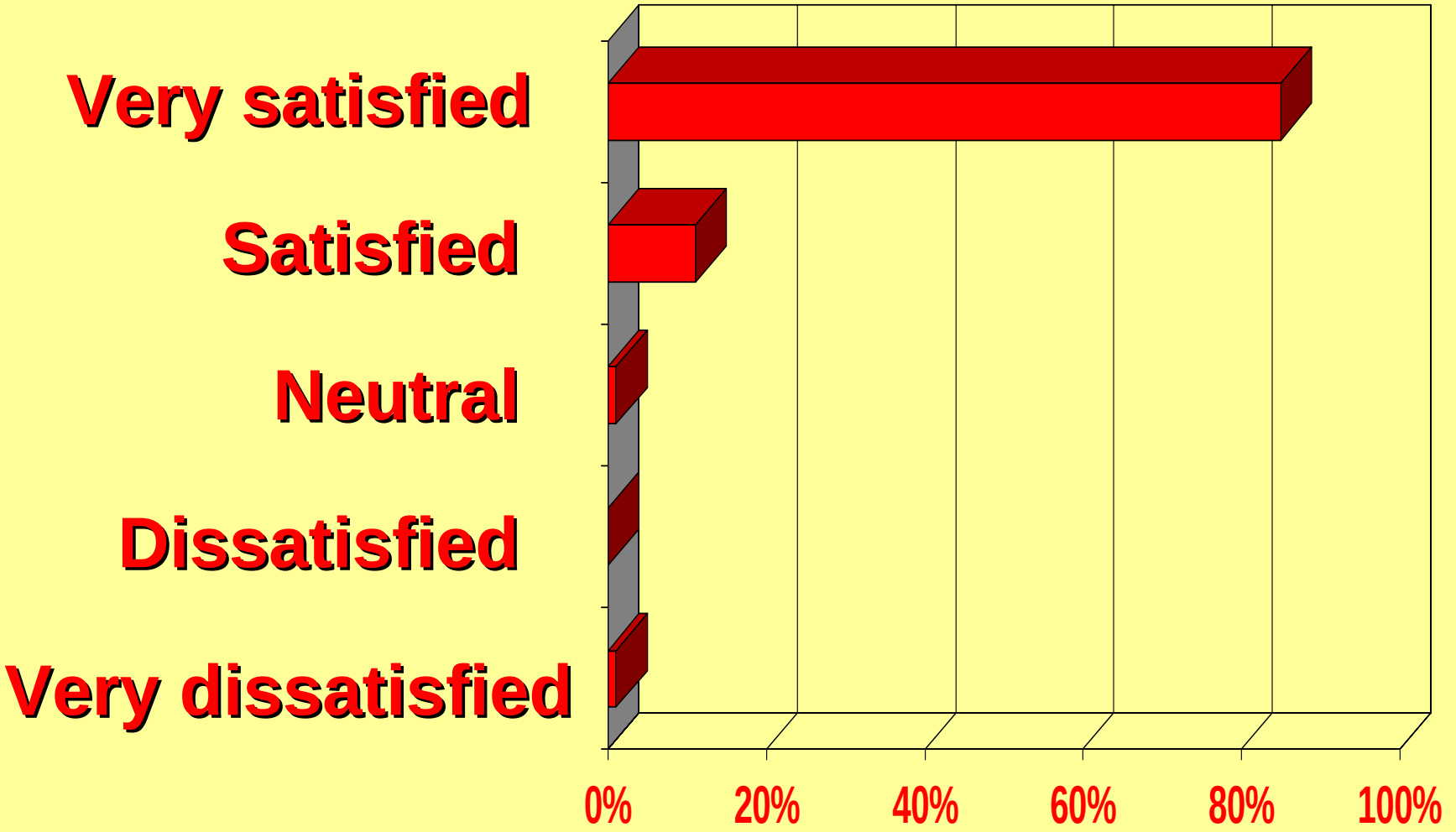
Courses

- Epidemiology
- Biostatistics
- Decision analysis/ cost-effectiveness analysis
- Social/behavioral research
- Clinical trials
- Ethics
- Health policy
- Health system research
- Quality Improvement
- Analysis of large databases

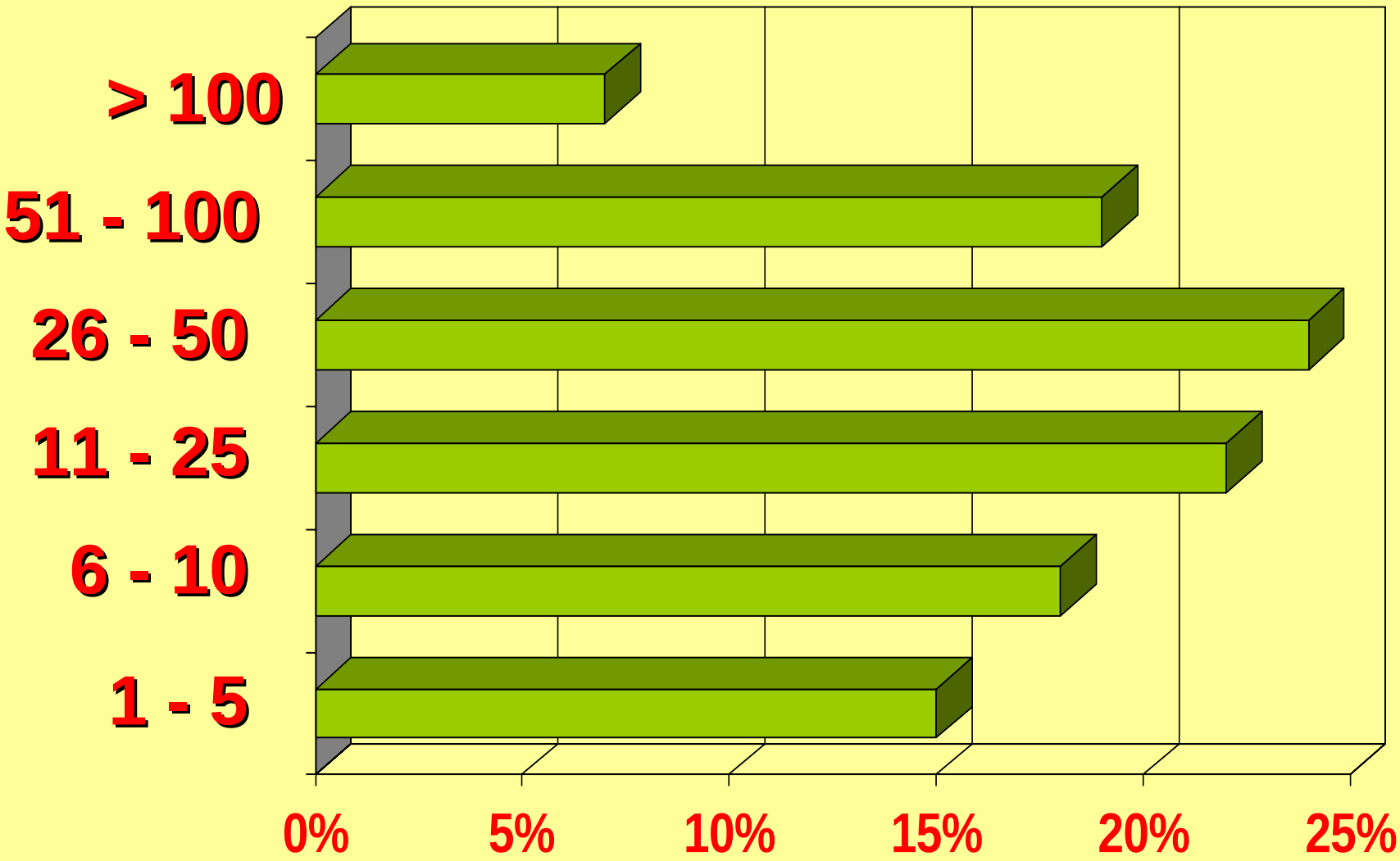
Number of Entering Students



Satisfaction with Program



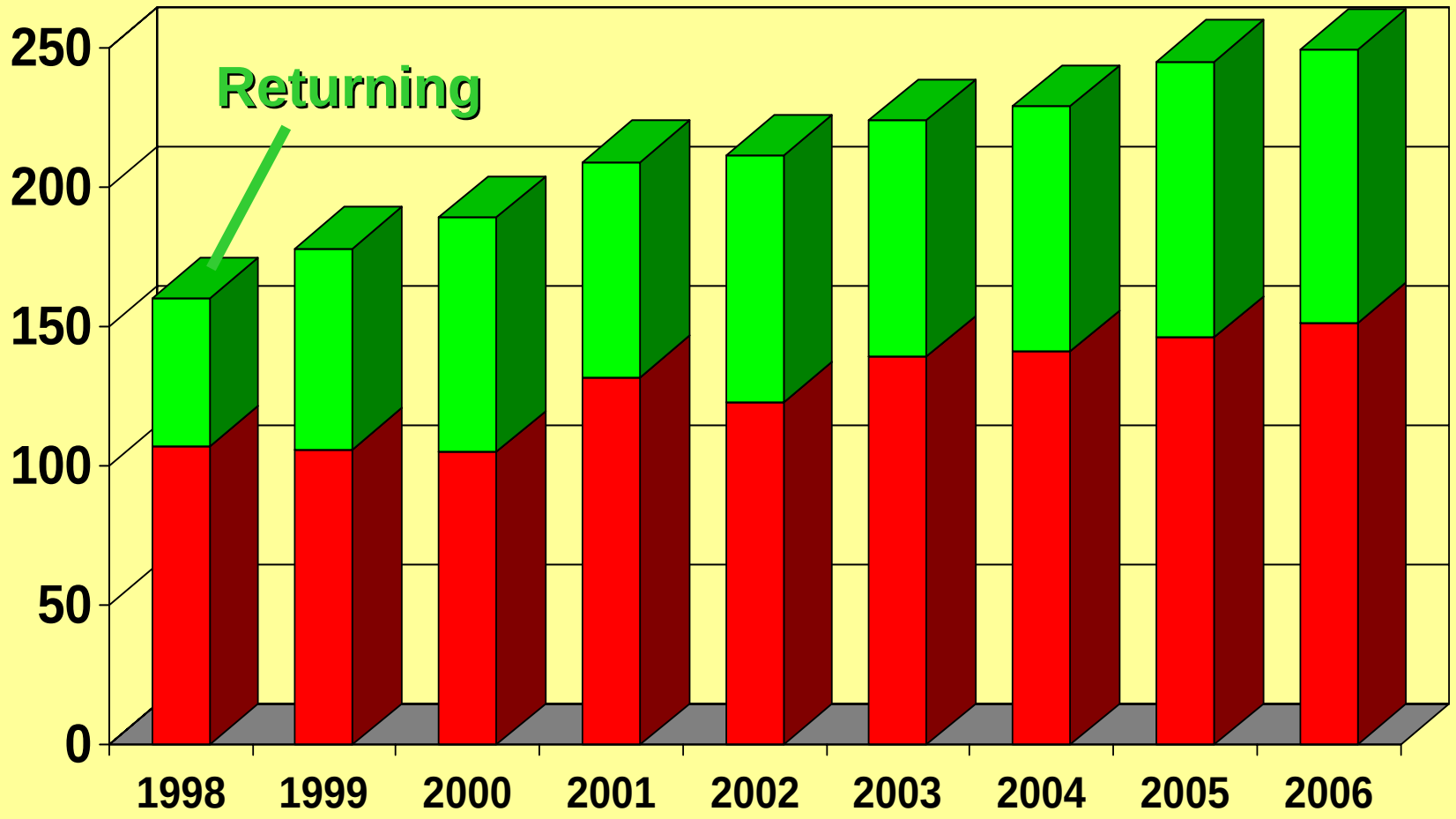
Number Papers Published Since Completing Program



Students

- Age when taking program
  - Age 25 - 39 : 86%
- Academic rank when taking program
  - Fellow/resident : 64%
  - Assistant professor: 29%
  - Associate professor: 4%
  - Professor: 2%
- Live and work
  - United States / Outside U.S.: 89% / 11%
  - From Harvard / From Elsewhere: 74% / 26%

Number of Entering *And Returning* Students



Research Fields

Epidemiology	55 %	Social-behavioral	11%
Clinical trials	43 %	Medical education	11%
Health financing and organization	42 %	Informatics / computers	8%
Translational research	16 %	Laboratory sciences	3%

Highest Rank Achieved By Graduates, as of 2006

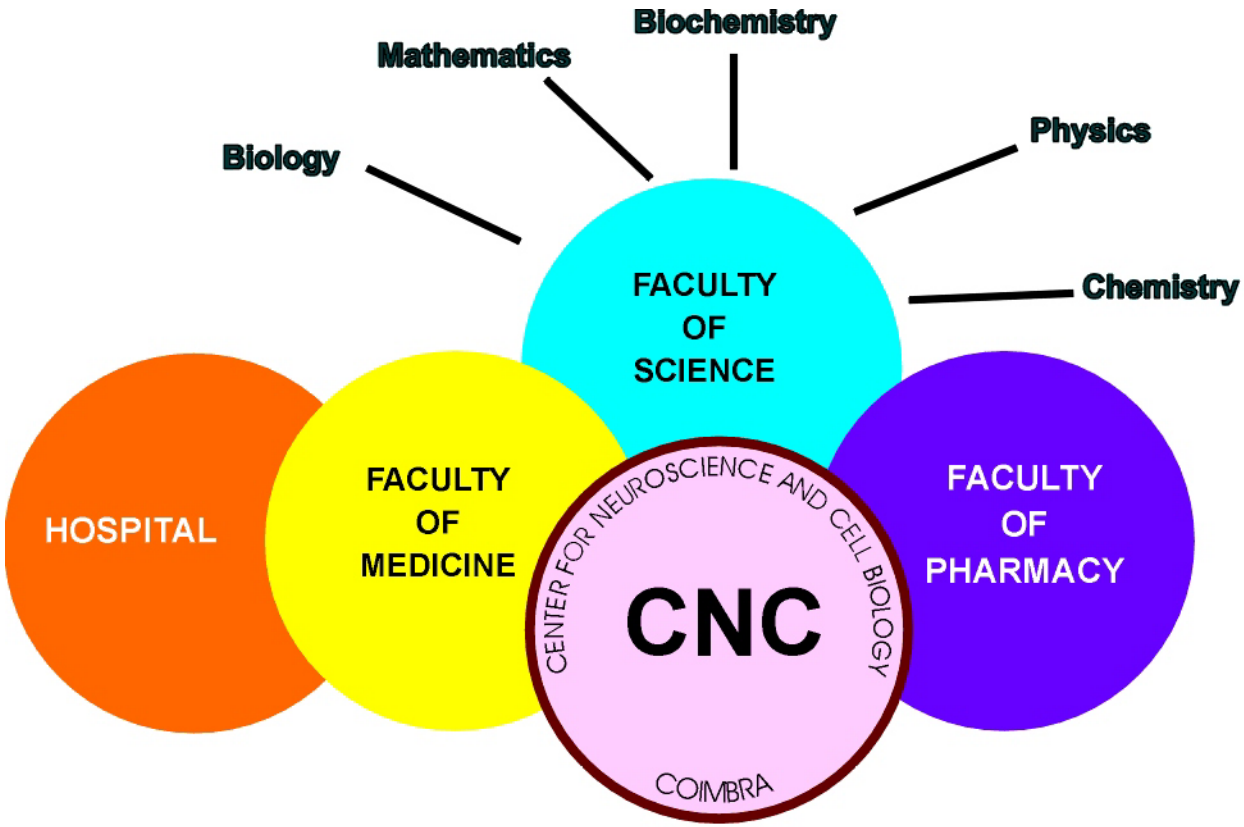
Professor	13%
Associate professor	25%
Assistant professor	51%

Fostering the public understanding of Science

- Undergraduate students in the lab
- High school students in the lab
- High school teachers
- The challenge: To commit the university to these activities

HMS/Portugal Collaboration - 16 April 2007

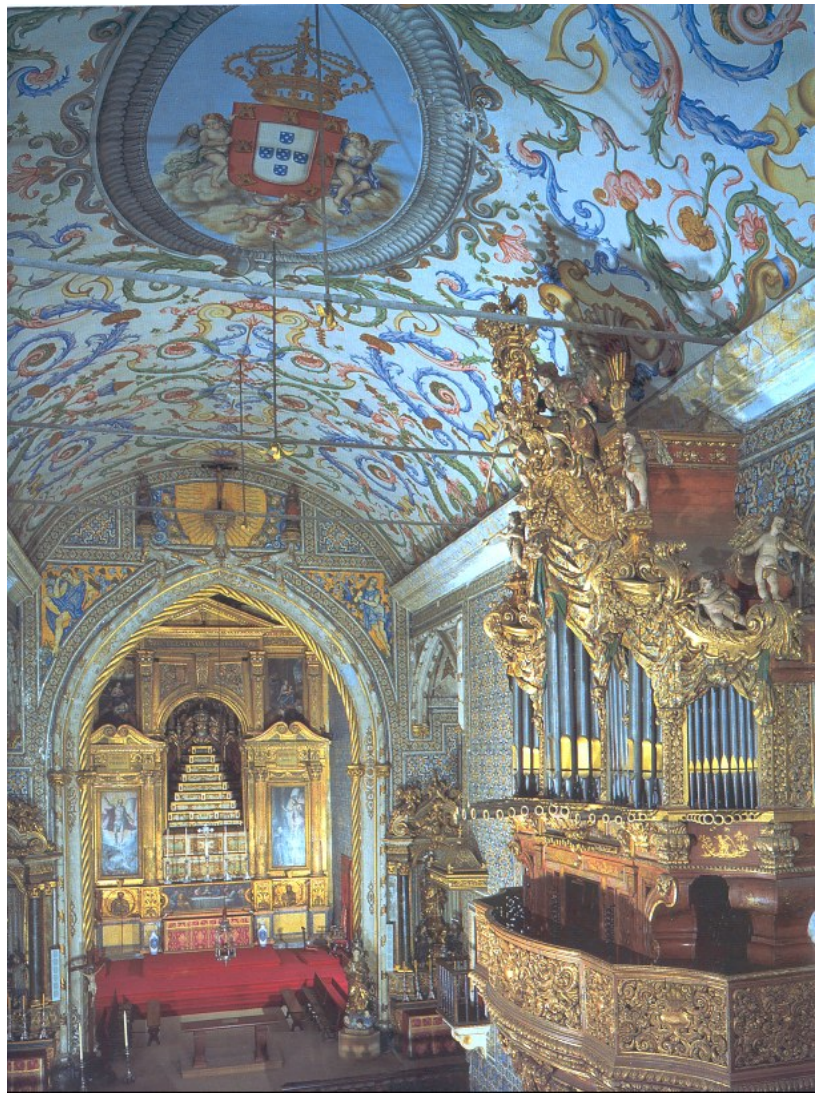
Center for Neuroscience and Cell Biology (CNC)
University of Coimbra



Departments of CNC

1st day: Visit to the University

University library



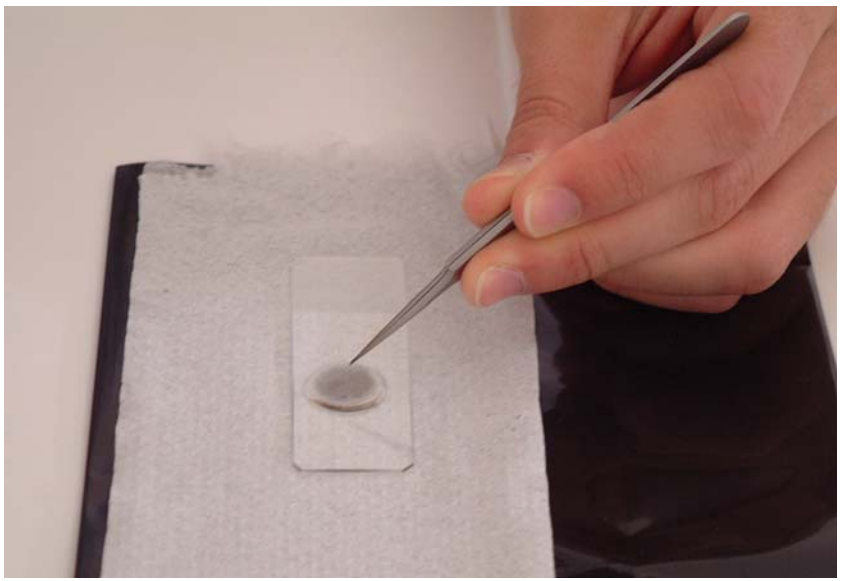
University chappel

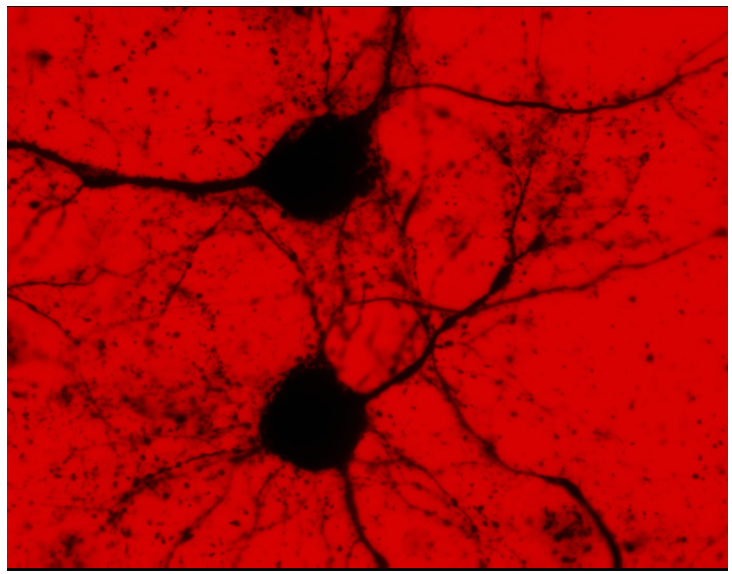
Students meet principal investigator

Students learn from graduate student

Students now work individually

Students obtain results





Students present their results at a seminar

- Students attain a high understanding of the research process
- Students acquire a grasp of the problems investigated
- Students develop a realistic view of research

Students leave happy!

Fostering the public understanding of Science

- Undergraduate students in the lab
- High school students in the lab
- High school teachers
- The challenge: To commit the university to these activities

HMS/Portugal Collaboration - 16 April 2007

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UNIVERSIDADE DO PORTO

Faculty of Medicine of the University of Porto

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UNIVERSIDADE DO PORTO

2005/2006	**St. Admissions**	**Undergraduate students: 250** **(admission classification: 18.1-19.6)** **Post-graduate students: 252**
	St. Total Number	**Undergraduate students – 1,378** **PhD students – 156** **Master students + other – 598**
	Faculty	**358 (159 PhDs)**

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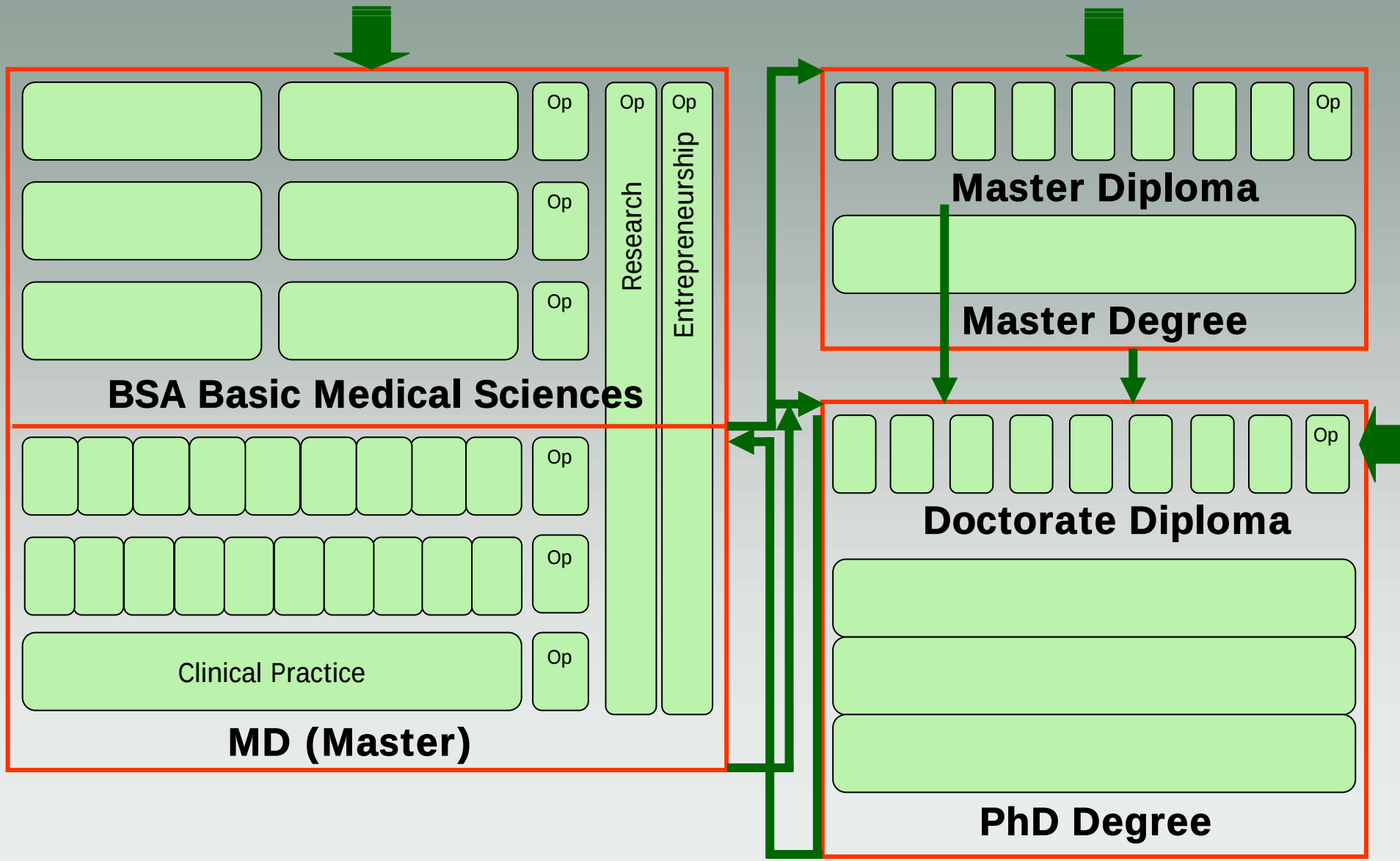

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Doctoral Programs

- Metabolism: Clinics and Experimentation
- Public Health
- Clinical and Health Services Research
- Forensic Sciences
- Molecular Medicine and Oncology
- Neuroscience
- Genetic Pathology
- Bioengineering
- GABBA

Master Programs

- Bioethics
- Forensic Sciences
- Orthognatic e Orthodontic Surgery
- Epidemiology
- Evidence and Decision in Heath
- Economics and Health Management
- Medical Informatics
- Emergency Medicine
- Molecular Medicine and Oncology
- Microsurgery
- Psychiatry and Mental Health
- Public Health

Post-Graduate Courses

- Forensic Medicine
- Hydrology and Climatology
- Heath Education
- Pain Medicine
- Sports Medicine
- Occupational Medicine
- Orthodontia
- Oral e Extra-Oral Rehabilitation
- Renal Therapeutic Support

Outreach

- Lab Visits (mainly high school students)
- Faculty visits (last year of high school)
- School visits (from elementary to high school) at the “Brain Awareness Week”
- “Brain Awareness Week” presentations at public places
- Participation in the University of Porto fair
- Junior University
- “Ciência Viva”

E-learning

Dominant technology in supporting new approaches to teaching and learning.

Unique ability to bring together a community of learners unrestricted by time or place: offers the means of creating an educational experience long idealized.

Creates learning environments that facilitate higher order cognitive abilities and encourage these to thrive
"Transactional perspective of teaching and learning embedded in a critical community of learners"

Garrisson and Anderson 2003

Aims

Develop a virtual learning environment to blend with the traditional learning scenario

Provide interactive, multimedia learning materials covering special parts of the curriculum

Create a forum for clarification and discussion of curriculum contents and related subjects

Open public access to teaching and research material

From course syllabus to e-learning - I

- **Course syllabus** (Information on the objectives, teaching methods and study plans)
  - All 349 undergraduate and postgraduate subjects offered regularly are at the Faculty web site (http://med.up.pt)
  - 41 subjects not offered in a regular basis (eg. Spring Courses or Summer School) provide information at their own web sites
  - Portuguese and in English for most of the subjects

- **Online learning materials** (online study materials such as HTML, Word, Excel, PowerPoint or PDF files)
  - 65% (27 out of 42) of the undergraduate subjects (Medicine Course)

    94% for basic subjects / 44% for clinical subjects

    (At the Faculty (19) or the University (8) web infrastructure)
  - Less than 15% of the postgraduate subjects (5 out of 21 Master and other postgraduate courses)

From course syllabus to e-learning - II

- **E-learning (Moodle @FMUP e WebCT @UP)**
  - –20% subjects (11 out of 42) of the Medicine Course (Moodle – 3; WebCT – 8)
  - – 5 post-graduate courses (Moodle)
  - – Wiki is currently being used to support teachers and students interactivity
- **E-learning functionalities**

  Course contents, events scheduling, exercises, automatic exam corrections, assignment's submissions, evaluation statistics, chat, news and forum
- **Internet access**
  - – Nearly 100 computers available for students at Faculty labs
  - – Wireless free access provided at most of Faculty and University premises

Subjects and E-Learning funcionalities

	Static online learning material	Interactivity Lecturer / Student	Automatic correction exercises and exams	Simulation exercises
Undergraduate subjects (n=42)	62% (26)	12% (5)	12% (5)	2% (1)
Master subjects (n=195)	8% (16)	1% (2)	0,5% (1)	0
Other post-graduate subjects (n=112)	17% (19)	0	1% (1)	0
Other subjects (n=41)	20% (8)	0	5% (2)	2% (1)

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Course Syllabus (eg.Molecular Cell Biology)

PORTUGUÊS | ENGLISH

Cellular and Molecular Biology
FACULTY OF MEDICINE OF THE UNIVERSITY OF OPORTO

HOME | TEACHING TEAM | CURRICULAR PROFILE | STUDENTS' WORK | RESEARCH | INTRANET

2003 / 2004

Curricular profile

Annual discipline of the 1st year of the courses of Medicine of the Faculty of Medicine of the University of Porto (FMUP) and of Dental Medicine of the Faculty of Dental Medicine of the University of Porto (FMDUP), with a total load of 150 hours.

Top

CONTENTS AND PURPOSES

The discipline of Cellular and Molecular Biology is focused on the aspects of the structural and molecular organization of the animal cell that are related to its normal functioning , as well as to the molecular mechanisms during development and aging. As an indispensable base to the understanding of developmental biology, the discipline includes in General Embryology. The basic purposes of the discipline aimed at providing students with theoretical and practical knowledge on (i) the structural and molecular organization of the cell and the underlying mechanisms to its normal function, (ii) the processes that govern the embryonic development and aging and (iii) the methodology and tools used in the study of the cell. The student should be enabled to practice several techniques of microscopic observation and laboratorial protocols, to

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Biologia Celular e Molecular
FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO

Introdução | Docentes | Plano curricular | Trabalhos dos alunos | Investigação | Avaliação GEM | Intranet

Actividade Científica

- Temas em investigação
- Projectos financiados
- Publicações seleccionadas

TEMAS EM INVESTIGAÇÃO

CARACTERIZAÇÃO DO PAPEL DO FACTOR DE TRANSCRIÇÃO DRG11 NO DESENVOLVIMENTO EMBRIONÁRIO DO SISTEMA NOCICEPTIVO
Deolinda Lima, Sandra Rebelo, Carlos Reguenga, Claudia Lopes

O Drg11 foi recentemente identificado pelo grupo, em colaboração com David Anderson, CalTech, como um gene primariamente implicado no desenvolvimento embrionário do sistema nociceptivo. O trabalho em curso, relativo ao seu real papel no desenvolvimento dos diversos componentes do

"Aplicação da microcirurgia laser para o estudo dos mecanismos de controlo da divisão celular" (2006-2007) Programa Gulbenkian de Estímulo à Investigação - Hélder Maiato

"Estudo molecular da disfunção endotelial e da expressão de factores de crescimento vascular no corpo cavernoso na hipertensão arterial. Efeitos do tratamento com antagonista da angiotensina II, bloqueador ß e antagonista dos receptores da endotelina-1 na progressão da disfunção eréctil vasculogénica" Bolsa APU 2006 - Delminda Neves, Pedro Vendeira

Topo

PUBLICAÇÕES SELECCIONADAS

Neves, D., Santos, J., Tomada, N., Almeida, H. e Vendeira, P. (2006) Ageing and orquidectomy modulate expression of VEGF receptors (FLT-1 and FLK-1) on corpus cavernosum of the rat. *Annals of the New York Academy of Sciences* 1067:164-172

Pinto, M., Lima, D. and Tavares, I. Correlation of noxious evoked c-fos expression in areas of the somatosensory system during chronic pain: involvement of spino-medullary and intra-medullary connections. *Neuroscience Letters* (no prelo)

Rebelo S., Chen, Z-F, Anderson, D.J., Lima, D. Involvement of the DRG11 in the development of the primary afferent nociceptive system. Mol. Cell. Neurosci. (2006), doi:10,1016/j.mcn.2006.07.013.

Monteiro C, Lima D & Galhardo V (2006) Switching-on and -off of bistable

Biologia Celular e Molecular
FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO

Introdução | Docentes | Plano curricular | Trabalhos dos alunos | Investigação | Avaliação GEM | Intranet

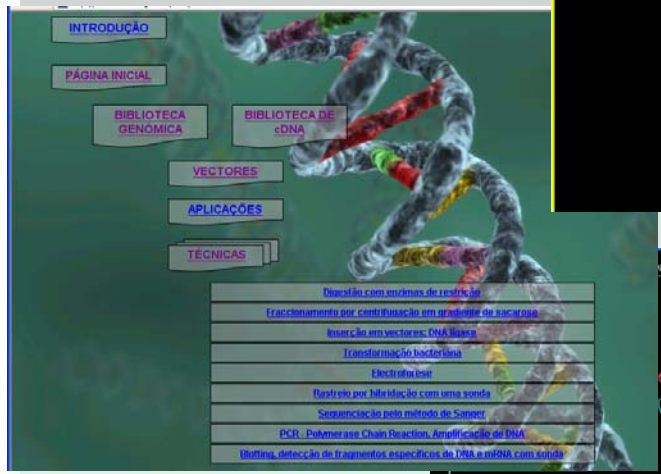
Trabalhos dos alunos

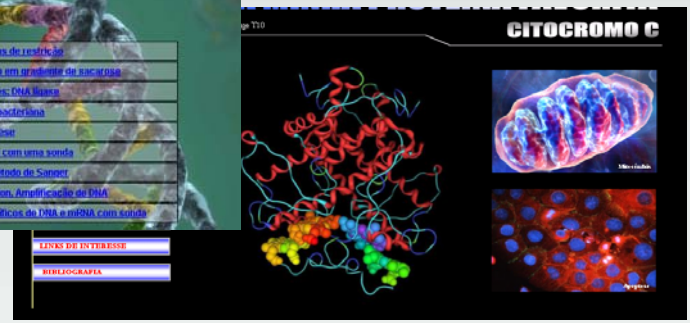
- Monografias
- Seminários
- Trabalhos de investigação
- Páginas web
- Paineis

MONOGRAFIAS

"Artrite Reumatóide" - Anexos
Ana Afonso, Catarina Miranda, Lígia de Sousa, Simão Torres, Tiago Torres
2004/2005

"Construção de plantas transgénicas"
Amanda Nogueira, Ana Castro, Ana Luís, Dia
2004/2005





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Online learning materials (eg. Molecular Cell Biology)

Endereço http://medicina.med.up.pt/bcm/intranet/index.html

Google | Search | 964 blocked | Check | AutoLink | AutoFill | Options | SnagIt

« SAIR

Biologia Celular e Molecular / Intranet
FACULDADE DE MEDICINA DA UNIVERSIDADE DO PORTO

- Calendário
- Horário
- Trabalhos complementares
- Sumários 05/06
- Avisos
- Aprendizagem *on-line*
- Classificações
- Alunos

2006 / 2007

Calendário

Seminários	Teóricas		Práticas
	Aula nº1 - 25 Set. Introdução à disciplina de Biologia Celular e Molecular	28 Set.	25 a 29 Set.
	Aula nº2 - 02 Out. Célula: conceito e evolução. Das células procarióticas às eucarióticas- PPT	05 Out.	02 a 06 Out.
	Aula nº3 - 09 Out. Metodologia de estudo da célula I - Microscopia; Isolamento e cultura celular- PPT	**Aula nº4** - 12 Out. Constituintes químicos da célula I - Pequenas moléculas - PPT	09 a 13 Out. L - Manejo do microscópio e práticas laboratoriais
	Aula nº5 - 16 Out. Constituintes químicos da célula II - Estrutura e função das proteínas: fixação de ligando e transição alostérica. Priões - PPT	**Aula nº6** - 19 Out. Metodologia do estudo da célula II - Fraccionamento celular; análise química; localização de moléculas - PPT	16 a 20 Out. M - Tipos de células
26 Out. *Polineuropatia amiloidótica familiar* Mª João Saraiva	**Aula nº7** - 23 Out. DNA: Estrutura e replicação - PPT	**Aula nº8** - 26 Out. DNA: Reparação, Recombinação e Transposição - PPT	23 Out. a 03 Nov. M - técnicas especializadas de microscopia
02 Nov. *O HPV, as vacinas e o cancro do colo do útero – da investigação à clínica* Rui Medeiros	**Aula nº9** - 30 Out. Transcrição: RNA mensageiro - PPT	**Aula nº10** - 02 Nov. Transcrição: RNA ribossomal e de transferência - PPT	L - Preparação de material biológico para Microscopia
	Aula nº11 - 06 Nov. Estrutura e funcionamento do núcleo. Transporte nuclear e	**Aula nº12** - 09 Nov. Tradução: Síntese de proteínas - PPT	06 a 17 Nov. M - Núcleo

Biologia Celular e Molecular - Microsoft Internet Explo

Ficheiro Editar Ver Favoritos Ferramentas Ajuda

Retroceder | Procurar

Endereço http://medicina.med.up.pt/bcm/intranet/sumarios0607/bc

Google | Search

2006/ 2007

Aula Prática 1L
Manejo do microscópio e práticas laborator

1. **Estrutura do microscópio**
   Estrutura óptica e estrutura mecânica do microscópio d
2. **Observação de preparações a fresco**
   Células da mucosa oral.
3. **Coloração e observação de um esfregaço sanguíneo**
   Efectuar e secar o esfregaço. Método de coloração:
   Segurar a lâmina com a pinça-suporte e depositar r
   esfregaço - 2 min. Depositar n gotas de água destilad
   5 min. Lavar na torneira, secar e observar estruturas ba
4. **Observação de preparações definitivas**
   - Mórulas de ouriço do mar
   - Pâncreas exócrino (gato) – coloração H+E
   - Esfregaço de sangue – corante de Wright

   com objectivas 10x, 40x e 100 x (imersão) no microscó
   das melhores condições de iluminação e manejo do di
5. **Determinação da ampliação e do limite de resolução.**

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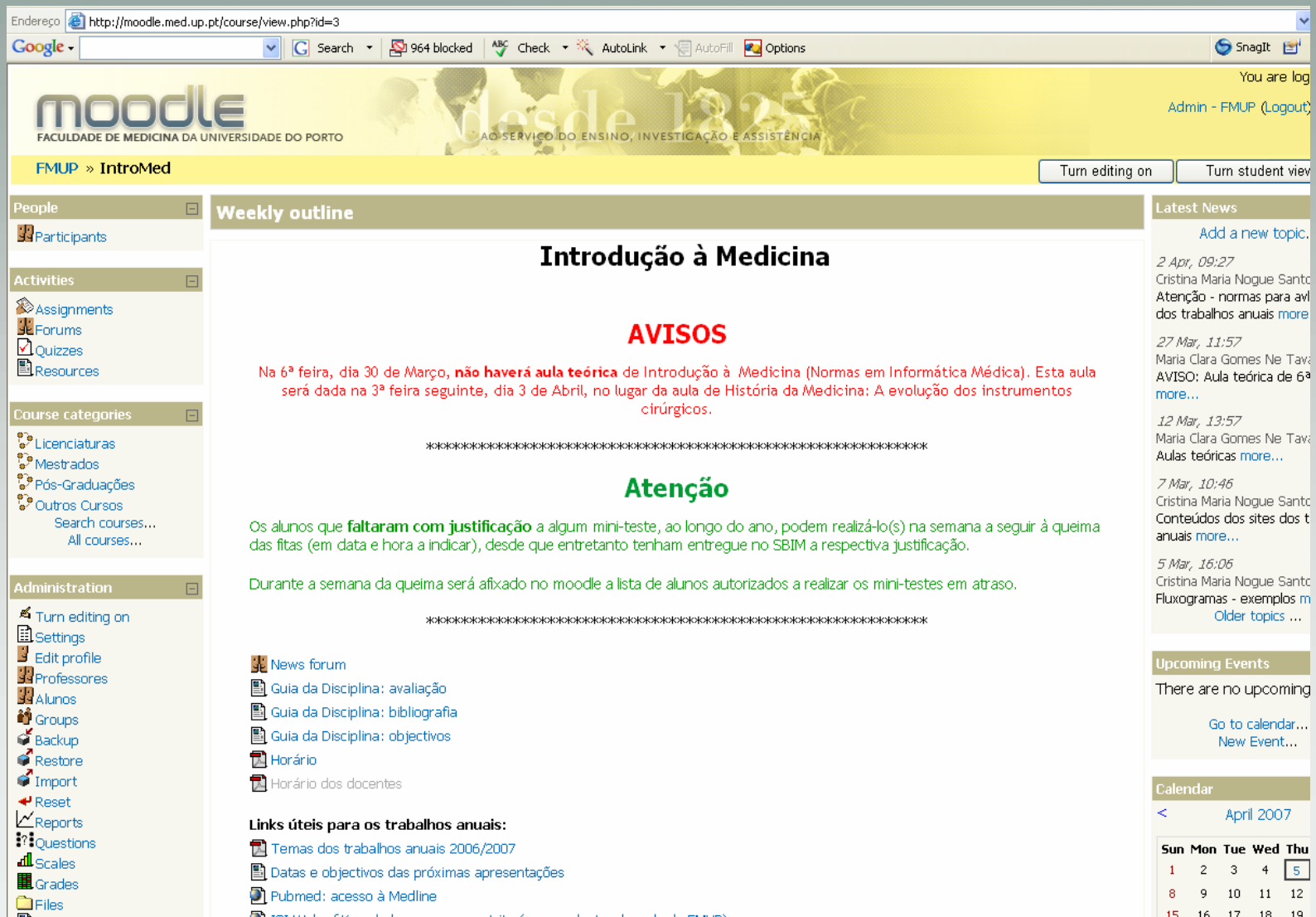
E-learning platform (eg. Introduction to Medicine)



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Aprendizagem on-line

Biologia Celular e Molecular

Aviso

As questões colocadas na aprendizagem on-line de Biologia Celular e Molecular só serão respondidas se forem enviadas até **30 de Janeiro**

A actividade normal será retomada a partir de 5 de Fevereiro (2º semestre)

FAQ Pesquisar Membros Grupos Registar
Perfil Ligar e ver Mensagens Privadas Entrar

Moderador: BCM

Utilizadores a ler este fórum: Nenhum

novotópico

Seleccionar todos os tópicos como lidos

Tópicos	Respostas	Autor	Vistos	Última Mensagem
Inamovível: Como participar no fórum de Biologia Celular e Molecular	3	mnunes	1136	Qua Jan 24, 2007 4:00 pm med06151
Metodologia do estudo da célula	9	Deolinda Lima	2221	Sáb Jan 27, 2007 5:20 pm med06004
Constituintes químicos da célula	1	Deolinda Lima	1175	Seg Jan 29, 2007 6:51 pm med06004
Estrutura das macromoléculas biológicas: DNA, RNA, proteínas [Ir para a página: 1, 2]	19	Deolinda Lima	2938	Seg Jan 29, 2007 11:45 pm med06004
Replicação, reparação e recombinação do DNA	14	Deolinda Lima	2353	Sáb Jan 27, 2007 5:14 pm med06004
Síntese e processamento de RNA [Ir para a página: 1, 2]	28	Deolinda Lim		

Síntese e processamento de RNA

Ir para a página 1, 2 Seguinte

-> Biologia Celular e Molecular

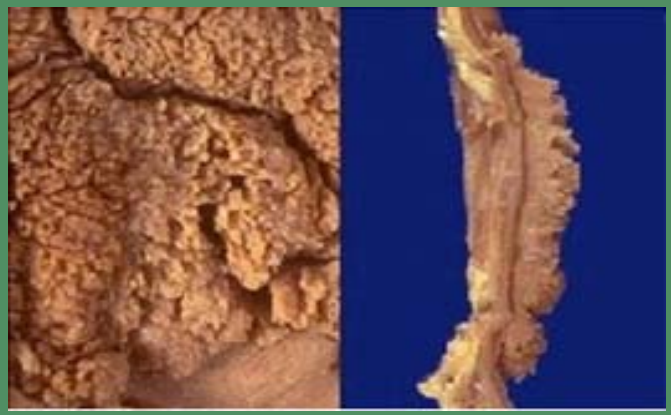
Ver mensagem anterior :: Ver mensag

Autor	Mensagem
m04130 Registo: 19 Fev 2005 Mensagens: 14	Colocada: Sáb Mar 05, 2005 10:57 am Assunto: Síntese e processamento de RNA O que são sequências de consenso? RESPOSTA O termo "sequências de consenso" aplica-se a sequências de nucleotídeos (DNA ou RNA) e de aminoácidos. T DNA e o processo de transcrição como exemplo, o que sucede é que um determinado conjunto de bases resp uma determinada função (por exemplo, promover a transcrição - promotor) varia bastante na forma como os se sucedem, embora uma determinada sequência seja muto mais frequente. Assim, dos quatro possíveis nuc a posição -35, um deles ocorre com muito maior frequência, o mesmo sucedendo para a posição -34, -33, etc sequências de consenso são as que ocorrem com maior frequência, e que portanto, reflectem, em média, a s correspondente a uma determinada função. As variações às sequências de consenso refletem maior ou menc realização dessa função, como, para o exemplo escolhido, o número de iniciações de transcrição por unidade este valor é definido para cada gene (maior para genes que codificam proteínas frequente; menor para gene codificam proteínas raras) em função das variações à sequência de consenso.
Voltar acima	perfil mp

“Quizzes” semanais

Adenoma e Carcinoma do colon

Pergunta 1. Aspecto macroscópico de extensa lesão do recto de um homem de 55 anos. Qual o diagnóstico mais provável?



A. Hiperplasia da mucosa rectal

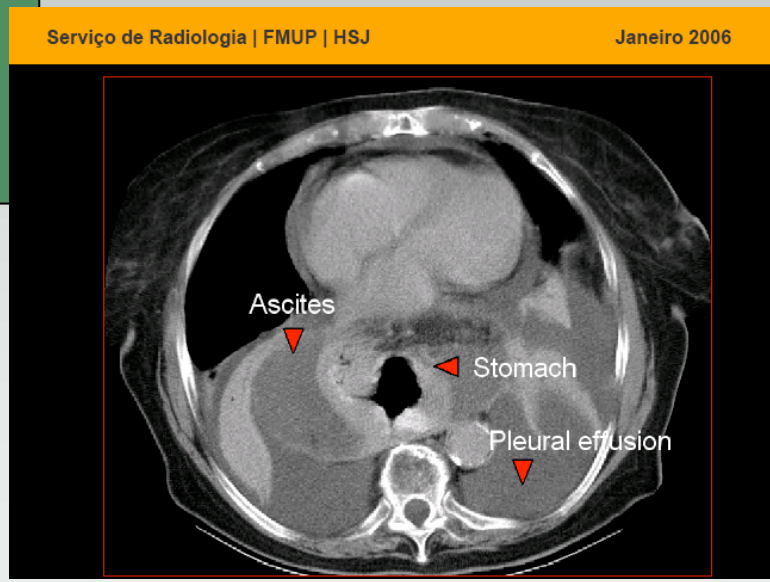
B. Hipertrofia das pregas da mucosa rectal

C. Úlcera rectal

D. Rectite crónica

E. Adenoma Viloso

Serviço de Anatomia Patológica



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CSB
CENTRO DE SIMULAÇÃO BIOMÉDICA

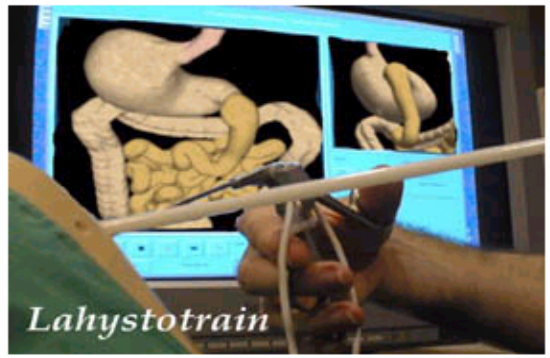
Em parceria com INEB
INSTITUTO DE ENGENHARIA BIOMÉDICA

Endereço http://www.ecotec.com/mes/projects/lahystotrain.html Ir para Hiperligações

i*m europe | home | projects | back | search

EDUCATIONAL MULTIMEDIA TASK FORCE

DG XIII Telematics and Applications Programme
DG XXII Leonardo da Vinci Programme



LAHYSTOTRAIN

Integration of Virtual Environments and Intelligent Training Systems for Laparoscopy/Hysteroscopy Surgery Training

E-learning platform - online evaluation

Endereço http://moodle.med.up.pt/mod/quiz/attempt.php?id=474

Google Search 964 blocked Check AutoLink AutoFill Options SnagIt

Preview 9º Miniteste - Base de Dados

Start again

Time Remaining
0:04:10

Marks: 1

Escolha a opção que completa a frase correctamente.

Um campo chave externa é ...

Choose one answer.

- a. Um campo numérico cujo valor nunca se repete
- b. Um campo cujo valor se pode repetir
- c. Um campo numérico cujo valor se pode repetir
- d. Um campo cujo valor nunca se repete

2

Marks: 1

Dado o seguinte esquema e de acordo com os dados nele existentes quantos doentes com idade inferior a 20 anos foram internados desde o inicio de 2006 no serviço de Pneumologia?

Nº Doente	Data Nascimento	Morada	Nome
123456	20/06/1998	Rua	X
654321	20/06/2000	Avenida	Y
6789	20/06/1999	Rua	Z

Nº internamento	Data Entrada	Nº Doente	Serviço
4	05/03/2006	654321	3
64	07/01/2006	123456	3
33	05/02/2006	6789	6

Servico	Nome

Evaluation of impact on the learning process

Quality of the material available:
high quality learning contents

Pages most frequently visited:
lecture presentations, learning modules-seminars; students deliverables

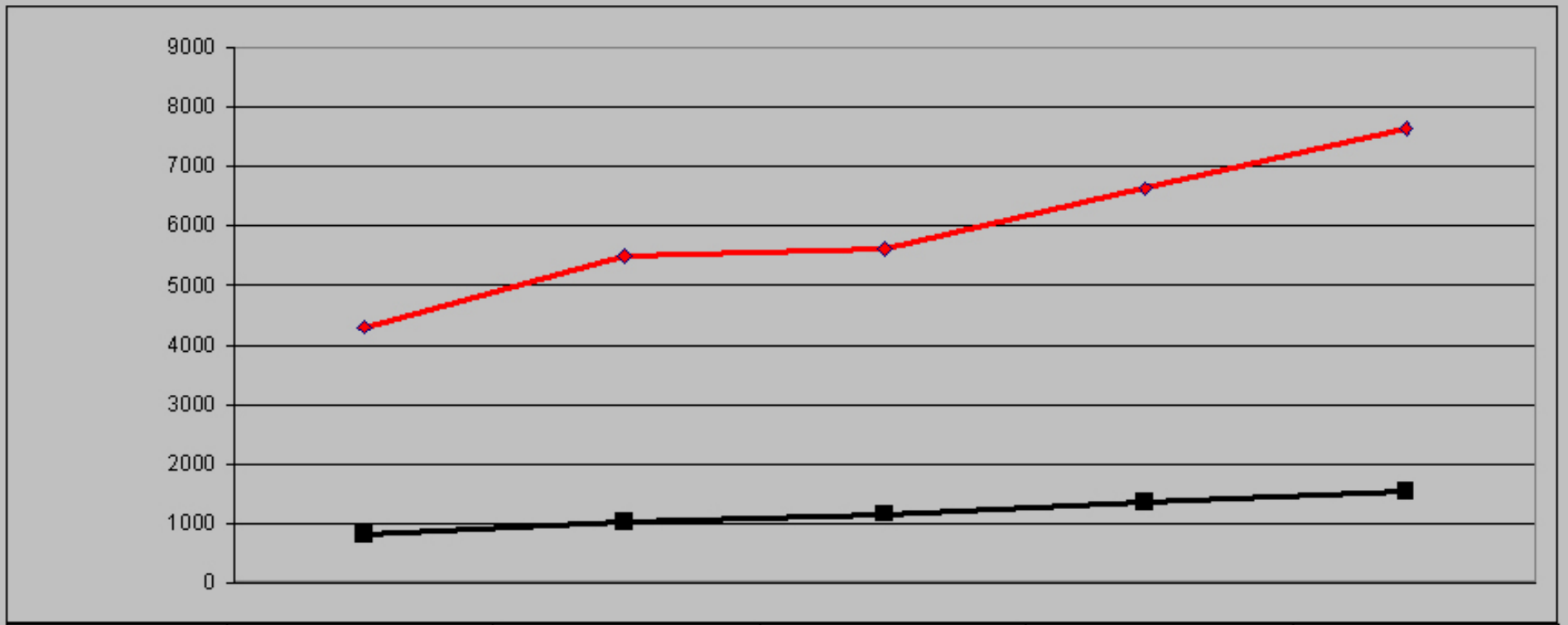
Correlation between student access to the web site and final grade:
significant positive correlation although a causal relationship could not be inferred

In the future

- On-line labs
- Clinical Simulation
  - Interview teaching tool
  - On-line physical exam teaching

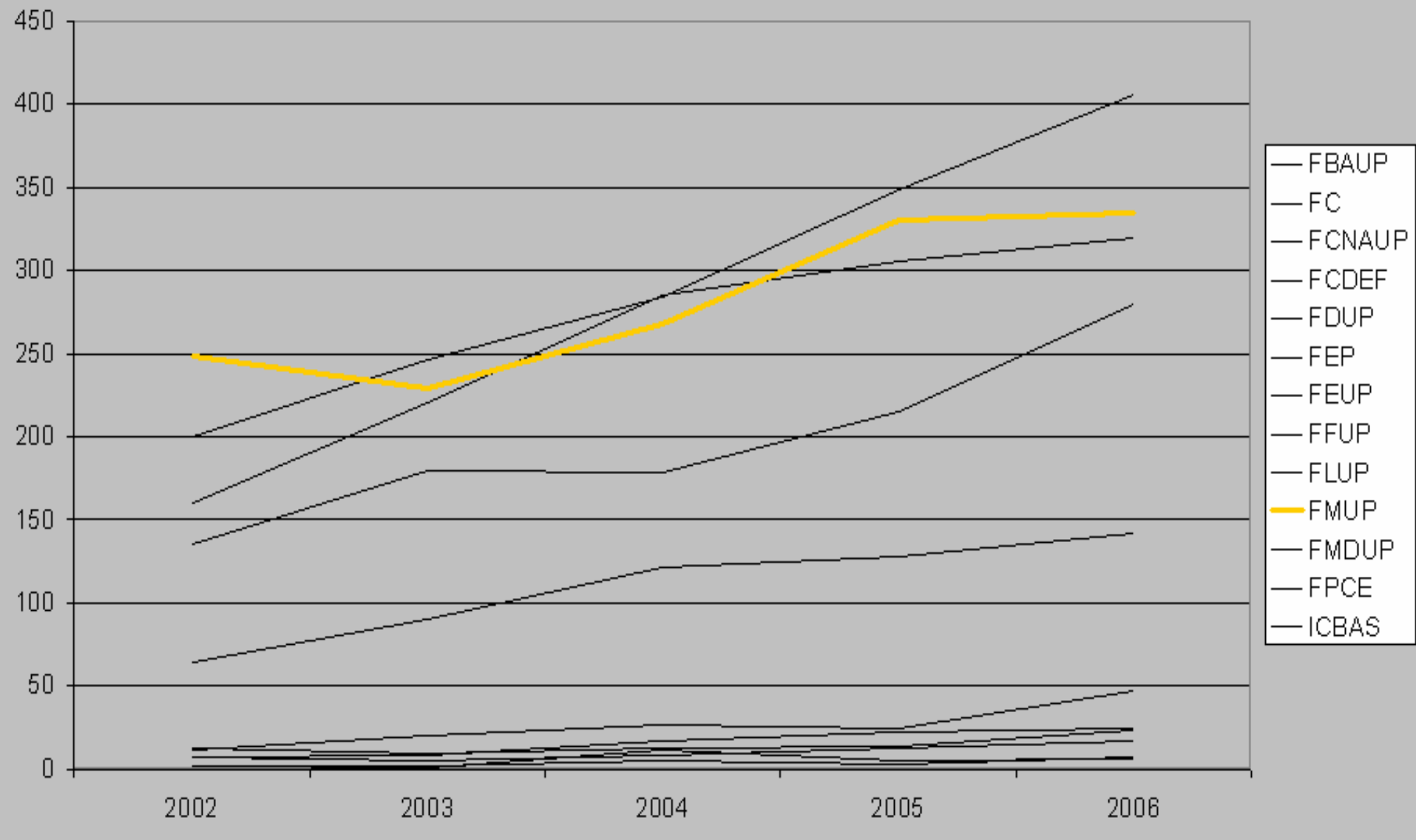
Papers ISI-WoS 2002-2006

Portugal / Univ Porto

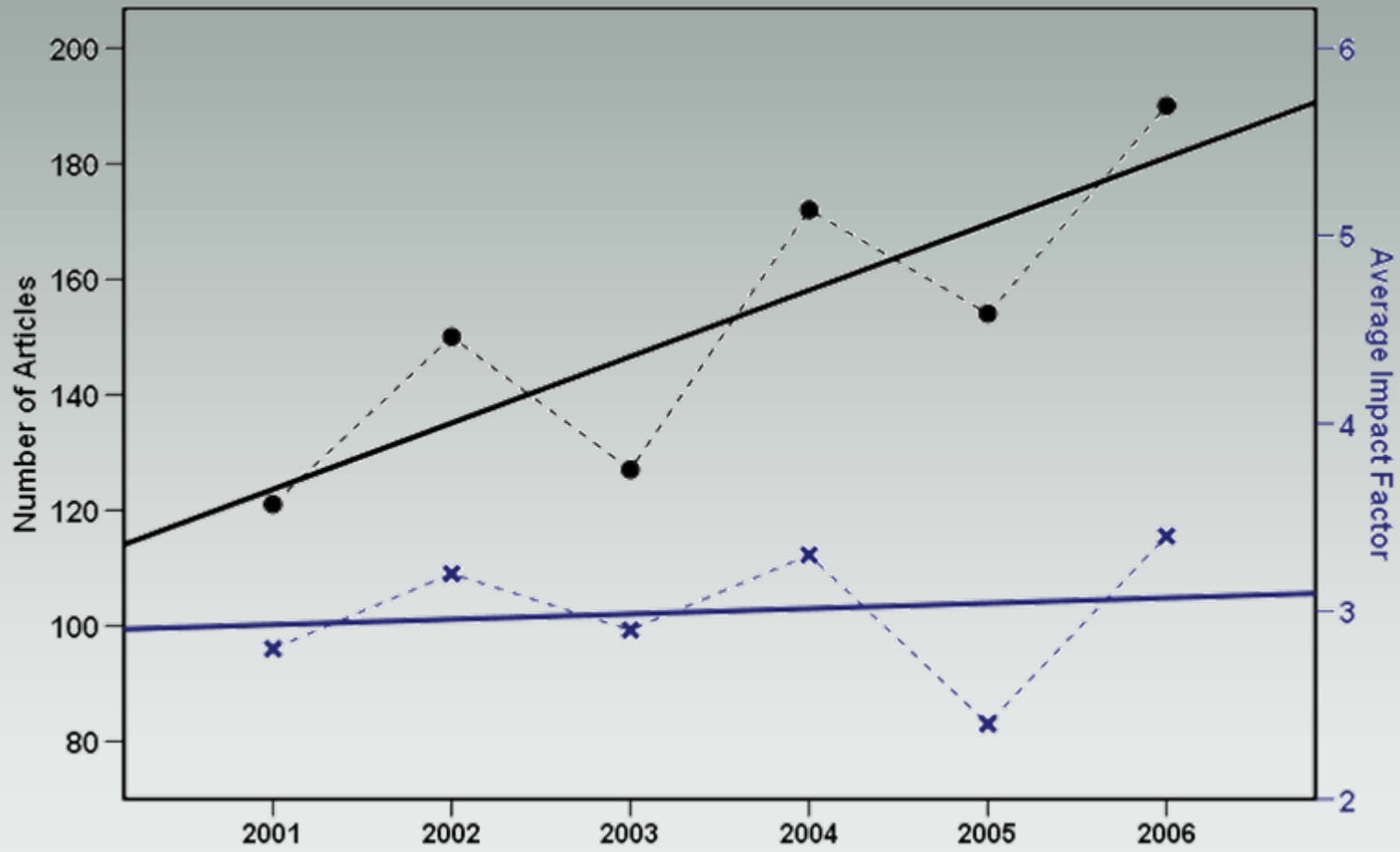


Ano	2002	2003	2004	2005	2006
Portugal	4303	5498	5618	6628	7643
UP	828	1023	1169	1369	1553

Papers ISI-WoS 2002-2006

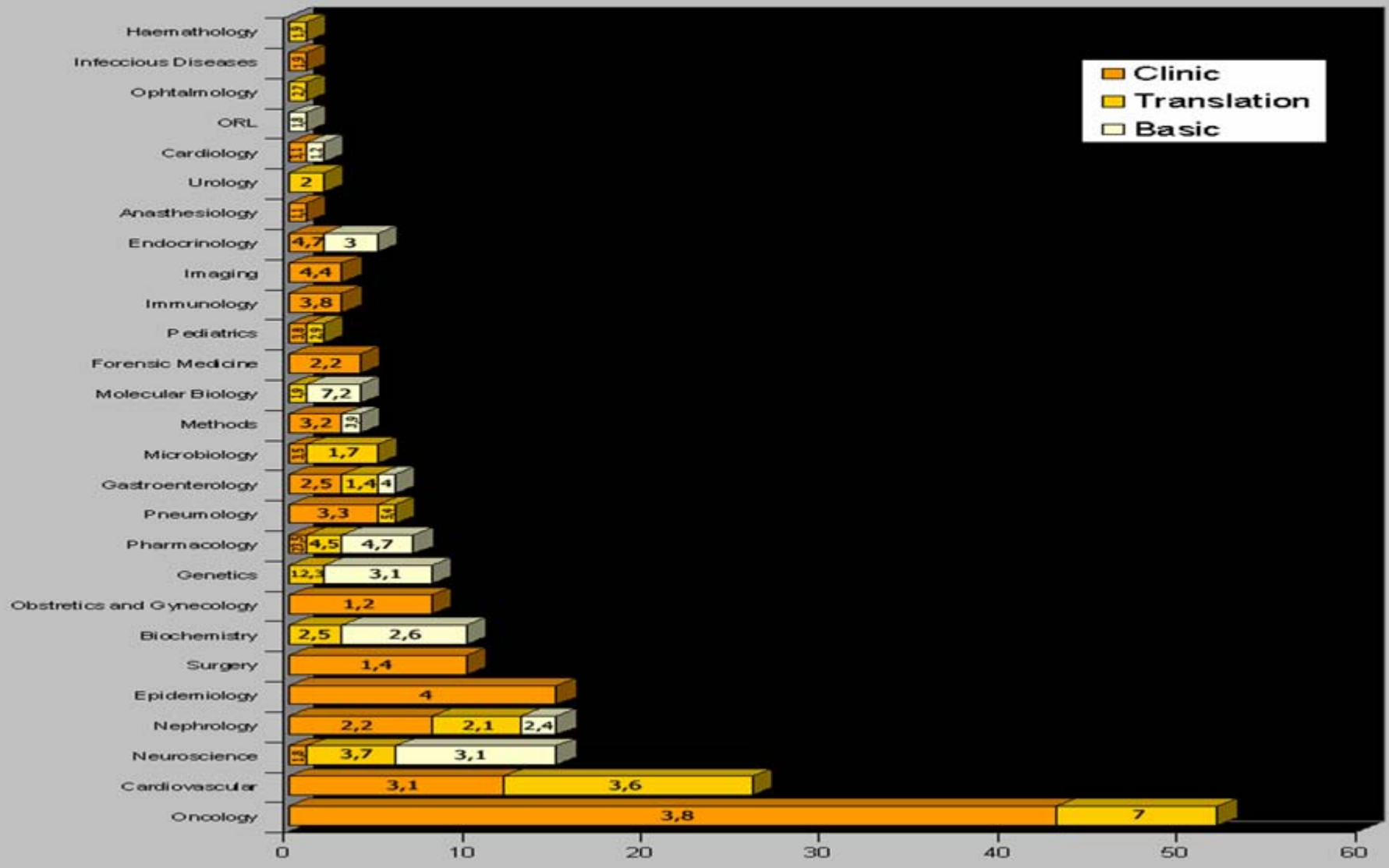


Full Papers ISI-WoS 2001-2006



Full Papers ISI-WoS **2006** by department

Full Papers ISI-WoS 2006



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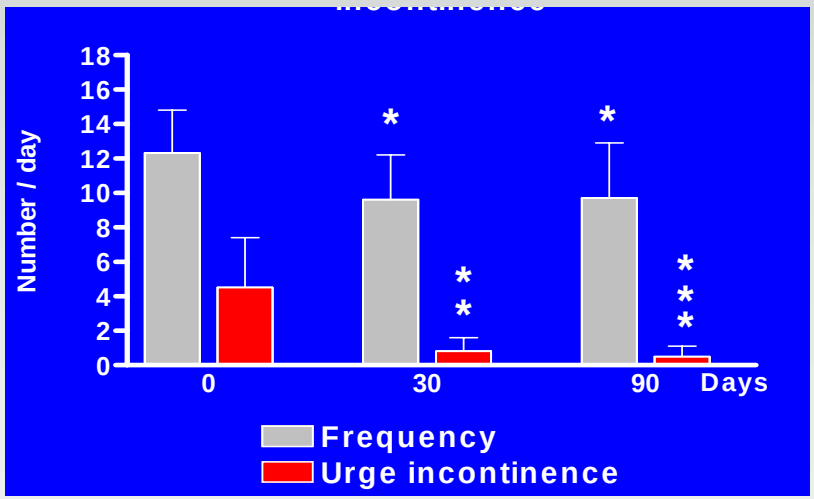
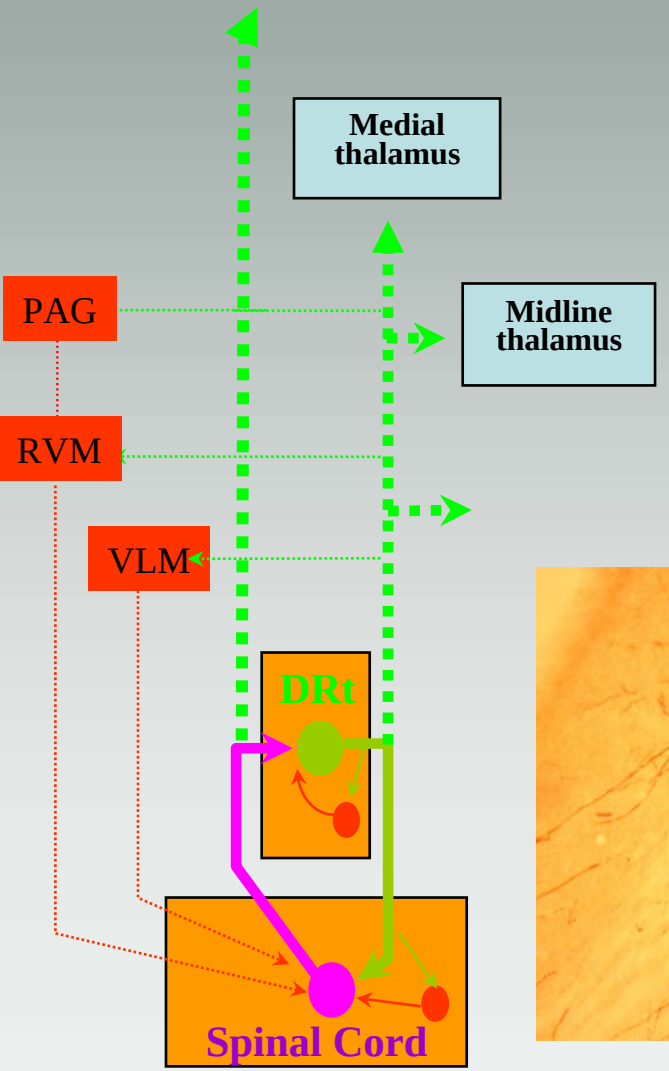
Vanilloids in Pain Therapy

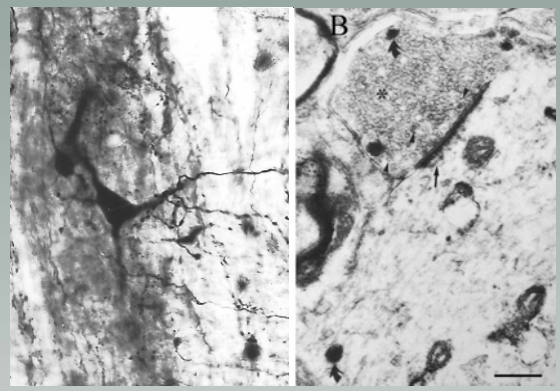
Vanilloid Receptors (TRPV1) in the urinary bladder

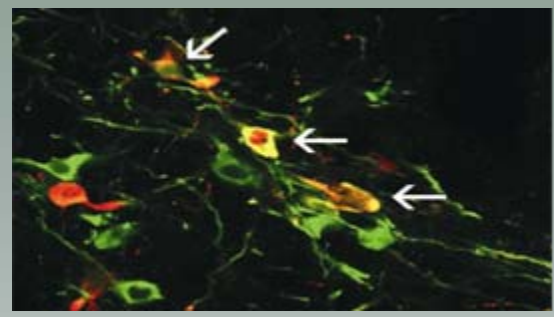


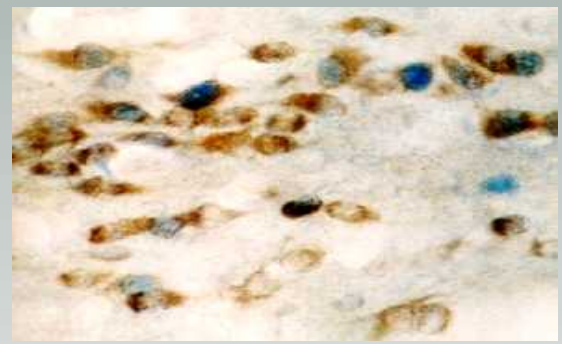
Francisco Cruz
António Avelino
Paulo Dinis
Ana Charrua
Célia Cruz
Carlos Silva

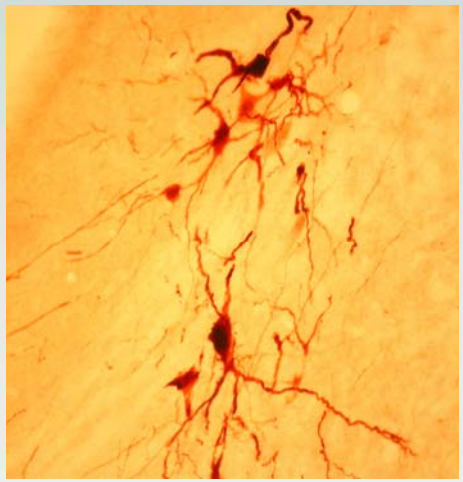
Gene Therapy for Pain Control

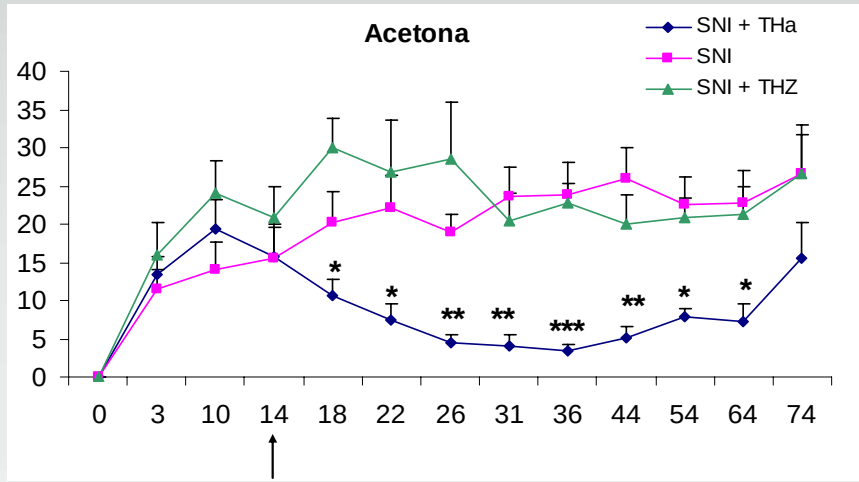












IBMC INEB
Laboratório Associado . Associate Laboratory

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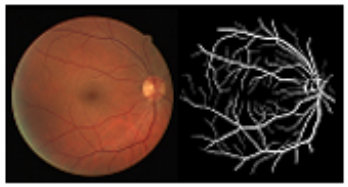
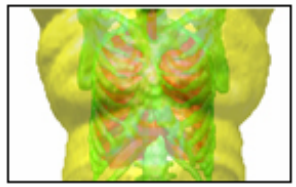
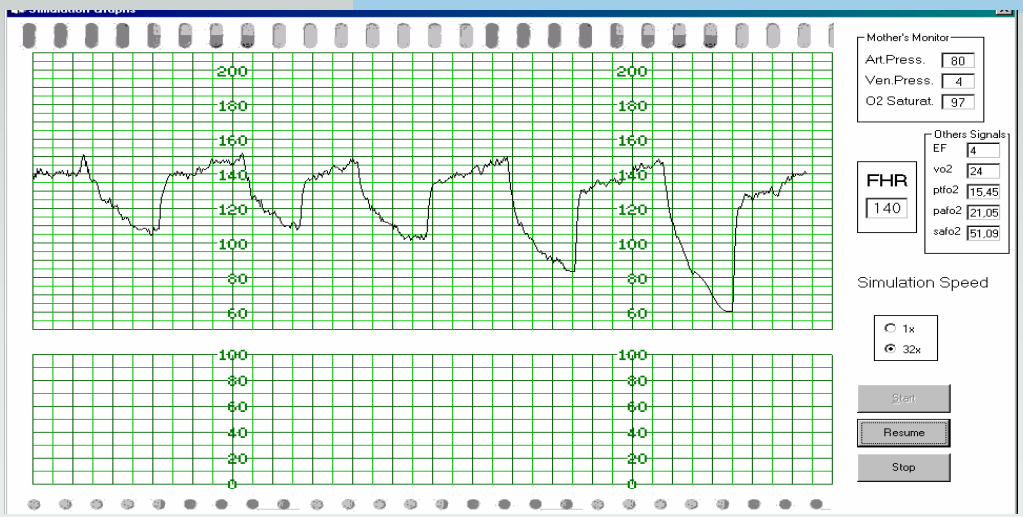
Signal & Image Laboratory


- Programme 1 - Advanced classification methods (Joaquim Marques de Sá)
- Programme 2 - Modelling and simulation (Willem van Meurs)
- Programme 3 - Clinical diagnosis ans signal processing (João Bernardes)

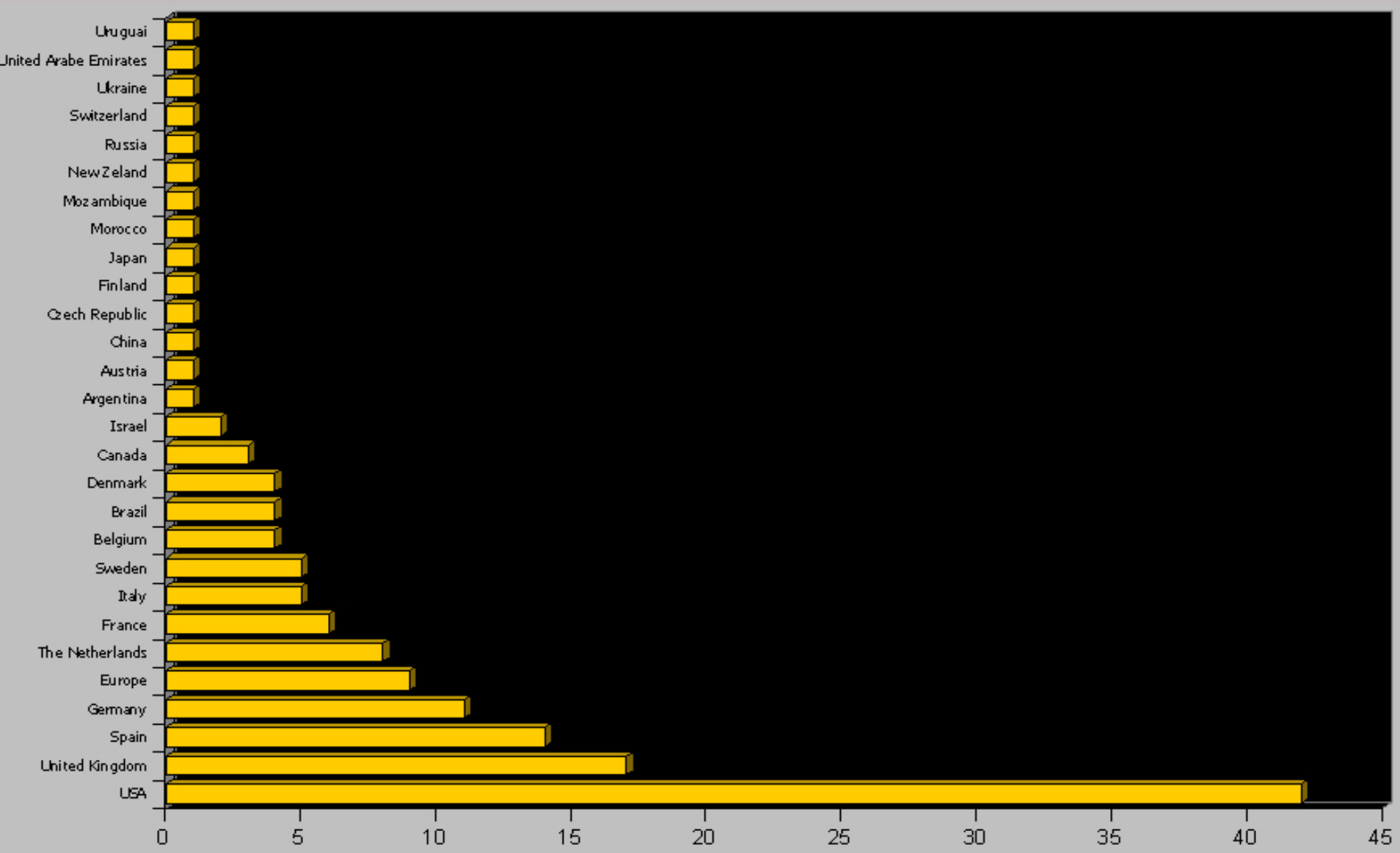


Sá-Couto P, van Meurs WL, Bernardes JF, et al. Mathematical model for educational simulation of the oxygen delivery to the fetus. Cont Eng Practice 2002

Obstetric simulator

Neonatal simulator

International Cooperation



Research at the undergraduate level

- Participation in research projects while attending the various modules
- Being part of a research team in a longitudinal module of the medical course
- Applying to a research project granted by Univ. Porto / Private Foundation
- Apply to the European “Standard Research Exchange Project” of the IFMSA
- Regular scientific workshops (FMUP students organization)
- YES Meeting – **Y**oung **E**uropean **S**cientists Meeting (FMUP students organization)

ICBAS

INSTITUTO DE CIÊNCIAS BIOMÉDICAS ABEL SALAZAR
UNIVERSIDADE DO PORTO

A school of applied biology / education and research

Established in August 1975

University degrees in different subjects
- graduate programme
- a post-graduate programme

Joint degrees with other faculties

Solid education and research in life sciences

Promoting health sciences

ICBAS

Degrees offered from 2007 / 2008

1st cycle (3 years)	2nd cycle (2 years)	Integrated Master (5 years)
Marine Sciences	Marine Sciences	Medicine (+ 1 year)
Biochemistry	Biochemmistry	Veterinary Medicine
	Environ.Toxicology	Bioengeneering
	Public Health *	
	Nursing	
	Forensic Medicine	

ICBAS

Students distribution

Undergraduate students	±1600
Postgraduate students	
Master degree	419
PhD students	245
Total Students	2 264

ICBAS

Degree in Medicine

with the

Hospital de Santo António

And others such as

- Oncology Institute (IPO)
- Hospital Magalhães Lemos
- Hospital de V.N.Gaia

ICBAS

The Hospital de Santo António

Budget	215 millions Euros
Medical doctors	755 (including internships)
Beds	615
Inpatient admissions	24 500
Inpatient surgery	12 500
Outpatient surgery	10 000
Outpatients	375 000
Emergency patients	130 000

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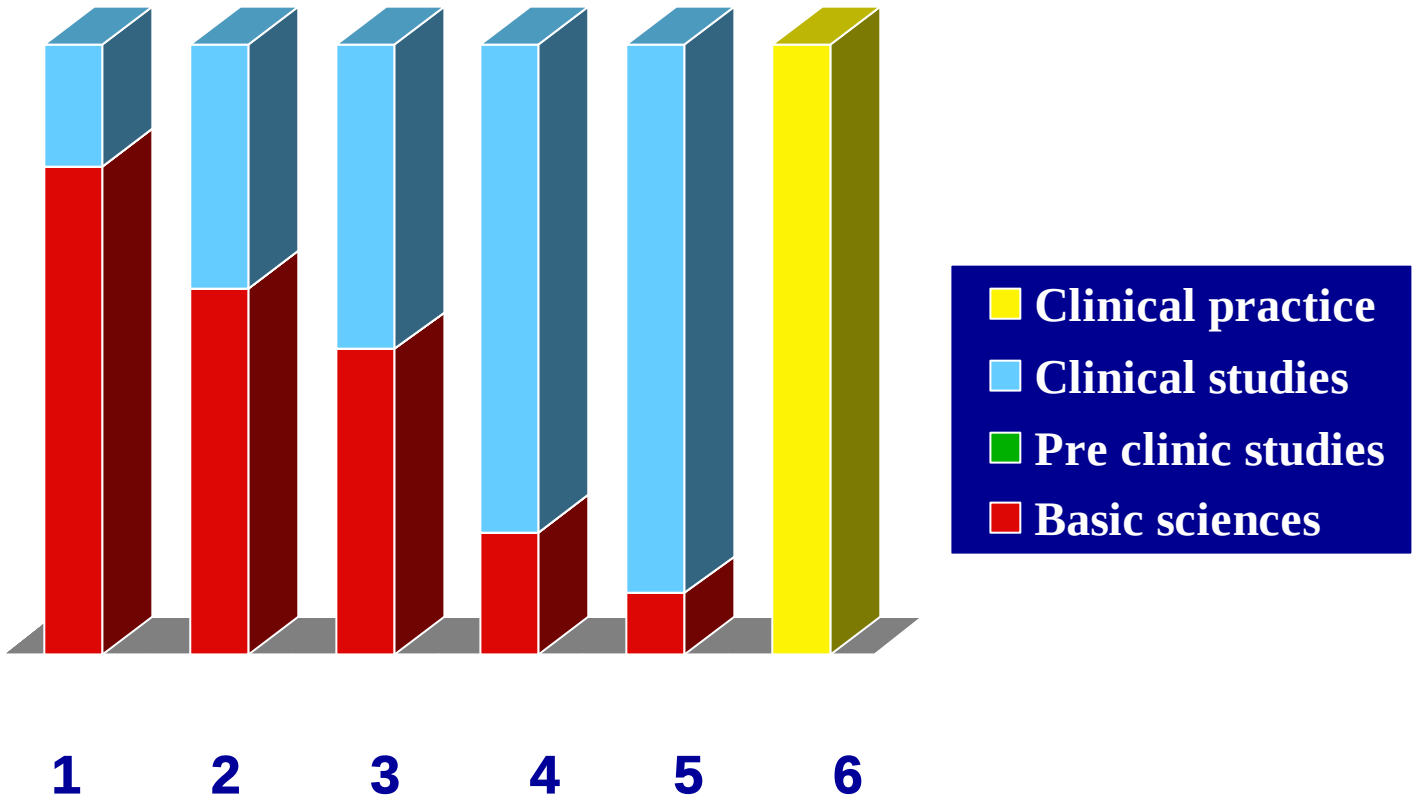
Subject distribution along the medical course



ICBAS

Staff

- involved in education and research (experimental) :

  > working at the Institute facilities

  > woking in partners research institutes such as :

  - Institute for Molecular and Celular Biology (IBMC)
  - Institute for Pathology and Moleculae Immunology (IPATIMUP)
  - Marine Research Center (CIMAR)

- involved in clinical education and research at the Hospital Santo António

ICBAS

RESEARCH ACTIVITIES AND TRAINING OF PhD STUDENTS

In 2006

- members of ICBAS are authors of more than 200 research articles in peer review journals

- 245 students are registered as PhD students

ICBAS

Ongoing and new PhD programmes

- - GABBA – graduate programme in basic and applied biology
- - Genetics and molecular pathology
- - Oncology and molecular medicine
- - Neurosciences
- - Bioengineering *

The PhD programmes are co-organised with the Faculty of Medicine, IPATIMUP and IBMC and INEB

* With the Faculty of Engineering

ICBAS

Improving the facillites >>>> **NEW BUILDING**

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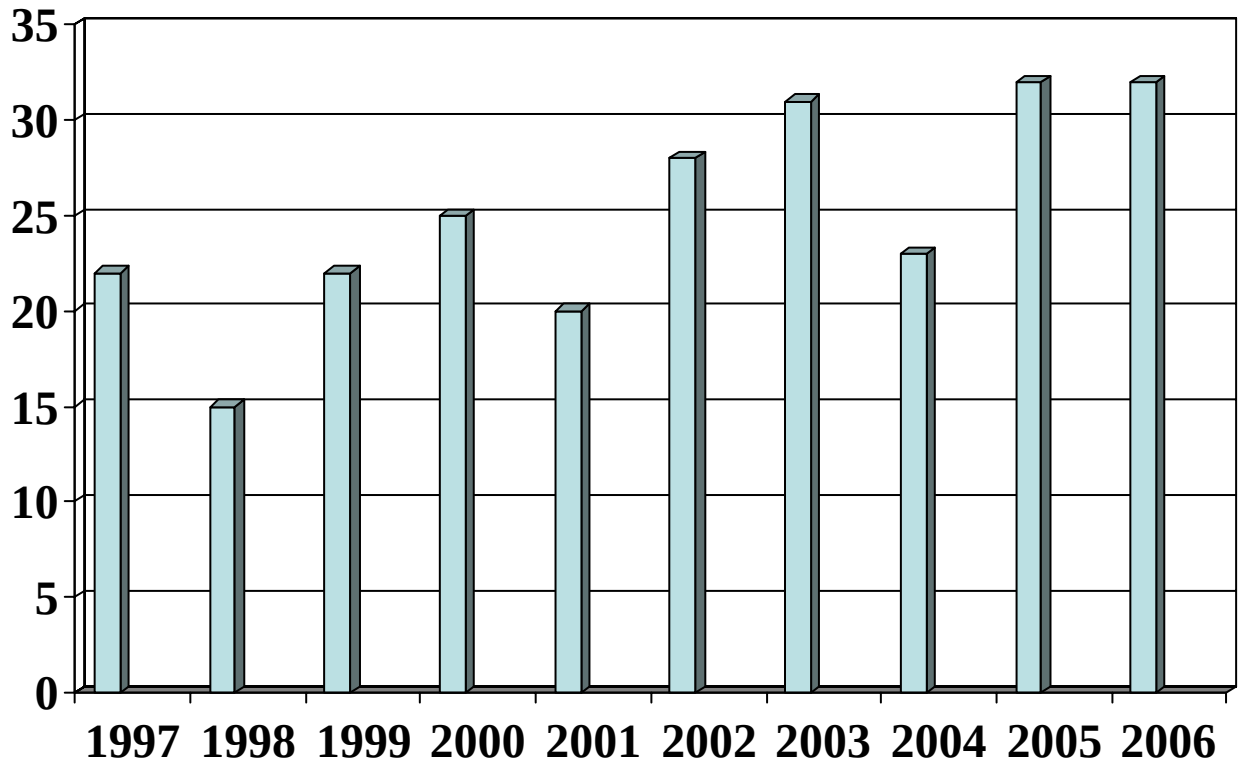
- Undergraduate students ±1600
- Postgraduate students
  - Master degree 419
  - PhD students 283

- Total Students ±2300

(from 18 countries)

PhD Graduations



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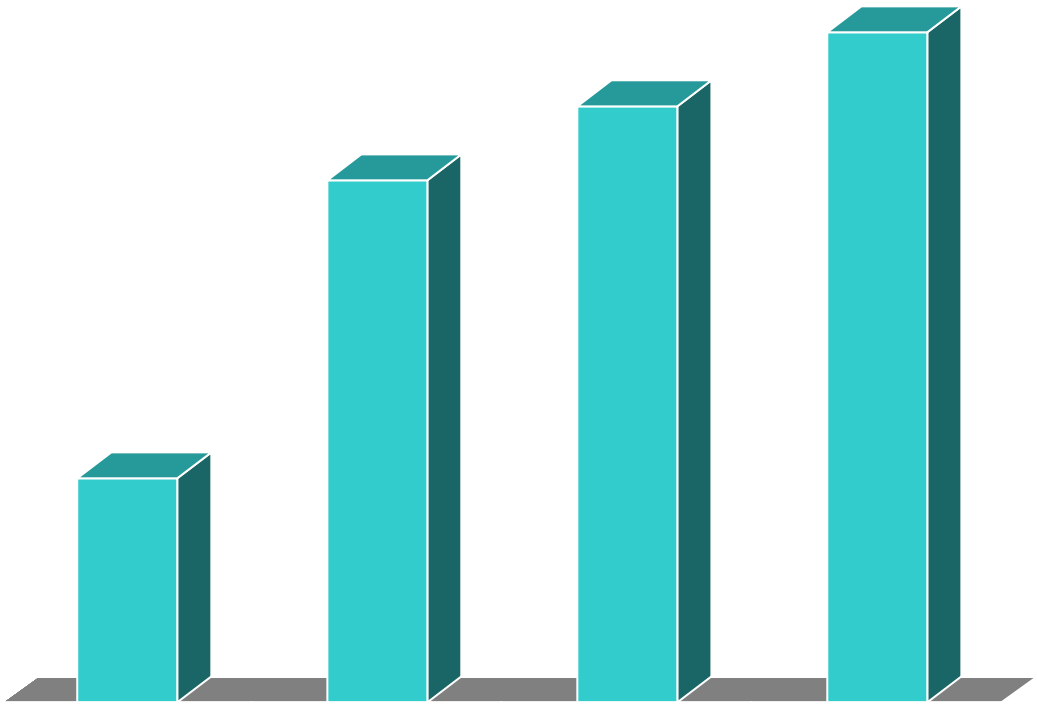
ICBAS UP



- Funding of the activities of the faculty (1)
  - Contribution of the government for an annual fixed number of students
  - Fees paid by students who have not qualified for state commisioned positions
  - Competitive research funding from the Portuguese Research Foundation or European grants
  - Work on contract basis

- Funding of the activities of the faculty (2)
  - The total funds allocated to de Abel Salazar Institute for the Biomedical Sciences
  - about 13 millions Euros

    (including donations)

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HGSA - UP

- Budget 215 millions Euros
- Medical doctors 755 (including internships)
- Beds 615
- Inpatient admissions 24 500
- Inpatient surgery 12 500
- Outpatient surgery 10 000
- Outpatients 375 000
- Emergency patients 130 000

- Why are interactions between university and health care difficult?
  - Different cultures
  - Lack of communication
  - Health care R&D is an academic affair
  - Achievement in R&D is not rewarded by hospitals.

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ICBAS - HGSA

- At government level does not exist a strong link between their departments of health and department of education.
- Professionaly we see medical education as a continuum, begining with the undergraduate education and continuing through professional development until the end of our professional lives.

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- Unfortunately the many players involved in medical education are not well coordinated

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ICBAS – HGSA

drivers for change

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drivers for change (1)

- Service – Pressures to reduce costs of clinical care, provide care more locally. Pressures to demonstrate quality of care

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drivers for change (2)

- Research – pressures to improve competitiveness, linked to institutional income. And pressures from the health system for a different kind of research

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drivers for change (3)

- Education – pressures to reform medical education, increase patient contact, broaden experience of illness and its context

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drivers for change (4)

- The way the medical school, university and health system govern their shared interests has to be rethought according to the changing context. The traditional model of liaison is increasingly ineffective as a form of governance

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Cooperation agreement

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Cooperation agreement

- Joint management, in this cooperation agreement, is more fluid than a merger implies and is not necessarily about integrating structures, which might be better thought of as joined management of teaching, research and service.

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Cooperation agreement

- Research, service and teaching should all be complementary but instead compete. The reason they compete is that usually the medical school has responsability for research while the teaching hospital is held accountable for the quality of clinical care.

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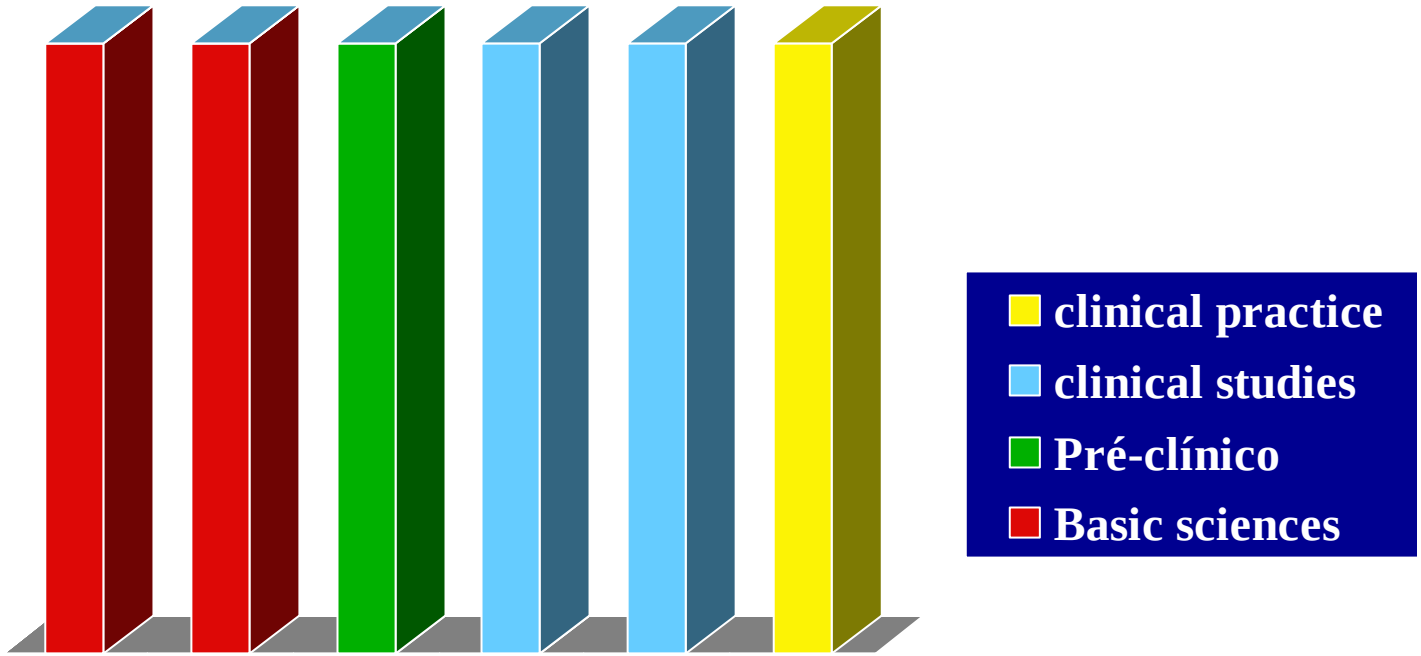

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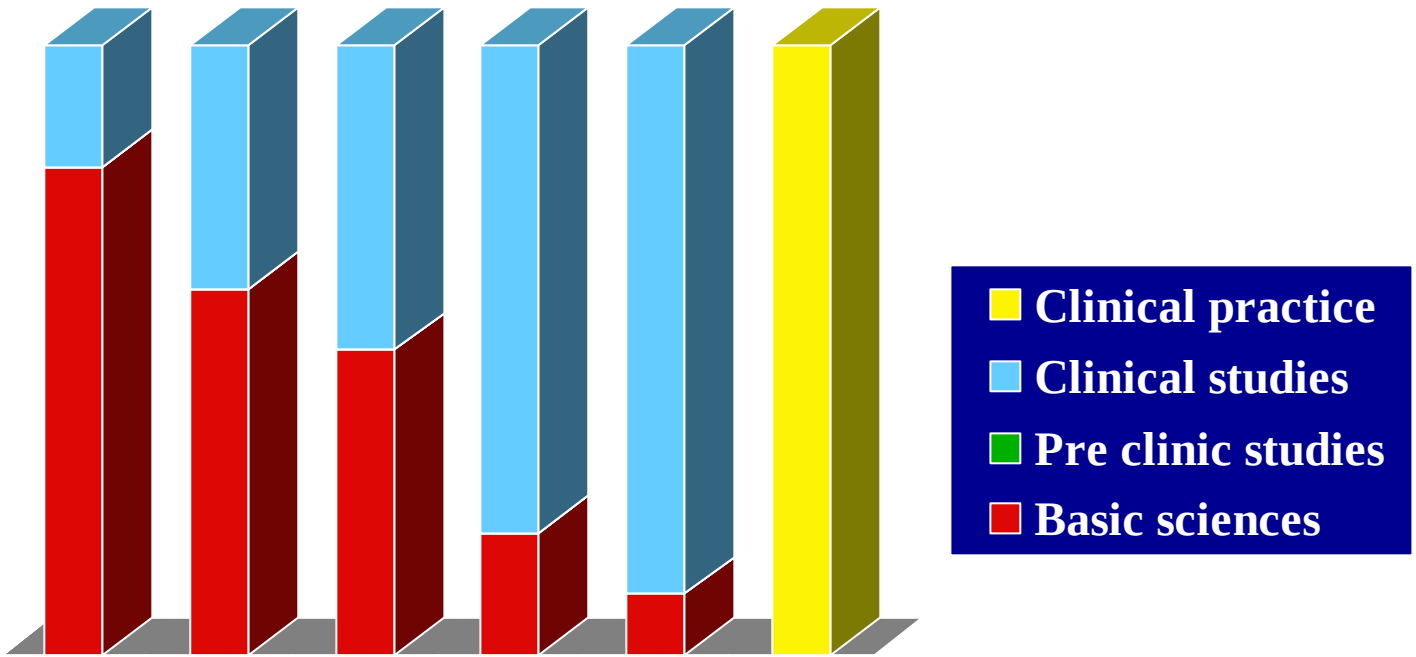

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UNIVERSIDADE DO PORTO

ICBAS – HGSA

Cooperation agreement

- Medical school Management Board
  - Dean
  - Head for scientific affairs
  - Head of teaching affairs
  - Administrative director
- Hospital Management board
  - Administrative director (CEO)
  - Medical director
  - Teaching director

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UNIVERSIDADE DO PORTO

ICBAS – HGSA

Cooperation agreement

- The Hospital Teaching Director mediates between the Hospital CEO and the Dean. This has not removed the tensions but has to an extent mitigated them. This model was adopted from the one that exits in the Johns Hopkins University, Baltimore and the Academic Medical Centre at the University of Amsterdam. In these institutions, as in ICBAS-HGSA, service, research and teaching all retain their individual balance through integrating their functions.

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ICBAS – HGSA

Cooperation agreement

- We assume the death of the triple threat leader
  - The medical leader, usually a professor and a head of an academic department who was outstanding at clinical practice, teaching and research no longer exists, if indeed he ever existed

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ICBAS - HGSA

- Clinical academic staff recruitment
  - Clinical leaders
  - Leaders of the profession
  - Recruitment
  - Retention
  - Role models?
  - International links
  - Agents for change?

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UNIVERSIDADE DO PORTO

ICBAS – HGSA

Cooperation agreement

- Clinical academic staff recruitment
  - The head of the clinic in the Hospital is not necessarily the head of teaching in the subjects related to that area
  - Every medical doctor has an obligation to take part in teaching either on pre-graduate level or on post-graduate level

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UNIVERSIDADE DO PORTO

ICBAS - HGSA

- Strategies for university and health care interactions
  - Create forum for informal communication
  - Development of common R&D strategy
  - Focus on larger program areas and integration of quality assessment

- Strategies for university and health care interactions
  - Stimulate academic career opportunities in health care
  - Improve scientific status of clinical R&D
  - Stimulate interactions between pre-clinical and clinical research

IBMC INEB

Laboratório Associado . Associate Laboratory

A partnership since 2001

A multidisciplinary research institution

IBMC INEB
Laboratório Associado . Associate Laboratory

The Institute for Molecular and Cell Biology (IBMC)
The Institute for Biomedical Engineering (INEB)
Universidade do Porto

Research institutions on Life Sciences, Health Sciences and Bioengineering

Non-profit associations
Public interest

IBMC INEB
Laboratório Associado . Associate Laboratory

The non-profit associations includes:

Universidade do Porto
- Faculdade de Ciências
- Faculdade de Engenharia
- Faculdade de Farmácia
- Faculdade de Medicina
- Instituto de Ciências Biomédicas Abel Salazar

Hospital Geral de Santo António
Hospital de S. João
Instituto de Genética Médica Jacinto de Magalhães
Instituto Nacional de Saúde Dr. Ricardo Jorge
Comissão de Coordenação e Desenvolvimento Regional do Norte
Câmara Municipal do Porto
FLAD (Fundação Luso-Americana para o Desenvolvimento)
BIAL

Member: UNESCO - Molecular and Cell Biology Network

A. Salgado – Ortopedia, Lda.
Centro Hospitalar de Vila Nova de Gaia *
Centro de Performance Humana
Centro de Reabilitação Profissional de Gaia (CRPG)
Comissão de Coordenação e Desenvolvimento Regional Norte *
Faculdade de Engenharia da Universidade do Porto (FEUP)
Hospital Geral de Santo António *
Hospital de São João *
Instituto Português de Oncologia (IPO)
Instituto Português do Sangue (IPS)
Serviço de Utilização Comum dos Hospitais (SUCH) *
Universidade do Porto *

* Founding Members

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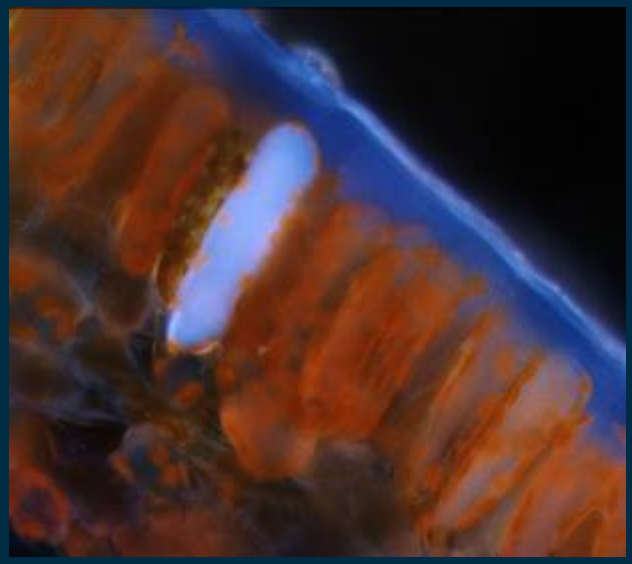

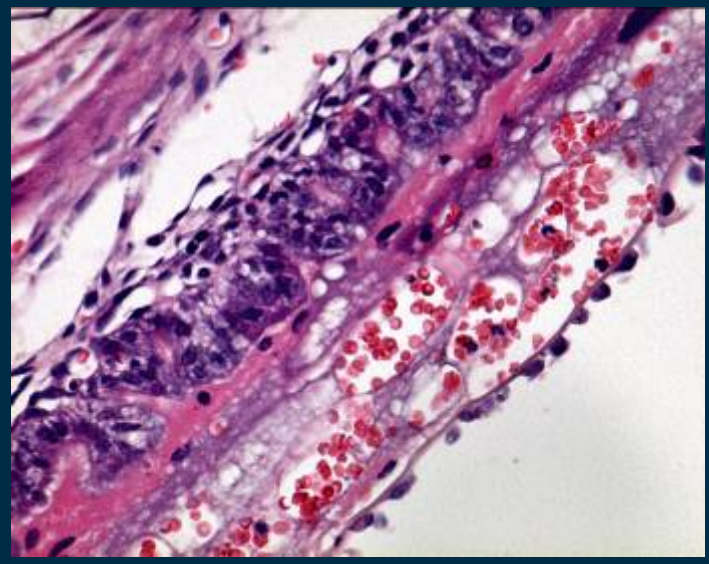

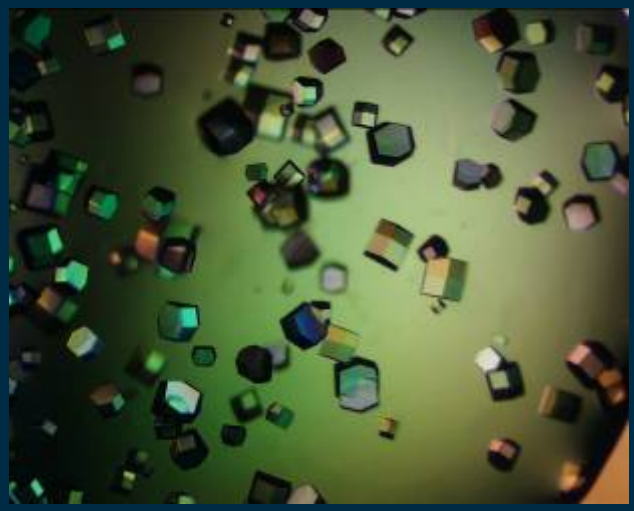

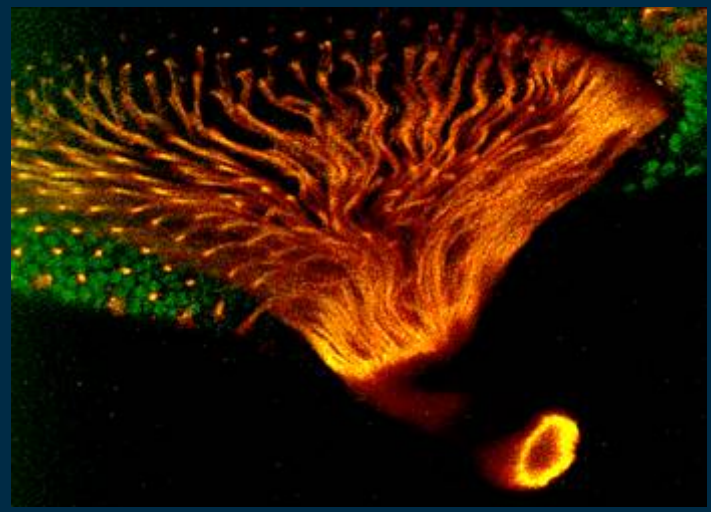

Scientific activity

- The Institutions are developing research in 7 different areas
- 31 Research Groups
- 17 support facilities

IBMC INEB
Laboratório Associado . Associate Laboratory

The 5 MAJOR RESEARCH AREAS at IBMC

With large component of fundamental and applied work

1. **BASIC & CLINICAL NEUROBIOLOGY**
   Head: Maria João Saraiva

2. **BIOLOGY OF INFECTION & IMMUNOLOGY**
   Head: Alexandra Moreira

3. **CELL ADAPTIVE MECHANISMS**
   Head: Pedro Moradas-Ferreira

4. **HUMAN GENETICS & GENETIC DISORDERS**
   Head: Maria de Sousa

5. **STRUCTURAL & MOLECULAR BIOLOGY**
   Head: Jorge Vieira

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The 2 RESEARCH AREAS at INEB

1. **BIOMATERIALS**

   The Biomaterials Laboratory is located at a building shared with the IBMC

2. **BIOMEDICAL SIGNAL & IMAGE**

   The Signal and Image Laboratory is located at the Faculdade de Engenharia da UP

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EXTERNAL SCIENTIFIC COUNCIL

Christopher Leaver (chair) - University of Oxford, Oxford
Angelo Azzi - University of Bern, Bern
JJ Neefjes - The Netherlands Cancer Institute, Amsterdam
Mina Bissell - University of California, Berkeley
Sydney Brenner - The Molecular Sciences Institute, California
Fotis Kafatos - EMBL, Heidelberg
Henk Groenewegen - Vrije Universiteit, Amsterdam

André Dittmar - INSA, Lyon
Bernard Buxton – University College London, London
Charles Baquey - Universite de Bordeaux II, Bordeaux
Paolo Tranquilli Leali - Universitá di Sassari, Sassari
William Bonfield (chair) – University of Cambridge, Cambridge
Nuno Grande – University of Porto, Porto
Eduardo Caetano - Lisbon

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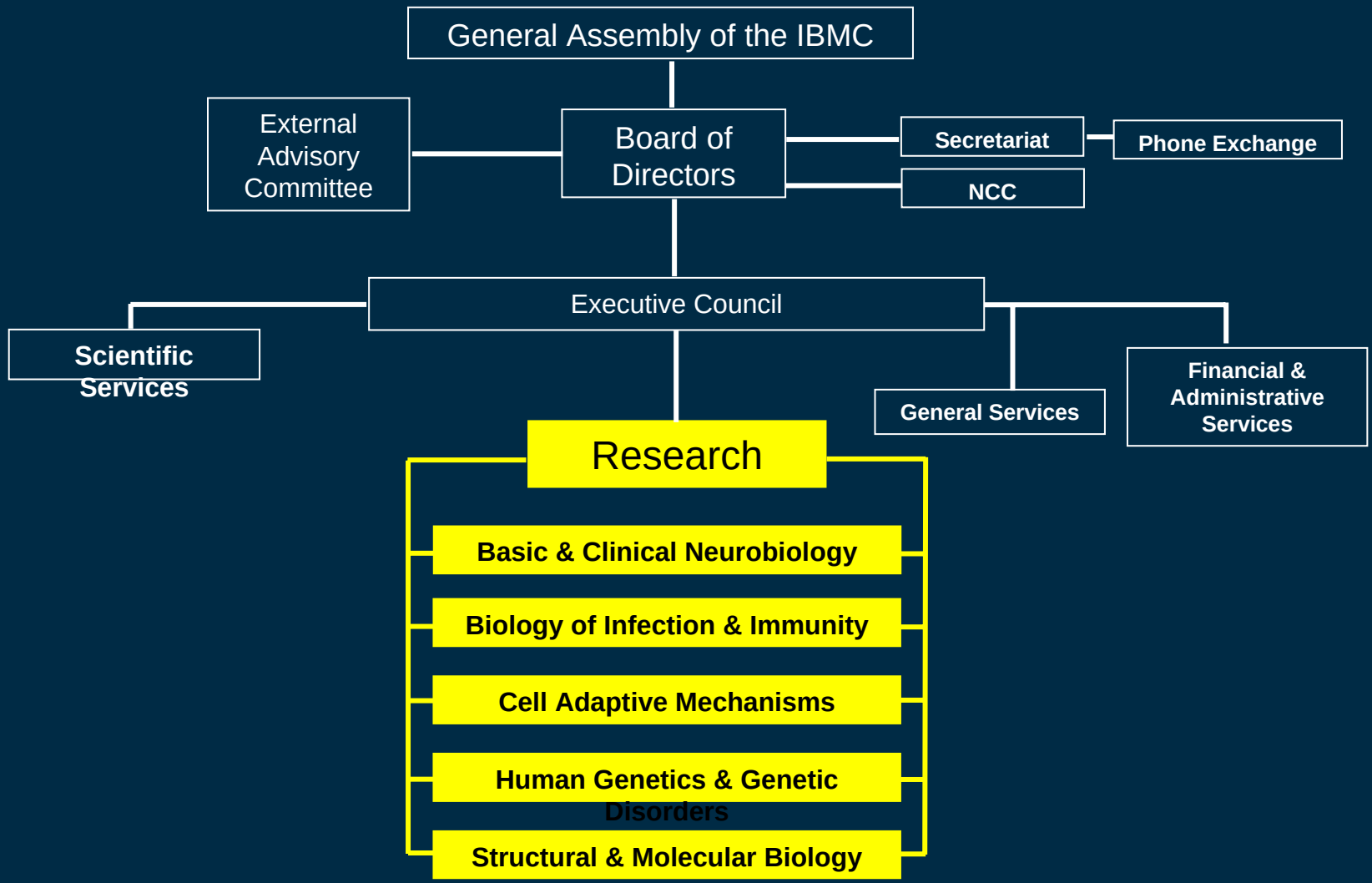

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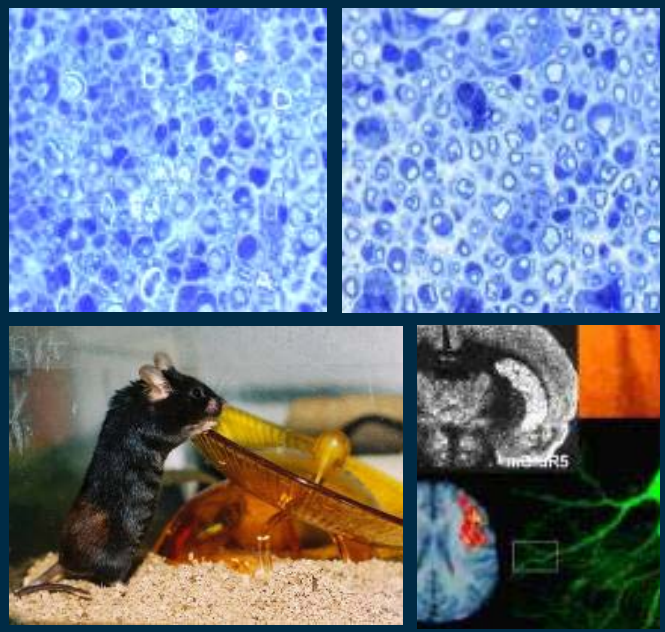
1. **BASIC & CLINICAL NEUROBIOLOGY**
2. **BIOLOGY OF INFECTION & IMMUNOLOGY**
3. **CELL ADAPTIVE MECHANISMS**
4. **HUMAN GENETICS & GENETIC DISORDERS**
5. **STRUCTURAL & MOLECULAR BIOLOGY**



Molecular Neurobiology - *MJ Saraiva*
Amyloid diseases; peripheral nerve; protein-ligand interactions

Morphophysiology of the Somatosensory System – *D Lima*
Molecular and physiological aspects of pain processing

Neurophysiology & Psychophysiology – *A Martins-da-Silva*
Neuropsychophysiology, neurorehabilitation, neuroepidemiology

Neurobehaviour - *L de Sousa*
Neurotoxicology and neuroprotection

Neuropharmacology - *A Albino-Teixeira*
Neuropharmacology of the peripheral nervous system

Laboratory Animal Science - *A Olsson & L Antunes*
Study housing conditions and evaluation of anesthetics

INTEGRATIVE INITATIVE
Establishing a joint program in understanding learning and memory

IBMC INEB
Laboratório Associado . Associate Laboratory

1. BASIC & CLINICAL NEUROBIOLOGY
2. **BIOLOGY OF INFECTION & IMMUNOLOGY**
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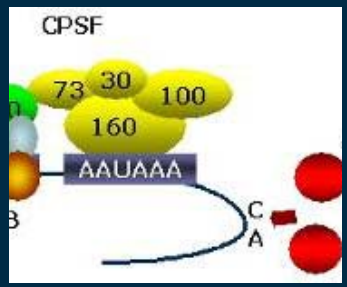

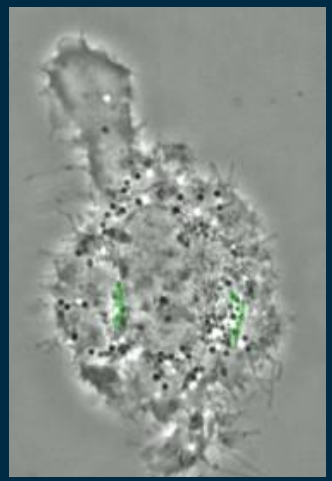

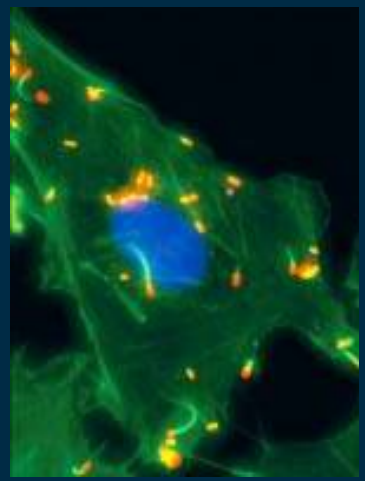

Cell Activation & Gene Expression – *A Carmo & A Moreira*

Analysis of gene transcription and protein expression in the immune and nervous system

Fish Immunology & Vaccinology Immunobiology – *N Santos*

Develop new vaccination strategies

Immunobiology – *M Vilanova & P Ferreira da Silva*

Develop new vaccination strategies

Microbiology & Immunology of Infection – *R Appelberg*

Dissect mechanisms of protective immunity

Molecular Microbiology – *D Cabanes*

New virulence factors of *Listeria monocytogenes*

Parasite Disease – *A Cordeiro-da-Silva & A Ouassi*

Leshmania infection

INTEGRATIVE INITATIVE
Tuberculosis

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2. BIOLOGY OF INFECTION & IMMUNOLOGY
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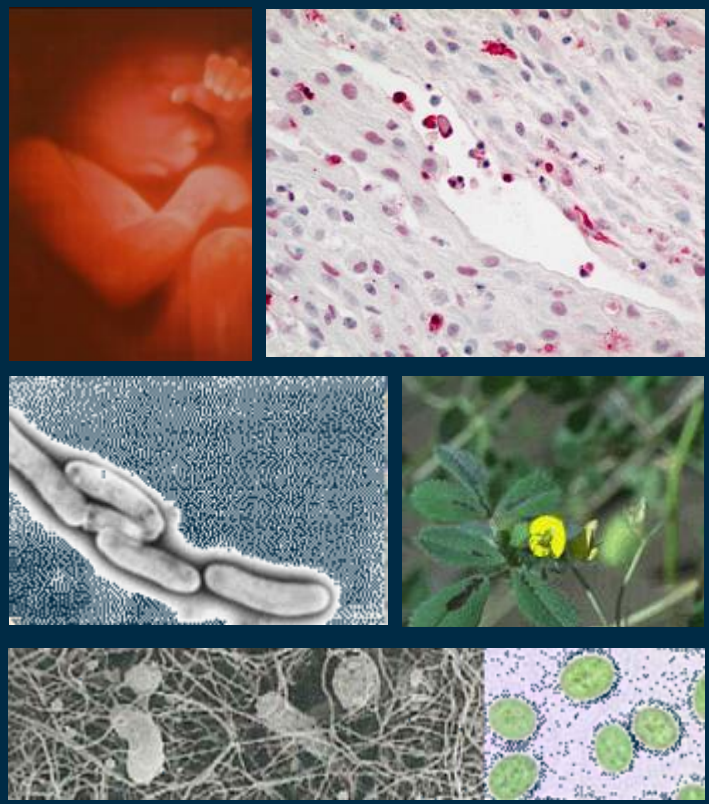

Biology of Inflammation & Reproduction – *N Teixeira*

Study of cell and molecular mechanisms associated to cell response in human conditions

Cellular & Applied Microbiology – *P Moradas-Ferreira*

Cell response and ageing in microorganisms

Stress in Animals – *H de Almeida*

Steroid cell function, transduction and cell response

INTEGRATIVE INITATIVE
Ageing and Biological Regeneration

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Laboratório Associado . Associate Laboratory

1. BASIC & CLINICAL NEUROBIOLOGY
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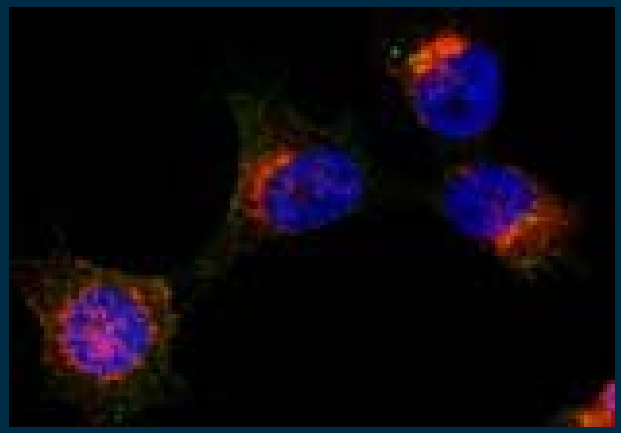

Iron genes & the Immune System – *M de Sousa*
Human immunogenetics and experimental models of iron overload

Molecular Epidemiology – *J Armas*
Musculoskeletal research

Lymphocyte Biology – *F Arosa*
Cell interaction and immune system

Lysosome & Peroxisome Biology – *C Sá Miranda*
Storage disorders and clinical trials in enzyme replacement

Organelle Biogenesis and Function – *J Azevedo*
Structural and functional relationships and pathways of peroxissoma proteins

UniGENe – *J Sequeiros*
Genetics and neurodegenerative diseases

INTEGRATIVE INITATIVE
Center for Predictive and Preventive Medicine

IBMC INEB
Laboratório Associado . Associate Laboratory

1. BASIC & CLINICAL NEUROBIOLOGY
2. BIOLOGY OF INFECTION & IMMUNOLOGY
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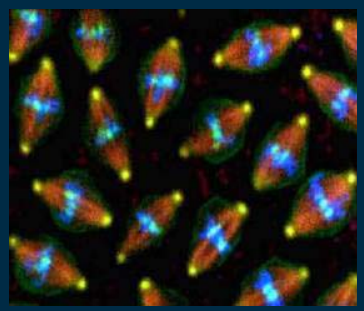

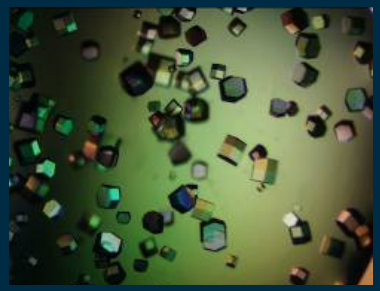
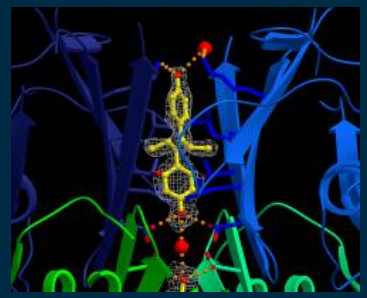
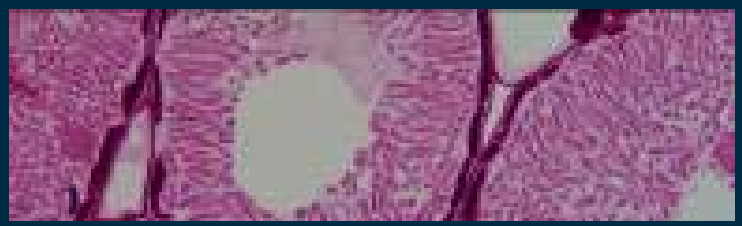

Developmental Biology – *F Casares*
Gene expression and regulation during *Drosoplhila* development

Mitochondria – *A Videira*
Characterization of mitochondria involvement in biological processes

Molecular Biology of Nitrogen Assimilation - *H Carvalho*
Protein regulation, gene expression and structural analysis

Molecular Evolution – *J Vieira*
Cromossomal polymorphisms, adaptation and genes co-evolution

Molecular Genetics – *C Sunkel*
Cell Division, aneuploidy and cell dynamics

Molecular Structure – *AM Damas*
Protein crystallography and structural analysis

INTEGRATIVE INITATIVE
Protein Production and Purification Facility

IBMC INEB
Laboratório Associado . Associate Laboratory

- INEB is organized in four research groups:

Biointerfaces - *M Barbosa*

Bioceramics and Glasses - *J Domingos Santos*

Signal Processing - *J Marques de Sá*

Biomedical Imaging and Vision Computing - *A Campilho*

Engineering that Lives

IBMC INEB
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The research is supported by 17 core facilities and administrative departments

- Financial and Administrative Department
- Secretariat
- Library
- Occupational health and safety
- Maintenance
- Projects office
- Information and technology department
- Public understanding of science office
- Technology transfer office (TTO)
- Animal Facility (P3)
- Advanced Light Microscopy Facility (ALMF)
- Advanced Tissue Analysis Facility (ATAF)
- Cell Culture and Genotyping
- Protein Production and Purification UP3
- Radioactivity
- Unit for Interfaces and Macromolecules
- Cytometry

Human and Animal Ethic Committees

IBMC INEB
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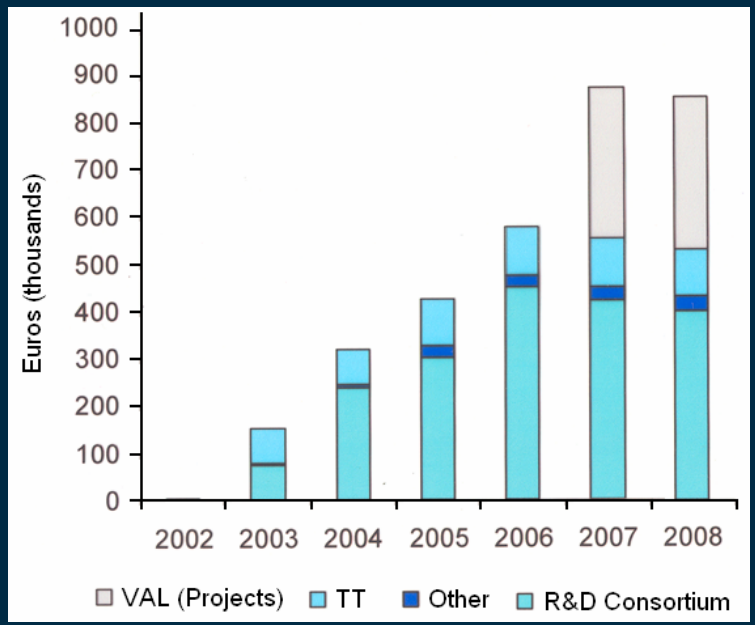
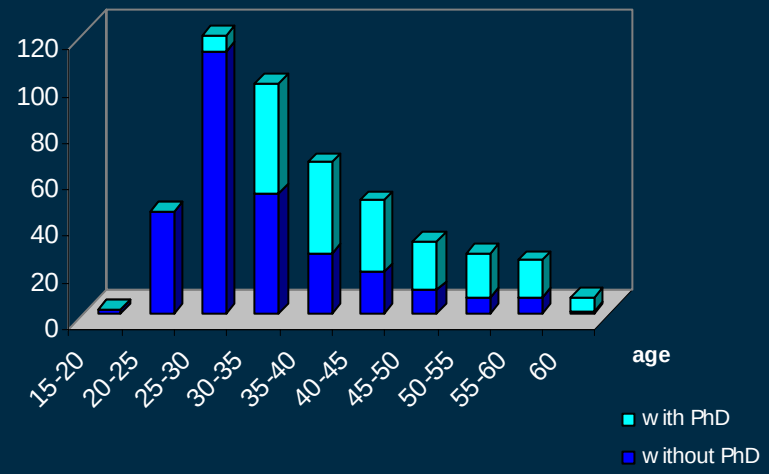
Research & Development



PME Capital
GRUPO LENA
IMUNOSTAR
GENETEST
NOVARTIS
Ablynx
genzyme
emerillon
METI
BIOMARIN
bioteca
Pierre Fabre
SPECULUM
bioCodex

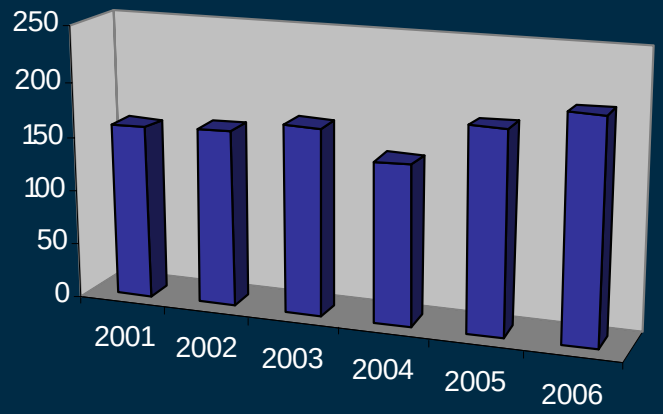
IBMC INEB
Laboratório Associado . Associate Laboratory

Associate Laboratory Staff	(n)
Researchers (PhDs)	185
Research Students	190
Support Personnel	80
Total	455



2/3 < 40 years; > 2/3 Women

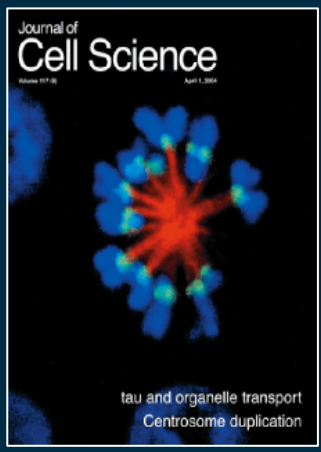
Number of researchers with PhDs

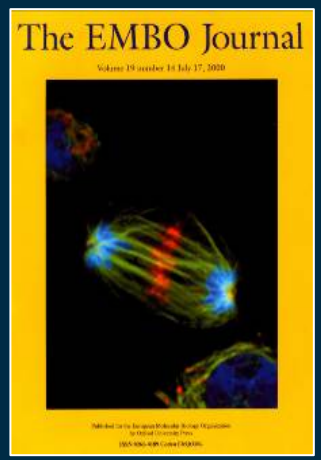


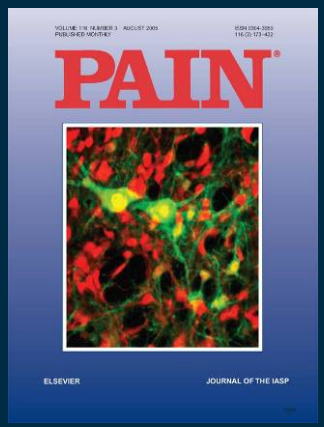
PhDs Researchers	(n)
Univ. Teachers & Others	113
Contracted by IBMC	25
PostDoc grant holders	47
Total	185

IBMC INEB
Laboratório Associado . Associate Laboratory

JOURNAL COVERS







IBMC INEB
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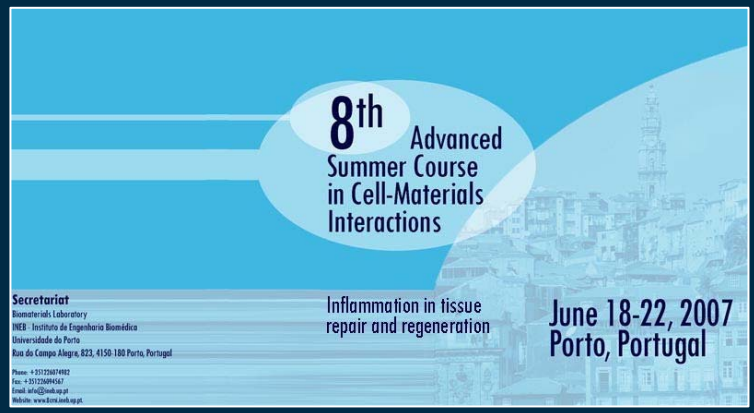
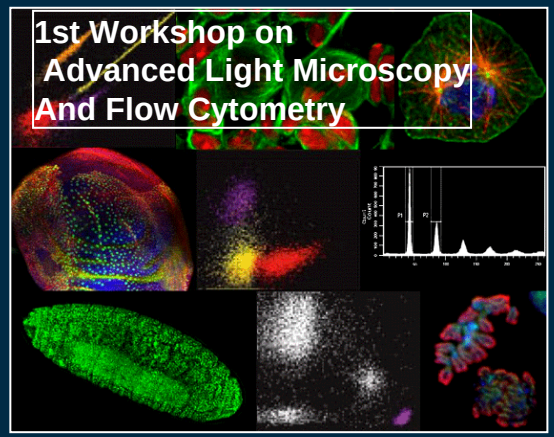
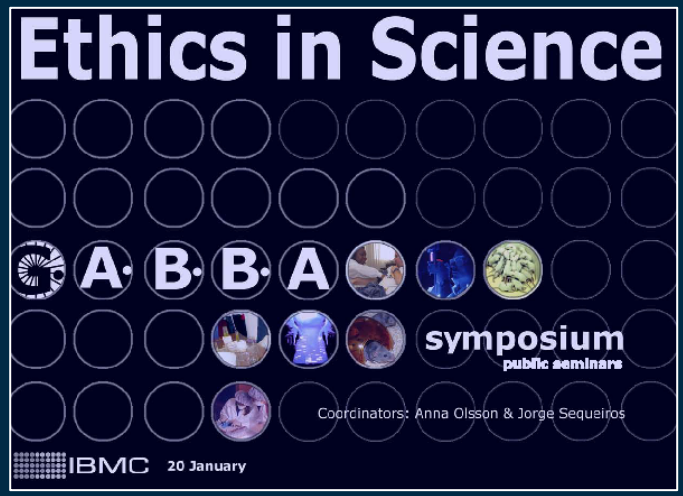
Outreach Activities

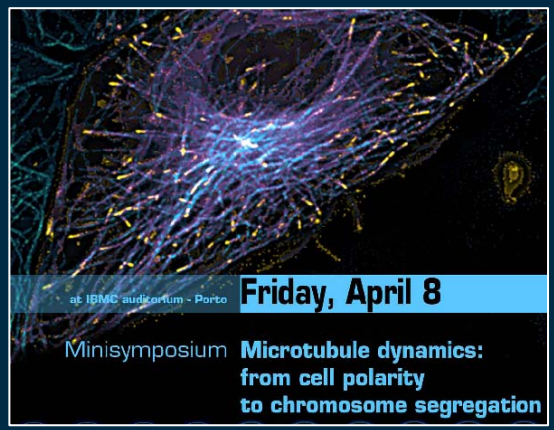
IBMC INEB
Laboratório Associado . Associate Laboratory

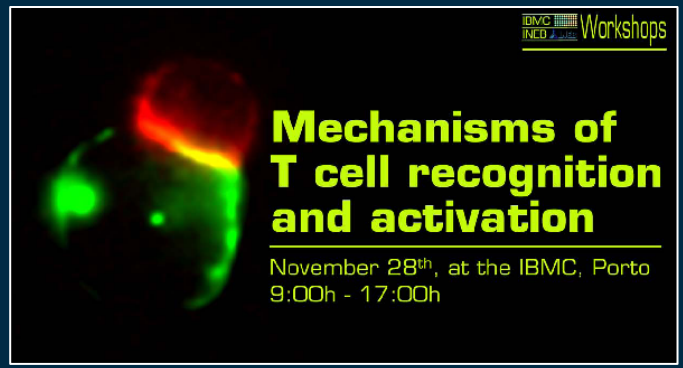


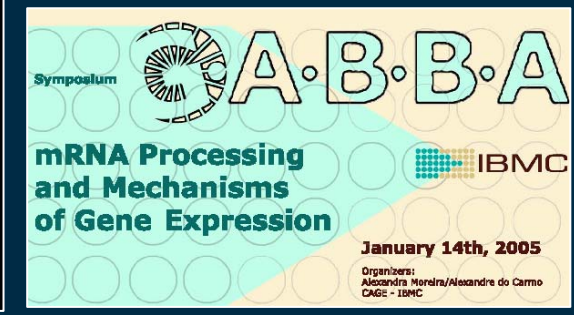




Workshops And Symposiums







IBMC INEB
Laboratório Associado . Associate Laboratory

Long Term Goals:

- Develop into an *Integrative Systems Biology Institute*
- Study the aetiology of disease and dysfunction
- Elucidate the genetic and environmental mechanisms involved
- Devise strategies for treatment, repair and regeneration
- Using new tools and developing innovative applications

IBMC INEB
Laboratório Associado . Associate Laboratory

Enhance the cooperation between IBMC·INEB and IPATIMUP.

- Joint application submitted to CCDRN for the constitution of Instituto de Investigação e Inovação em Saúde (I^3S).

Center for Neuroscience and Cell Biology

CNC
CENTER FOR NEUROSCIENCE AND CELL BIOLOGY
UNIVERSITY OF COIMBRA, PORTUGAL

Harvard Medical School - Portugal

April, 16 2007

Lisboa

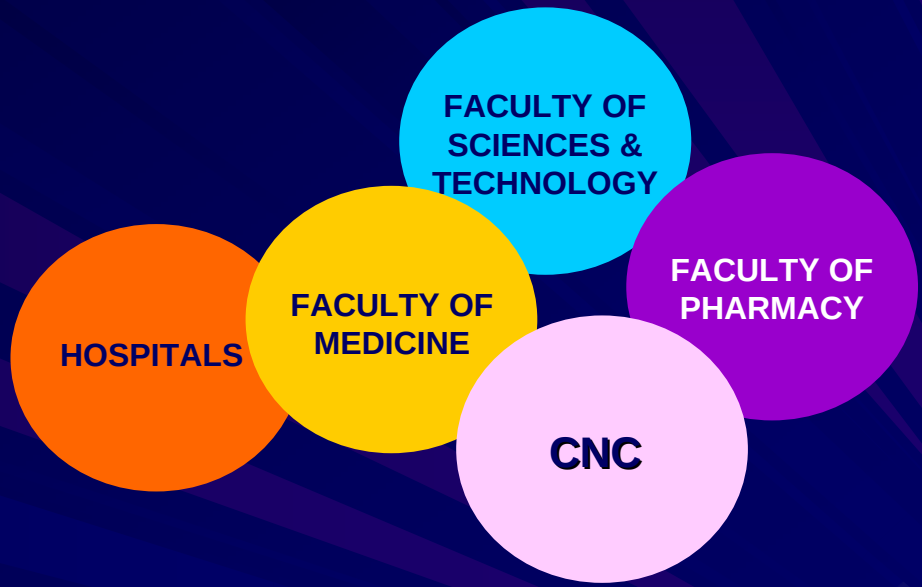
Center for Neuroscience and Cell Biology

CNC
CENTER FOR NEUROSCIENCE AND CELL BIOLOGY
UNIVERSITY OF COIMBRA, PORTUGAL

Staff

Technicians …….25
Administrative …….. 7
Ph.D. members ….. 89
Ph.D. students ……. 112

Total: 233



Scientific activity (2001-2006)
Ph.D. thesis …….. 60
M.Sc. thesis …….. 49
Financed national projects ……. 241
Financed international projects …… 24
Scientific papers …….. 774
Advanced Courses …….. 76
Seminar …….. 159

Center for Neuroscience and Cell Biology

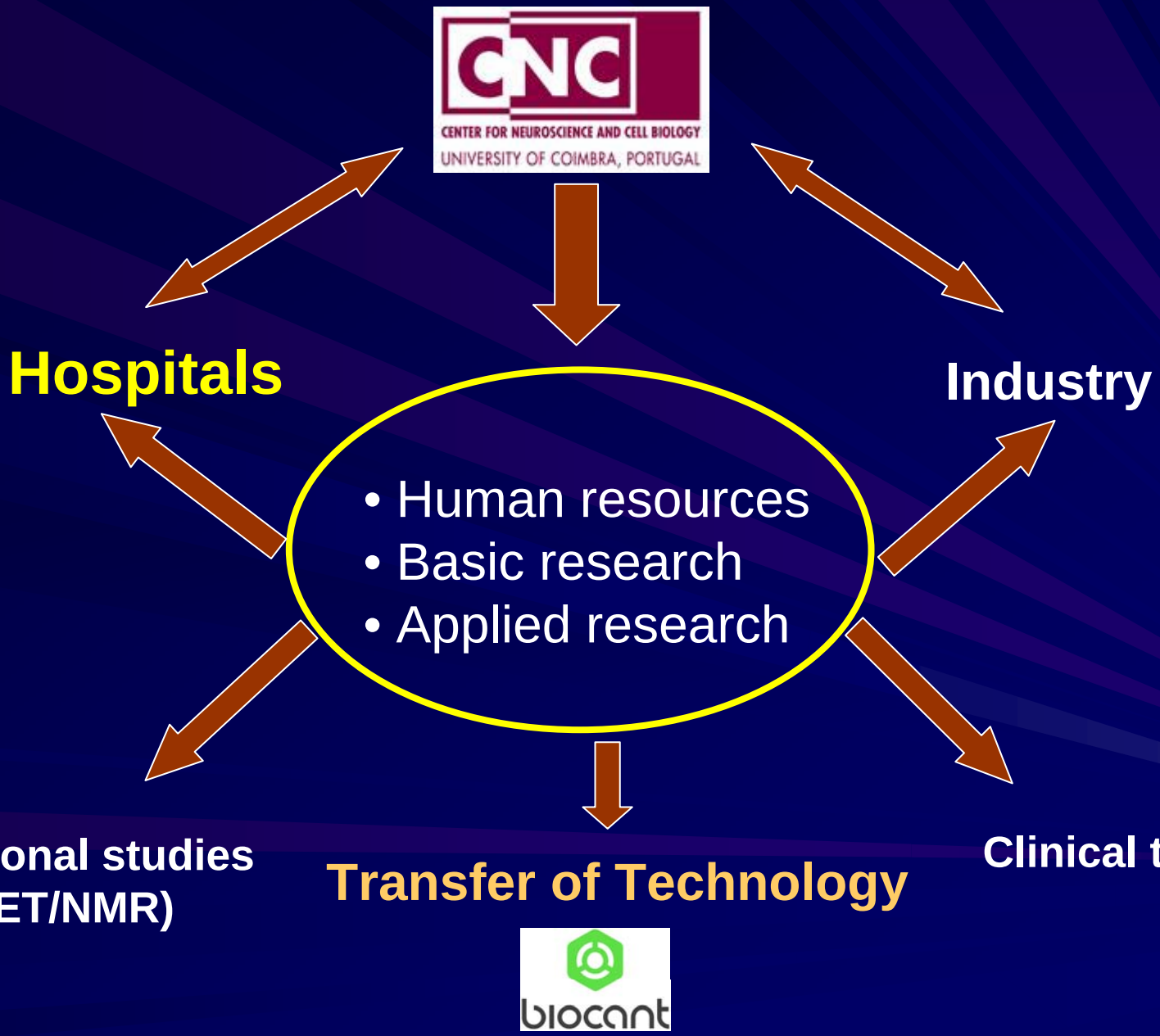
CNC
CENTER FOR NEUROSCIENCE AND CELL BIOLOGY
UNIVERSITY OF COIMBRA, PORTUGAL

Scientific Areas

- ✓ **Neuroscience and Disease**
- ✓ Molecular Biotechnology and Health
- ✓ Cell and Molecular Toxicology

- ✓ Biophysics and Biomedical NMR
- ✓ Cell and Development Biology
- ✓ Microbiology

Outreach Programme



Center for Neuroscience and Cell Biology

University of Coimbra

Graduate Studies Programme

- ✓ **Taught by leading portuguese and foreign scientists**
- ✓ **Providing advanced research-oriented training in emerging areas of Biology and Biomedicine**

Doctoral Programme in Experimental Biology and Biomedicine

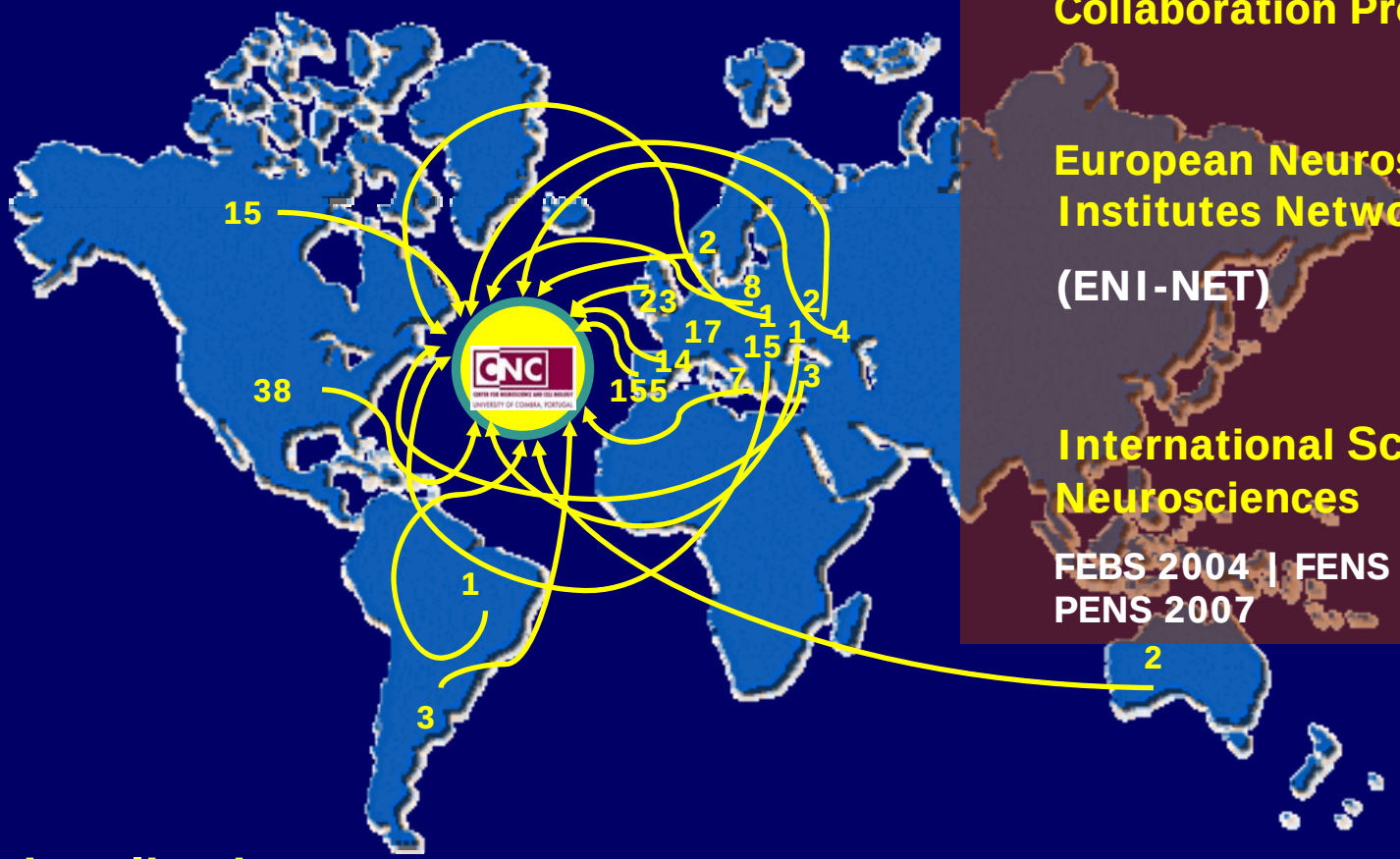
Master Programme in Cell Biology

Advanced Courses

Seminar

Center for Neuroscience and Cell Biology

CENTER FOR NEUROSCIENCE AND CELL BIOLOGY
UNIVERSITY OF COIMBRA, PORTUGAL



MIT – Portugal Collaboration Programme

European Neuroscience Institutes Network

(ENI-NET)

International Schools of Neurosciences

FEBS 2004 | FENS 2005 | PENS 2007

Internationalization

Visiting scientists : **127** [2002-2007]

Center for Neuroscience and Cell Biology

CNC
CENTER FOR NEUROSCIENCE AND CELL BIOLOGY
UNIVERSITY OF COIMBRA, PORTUGAL

A Glance on Research at the Center for Neuroscience

Rodrigo Cunha

School of Medical Sciences

New University of Lisbon

J.M. Caldas de Almeida

16 April 2007

Medical education

- Clinical education delivered in clinical learning environments distributed throughout the health care delivery system:
  - 8 affiliated hospitals in Lisbon
  - family medicine in physicians' practices throughout Lisbon and the south of Portugal
- Innovation on medical educations issues

PBL experience

- Applied in the first years, but with impact on the clinical teaching
- Development of computer programs allowing for students interaction with clinical cases
- Development of concept maps in order to improve medical reasoning from basic science to clinical symptoms

Post graduate education - major areas

- Respiratory diseases
- Microbiology (MSc jointly developed by FMC, ITQB and IHTD)
- Mental health
  - Participation in international master and PhD courses on mental health services funded by the EU
  - International MSc on mental health services development to start in 2008 (joint initiative of SMC and World Health Organization)
- Public health

Research

- A growing program in basic medical sciences
- Important alliances with the Institute of Tropical Medicine and the National School of Public Health both of which are sited in the New University of Lisbon
- Special focus on health services research

Centers for Biomedical Research

- Center for Research in Human Molecular Genetics
- Respiratory Diseases Research Centre
- Associated Laboratories: “Center for Malaria and other Tropical Diseases (IHTD/NUL)”
- Key projects:
  - Center of molecular biology
  - New labs for molecular biology, genetics and microbiology included in the plan of expansion of the SMC
  - New labs included in the project of the new teaching hospital

Health services research (1)

National and international projects on mental health policy and services:

- Collaboration with Harvard Medical School (participation in the World Mental Health Survey, Ronald Kessler, Department of Health Care Policy)

- Participation in several projects with WHO and EU on mental disorders in primary care, mental health and poverty, suicide prevention

Health services research (2)

- Collaboration with WHO in the development and evaluation of mental health policies and services in Eastern Europe, Africa and Latin America

- Coordination of the national Mental Health Plan development in Portugal

- Coordination of the national Plan against Depression (EAAD)

Major areas for collaboration

- Improvement of medical education
  - Curriculum development
  - Development and adaptation of materials
  - Students exchange

- Health systems research
    - Capacity building
    - Education of doctors, other professionals and the general public on disease management
    - International cooperation initiatives


INSTITUTO GULBENKIAN DE CIENCIA

GULBENKIAN FOUNDATION

Four statutory goals: science, art, education, charities

Assets ~4 B US$; Annual spending ~150 M US$

Instituto Gulbenkian de Ciência, from 1961:

introduced graduate education;
professionalized research in biomedicine;
reformed in 1985 and 1998;

MISSION STATEMENTS (from 1998):

- *"to identify, educate, "incubate" and export new research leaders"*

- *"to serve as an entrance hall to the country"*

- *"to conduct biomedical research on the genetic bases of development and evolution of complex systems"*

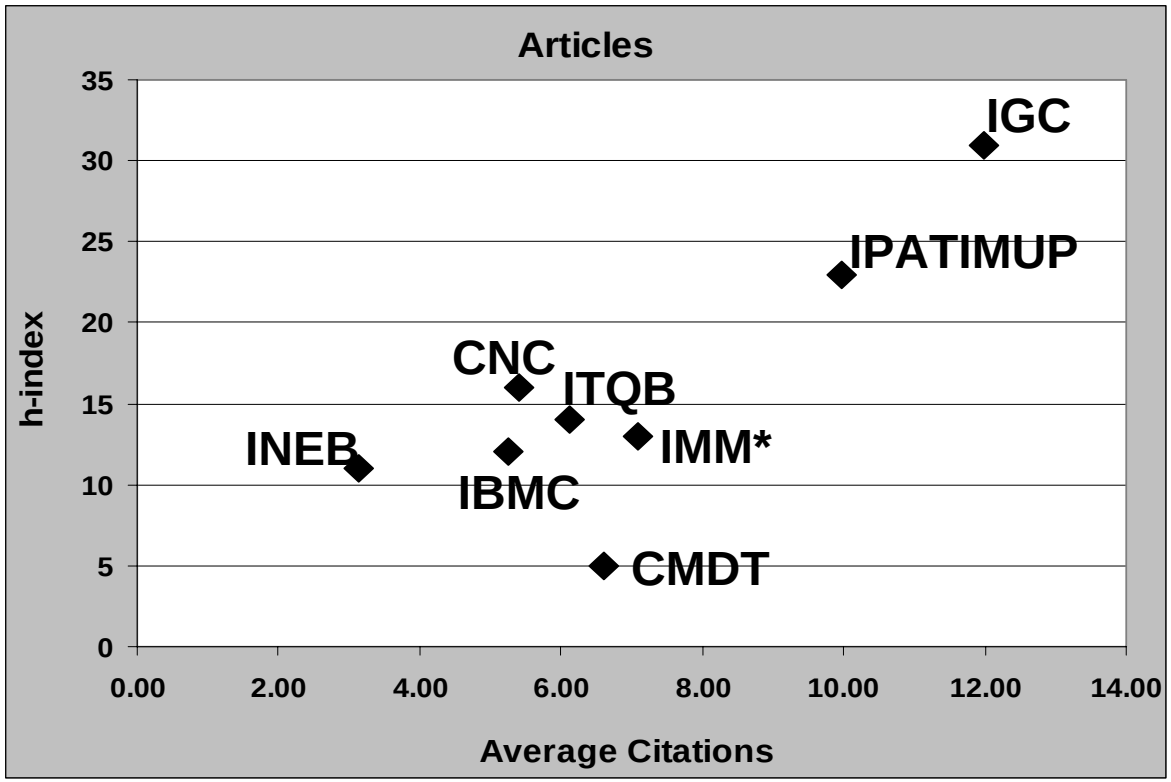
“serve as an entrance hall into the country”

- 46/48 PIs established at the IGC came from abroad
- Of 19 groups exported, 12 remained in Portugal
  (also Spain, France, Germany and Sweden)
- “External”, associated groups in other institutions
- A network of alumni in Portugal and over the world
  (Annual PhD retreats; GAMeets)
- “Collaboratorium in Computational Biology”
- Visitors and sabbatical programs

“to identify, educate, “incubate” and export new research leaders”

- Strong PhD programs with an international Faculty (started 1993; 4 Programs running; 100 speakers/y/progr)
- 311 PhD students started at the IGC in those programs; another 67 were educated here;
- Small groups (5-6); very young group leaders (age 30-35); (currently: 25% foreigners; ~40% females)
- Full scientific and financial autonomy to the groups
- High turnover of groups (5-6 years/group; 7 groups/2006)

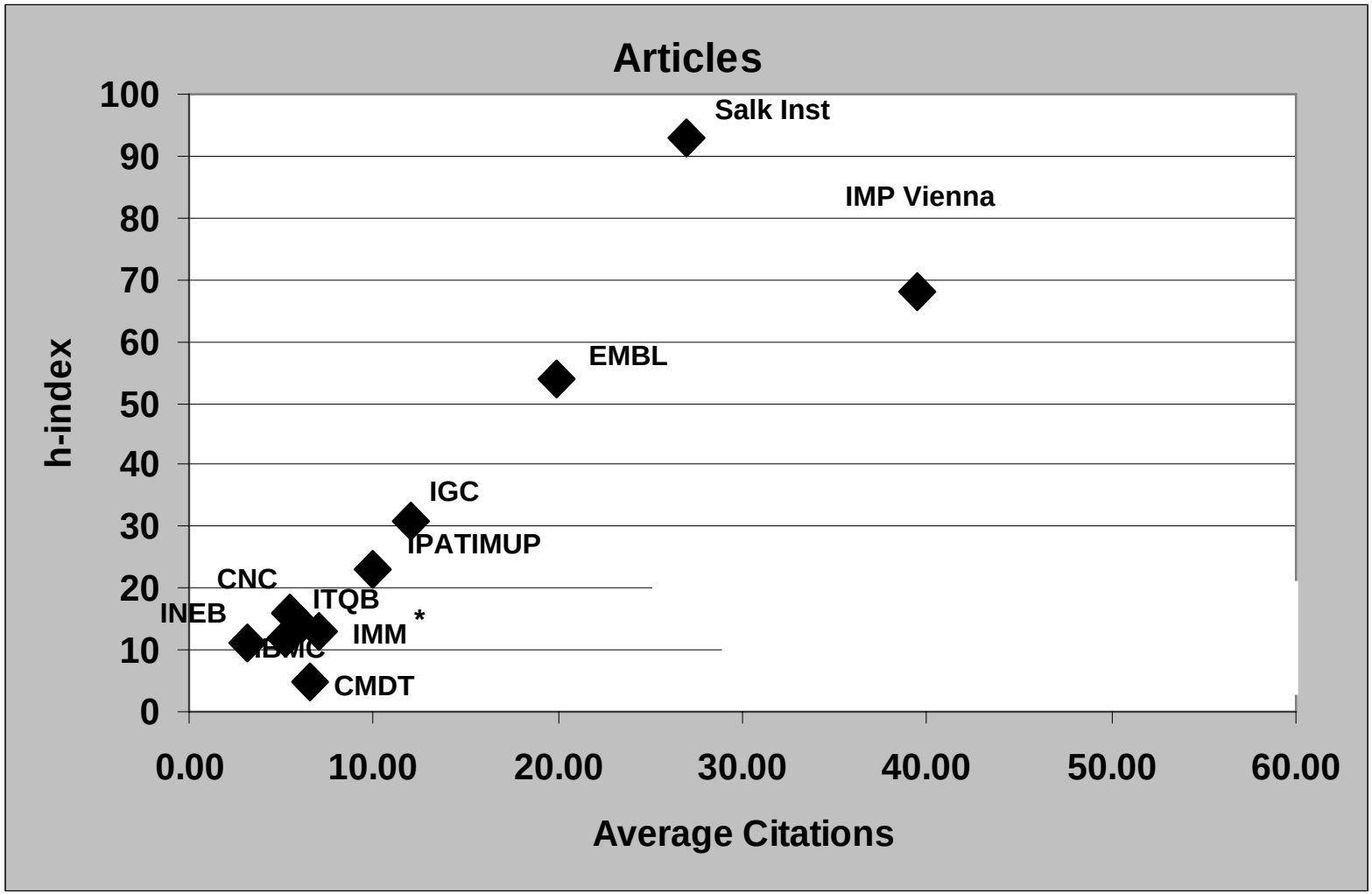
“biomedical research on the genetic bases of development and evolution of complex systems”



*** :2002-2007**

2001-2007

2001-2007



* :2002-2007

Host Institution:

- **Scientific Advisory Board**

- Intellectual atmosphere
  (last 7 years: 99 courses/workshops;
  ~ 3,000 lecturers & seminar speakers)

- Lab set-ups and common technicians

- Sate of the art, centrally run **technological platforms** and user-directed **services** with “user committees” (8 technology-support units, open to external users, and 5 centralized services)

IGC Scientific Advisory Board

- Sydney Brenner (Chairman)
- Jonathan Howard
- Philippe Kourilsky/David Sabatini
- Nicole Le Douarin
- Martin Raff
- Kai Simons
- Susumu Tonegawa
- Lewis Wolpert/Gines Morata
- In appointment: 3 more neuroscientists

Strategic principles:

- Small and cohesive; “esprit de corps”:
  no divisions; all spaces and equipments in common
- Diversity, openness: all know what everyone is doing
- Autonomy, cooperativity, and flexibility: explore “edges”
- Encourage risk-taking research
- Scientific “glues/organizers”:
  evolutionary biology;
  theoretical/mathematical biology

“biomedical research on the genetic bases of development and evolution of complex systems”

- Hypothesis-driven, thoughtful science
- Risk-taking research on integrative, quantitative biology
- Organism-centered approaches:
  bacteria, yeast, plants, worms, flies, fish, mice, man
- Transversal themes (e.g., morphogenesis, inflammation, population dynamics; phenotype/genotype mapping)

[LA ITQB/IBET: protein chemistry, structural biology, microbiology, biotechnology]

Currently:

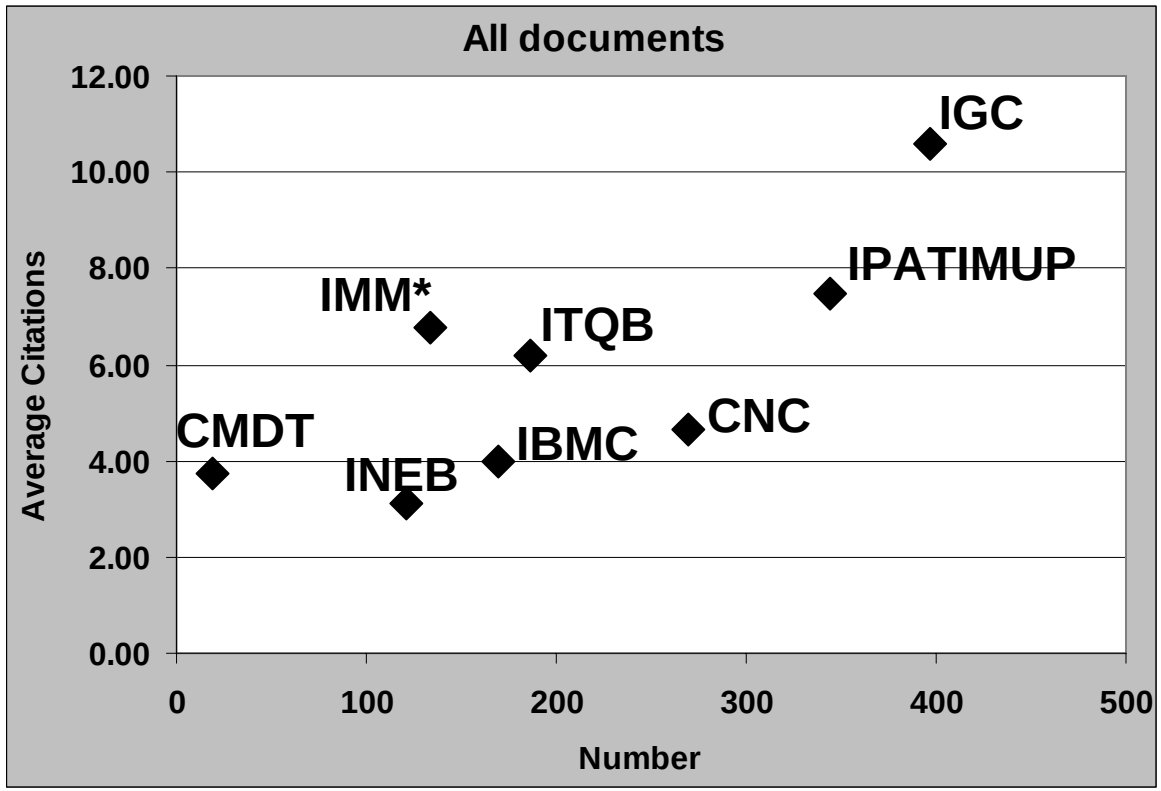
- Total population of ~285
  (~100 PhDs; 106 PhD students)

- 29 research groups

- Total budget: ~9,500,000€ (year average last 3 years)
  (operation 8,500,000€; infrastructure 1,000,000€)

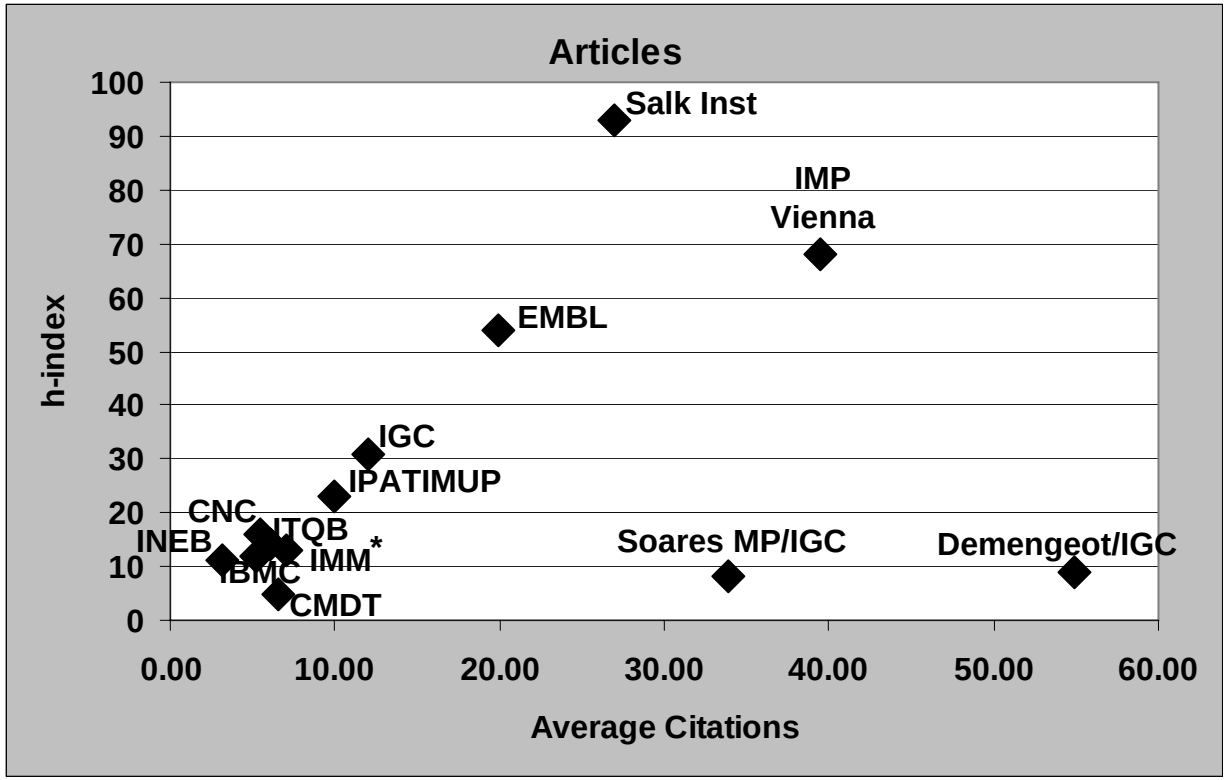
  - F Calouste Gulbenkian: ~5,000,000€
  - FCT (LA, 2 Units, contracts, fellowships);
  - IEFP; EU; EMBO; NIH (USA); CNRS (Fr); etc.
  - corporations; private organizations; etc.

2001-2007



* :2002-2007

2001-2007



* :2002-2007

Associate Laboratory ITQB /IGC /IBET

2000 - 2007

April 2007

Associate Laboratory ITQB /IGC /IBET

ITQB– Chemistry and Biology Frontiers - Chemistry, Microbiology, Cell Biology, Genetics, Biochemistry and Structure and Function of Proteins

IGC– Molecular Medicine, Developmental Biology, Immunology, Computacional Biology, Neurosciences

IBET – Platform for technology transfer, collaboration with industry, GLP services, Pilot Plant (fermentation and down stream processes) – Main Projects with Pharmaceutical International Companies ; 11 Start up Companies

Large set of multiple Biophysical Methods, Computational Biology, Analytical Methods, Imagiology, Transcriptomics, Animal house, Transgenics units, etc

Associate Laboratory ITQB /IGC /IBET

600 Researchers
262 PhD Holders
80 Independent Laboratories

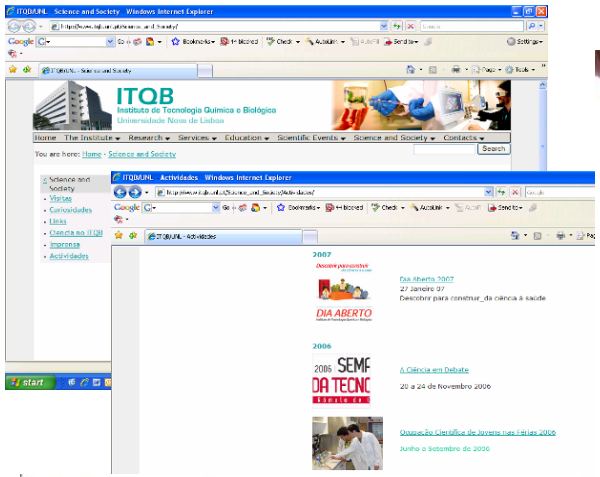
Open Institutions (Other Faculties, Research Institutes, Associate Laboratories, ...)
2001-2006 > Over 1300 ISI Papers (2006 – 2 Nature, 1 Science);Over 200 PhDs Degrees

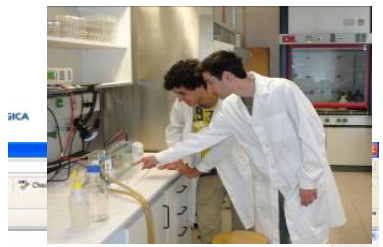
Doctoral Programs,
Incubation of New Research Groups

From Basic and Transdisciplinar Research to Societal Issues (Medicine, Industry, Public Awareness of Science)

April 2007

Associate Laboratory ITQB /IGC /IBET





Oeiras vive a ciência

Ciência Viva
AGÊNCIA NACIONAL PARA A CULTURA CIENTÍFICA E TECNOLÓGICA

Associate Laboratory ITQB /IGC /IBET

Medical Microbiology

Laboratory of Microbial Development

Genetics of spore formation in *Bacillus subtilis* and related spore-forming bacteria; emphasis on asymmetric cell division and chromosome segregation, the establishment and maintenance of compartmentalized gene expression, and the molecular mechanisms underlying morphogenesis of the bacterial spore

Laboratory of Molecular Genetics

Main focus: genetics, biochemical and evolutionary mechanisms and epidemiology of drug resistant gram-positive pathogens, specifically, *Staphylococcus spp.* and *Streptococcus pneumoniae*.

Tracking the spread of drug resistant *S. aureus* clones in **hospitals and in the community**. Long-range studies on the colonization of children by *S. pneumoniae* in **Day Care Centers** in the Lisbon area and molecular characterization of the new *S. pneumoniae* genotypes that emerge in response to the selective pressure of the 7-valent conjugate vaccine PrevenarL

April 2007

Associate Laboratory ITQB /IGC /IBET

Medical Microbiology

Bacterial Cell Biology Laboratory

Model organism: *Staphylococcus aureus,* a Gram positive pathogen and the most common cause of antibiotic-resistant hospital-acquired infections both in the US and in Europe.

Aim: to understand, at a molecular level, the organization and the temporal and spatial regulation of two fundamental steps of cell division - the segregation of the bacterial chromosome and the synthesis of the division septum, as well as to integrate this information for a better understanding of antibiotic resistance mechanisms in *S. aureus*.

Laboratory of Bacterial Cell Surfaces and Pathogenesis

The relationship of Gram-positive pathogens and their hosts, namely the role of cell wall synthesis and turnover in the process of host colonization and infection.

Use of *Staphylococcus aureus* and *Streptococcus pneumoniae* as bacterial model organisms, to understand the metabolism of the peptidoglycan macromolecule, which is conserved in almost all bacteria and has been shown to cause an inflammatory response in different invertebrate and vertebrate hosts. Interaction of peptidoglycan with peptidoglycan-recognizing proteins, using NMR spectroscopy

Associate Laboratory ITQB /IGC /IBET

Medical Microbiology

Molecular Genetics of Metalloproteins Laboratory

Elucidation of the bacterial systems that confer to bacterial pathogens resistance to reactive oxygen and nitrogen species, namely nitric oxide and peroxides in *Escherichia coli*, *Staphylococcus aureus* and *Helicobacter pylori*, and in protozoa.

Neurodegenerative diseases

Glycobiology Laboratory

Intracellular trafficking and glycosylation of proteins associated with ovarian carcinoma and the neurodegenerative disease amyotrophic lateral sclerosis.

Protein folding Laboratory

Protein folding and disease: disorders that result from protein misfolding, for example due to a mutational change. In some circunstances, that is the case of the neurodegenerative disease Friedreich ataxia (FRDA) which involves the protein frataxin.

April 2007

Associate Laboratory ITQB /IGC /IBET

Cell Physiology and NMR

Novel osmolytes from hyperthermophiles and their role in protein stabilization, as chemical chaperones in therapeutic approaches to protein-misfolding diseases: mode of action and solute engineering.

In particular, the chaperone effect demonstrated by several solutes holds a tremendous potential for the treatment or prevention of many conformational diseases that afflict modern society.

Phamacological oriented projects

Macromolecular Crystallography Laboratory

Proteins with Biomedical applications

Animal Cell Technology Lab

Development of cell and gene therapies

Phase II clinical trials Unit for biopharmaceuticals

Chemistry

Development of Novel pharmaceuticals, synthesis of biologically important molecules

Harvard / Portugal

Strenghten Research Activities

Forster Translational of Knowledge to Medical Schools

Forster Intertwinship with Medical Schools

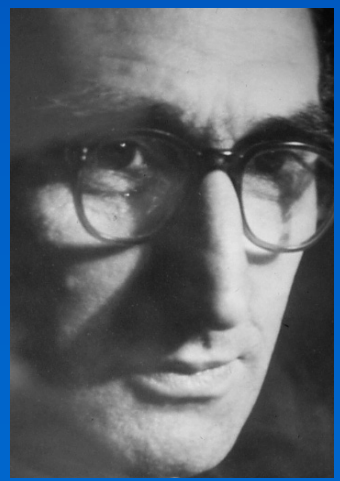
FACULTY OF MEDICINE - UNIVERSITY OF LISBON

Egas Moniz

Cerebral Arteriography (1927)
Pre-frontal Leucotomy (1933)
Nobel Prize (1949)

Reynaldo dos Santos

Translumbar
Aortography (1929)



J. Cid dos Santos

Phlebography (1937)
Endarterectomy (1946)

FACULTY OF MEDICINE - UNIVERSITY OF LISBON

Strengthen Basic Science

Institute for Molecular Medicine

New facilities (*Egas Moniz* building)

Network of Affiliated Institutions for Clinical Teaching

Health Centres and Hospitals (Partnership)

Clinical Professorship (invitation)

New Programs Leading to Academic Degree

Microbiology

Dietetics / Nutrition

Institute of Preventive and Social Medicine

Institute for Advanced Education (IFA)

Provision of Public / Community Services

Student Support Office

- **Health / Integration**
- **Tutorial Program (new students)**
- **Exchange programs (Socrates / Erasmus)**

Curricular Revision (pre-graduation)

Program on Education through Science

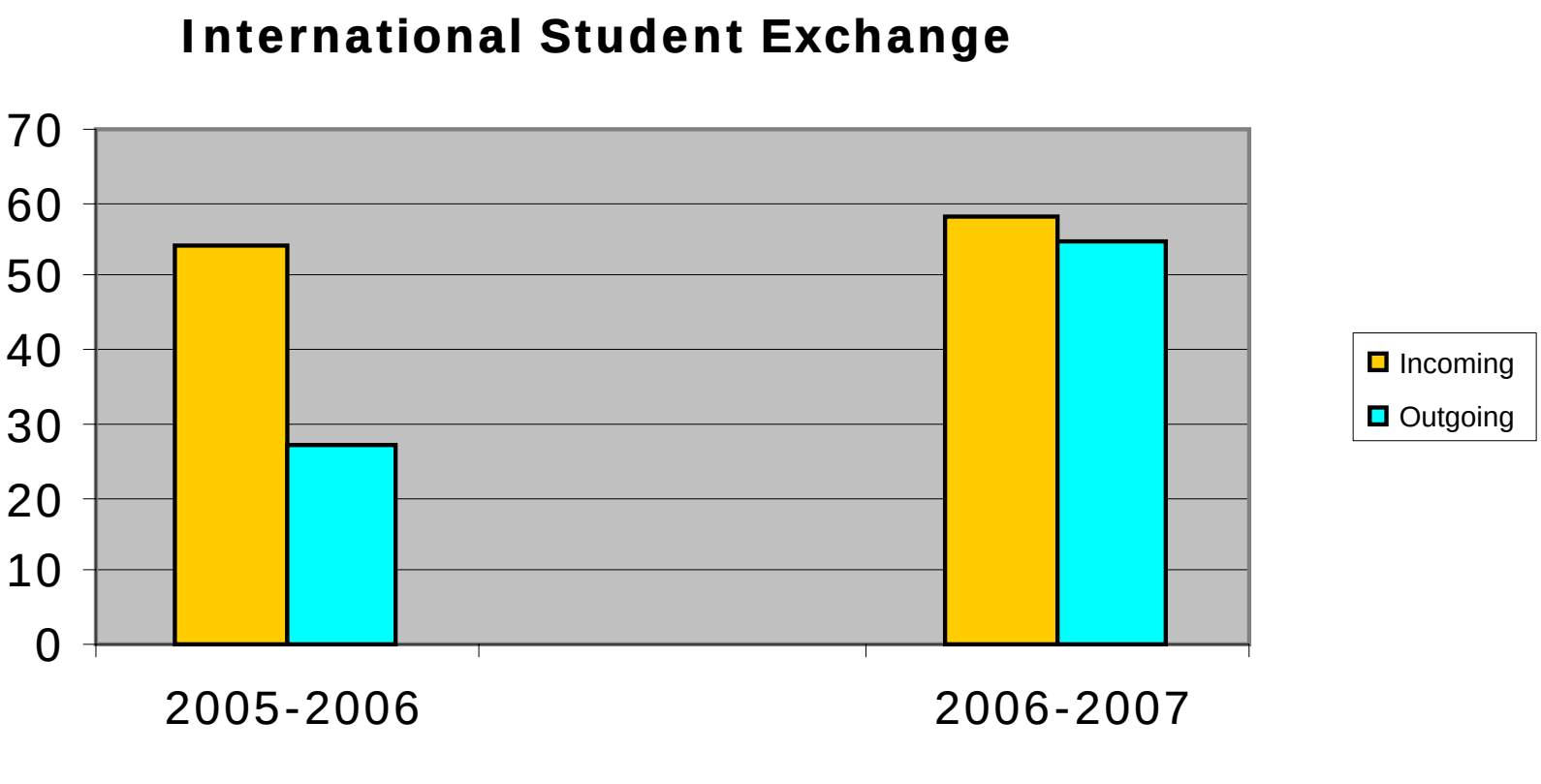
(Pre-graduation Students)

Year	No. Projects
2004/2005	12
2005/2006	13
2006/2007	15
TOTAL	40

Number of Students - Total

	2003	2004	2005	2006	Variation
Pre-Graduation					
Medicine	1.292	1.373	1.554	1.639	
Dietetics and Nutrition		20	21	29	
Microbiology		38	42	51	
Total	1.292	1.431	1.608	1.719	+44.3%
Advanced Education					
Post-Graduation Courses	148	708	807	496	
Master Degree Programs	182	216	350	284	
PhD/Doctorate	17	15	25	79 (60-IMM)	

FACULTY OF MEDICINE - UNIVERSITY OF LISBON



FACULTY OF MEDICINE - UNIVERSITY OF LISBON

- **DEPARTMENTS AND LABORATORIES (Basic Science)**

  Anatomy
  Molecular and Cell Biology
  Physiology
  Histology and Developmental Biology
  Pharmacology and Basic Neurosciences
  Biochemistry and Biopathology
  Immunology
  Microbiology
  Pathology
  Nuclear Medicine
  Nutrition
  Genetics
  Biomathematics

- **DEPARTMENT OF PREVENTIVE AND SOCIAL MEDICINE**

- **DEPARTMENT OF CLINICAL SEMIOTICS**

  Simulation / Skills Laboratory for Introduction to Clinical Medicine

FACULTY OF MEDICINE - UNIVERSITY OF LISBON

HOSPITAL SANTA MARIA

1,100 BEDS
444,000 outpatients
37,000 inpatients / year

- Departments (Medicine, Surgery, Thorax and Clinical Neurosciences, Pediatrics)
- Specialized University Clinics

AFFILIATED HOSPITALS AND HEALTH CENTRES

10 Hospitals

230 Health Centres

FACULTY OF MEDICINE - UNIVERSITY OF LISBON

FACULTY

	Basic Science	Clinical	Total
• Full Professors	10	15	25
• Associated / Assistant Professors	47	70	117
• Assistants / Lectures	126	129	355
• Instructors			12
• Researchers	20		20
• Clinical Tutors *Docente-Livre*		862	862

BASIC SERVICES

Information technology / Informatics Unit

Library / Documentation Centre

Preservation of historical documentation
Free Access to academic / hospital personnel
Virtual Library (VPNs, Wifi)

Administrative Division

Academic Division

FACULTY OF MEDICINE - UNIVERSITY OF LISBON

- PRE-GRADUATION CURRICULUM:
  - Discipline based, teacher-centred, unsstructured repetitions
  - 2 periods: preclinical 3yrs + 2yrs clinical electives
  - 6th year (professional year with clinical rotations (internal medicine, surgery, obst-gyn, pediatrics and general and familial medicine)

M.D. DEGREE

NEW INTEGRATED CURRICULUM (I)

- Student-Centred, Learning vs Teaching focus
- Translational Medicine: cooperation between basic science/clinical medicine
- Integrated areas vs discipline based
- Early exposure to Clinical Medicine
- Emphasis on Community and General Medicine
- Bioethics and Social Aspects of Medicine

NEW INTEGRATED CURRICULUM (II)

- Integration (*Foundation*) course / 1st week
- Modular Organization: integration and continuity
- Common Trunks: cooperation between basic science / clinical medicine
- Research initiatives for students

NEW INTEGRATED CURRICULUM (III)

Semester (6 yrs-12 semesters): 360 ECTS → Master Degree

2 final semesters: professional year with clinical rotations

20% reduction in contact hours

Exposure to Community Medicine (1st / 2nd / 6th yrs) and hospital medicine (3rdyr: 9 weeks)

Electives (Medicine, Surgery, Pediatrics, Mental Health, Obst-Gyn, Community Medicine) during 4th and 5th yrs.

Optional Curriculum: disciplines, practical courses, community medicine and research projects

ADVANCED EDUCATION (I)

POST-GRADUATE COURSES (< 6 m)

MASTER DEGREE COURSES (2 yrs)

Theoretical program
Research project (Thesis)

PhD / DOCTORATE PROGRAMS

Biomedicine
Clinical Medicine
Health Sciences

ADVANCED EDUCATION (II)

Master Degrees Courses

Bioethics
Pain
Sleep Disorders
Palliative Care
Neurosciences
(→ PhD)
Medical Education
Mental Disorders

School Health
Clinical Nutrition
Human Sexuality
Emerging Infections Diseases
Forensic and Legal Medicine

Child and Adolescent Abuse
Dependency and Behavioural Disorders

ADVANCED EDUCATION (III)

	2005 / 2006 Programs	2005 / 2006 Students	2006 / 2007 Programs	2006 / 2007 Students
Post-Graduate Courses	20	807	11	496
Master Courses	11	350 (13%)	8	284 (34%)
PhD / Doctoral				
Biomedical Sciences		11		13
Clinical Medicine		2		4

PUBLICATIONS

FacMed Lisbon or FacMed Lisboa or Hosp Santa Maria or Inst Mol Med

420 records

Publication Year	*Nº publications*	*%*
2005	181	43.0952 %
2006	239	56.9048 %

PUBLICATIONS

	Nº of papers	%
Clinical Neurology	94	22.4
Basic Neurosciences	53	12.6
Peripheral Vascular Diseases	36	8.5
Immunology	32	7.6
Biochemistry and Molecular Biology	31	7.3
.....		

MISSION AND FUTURE

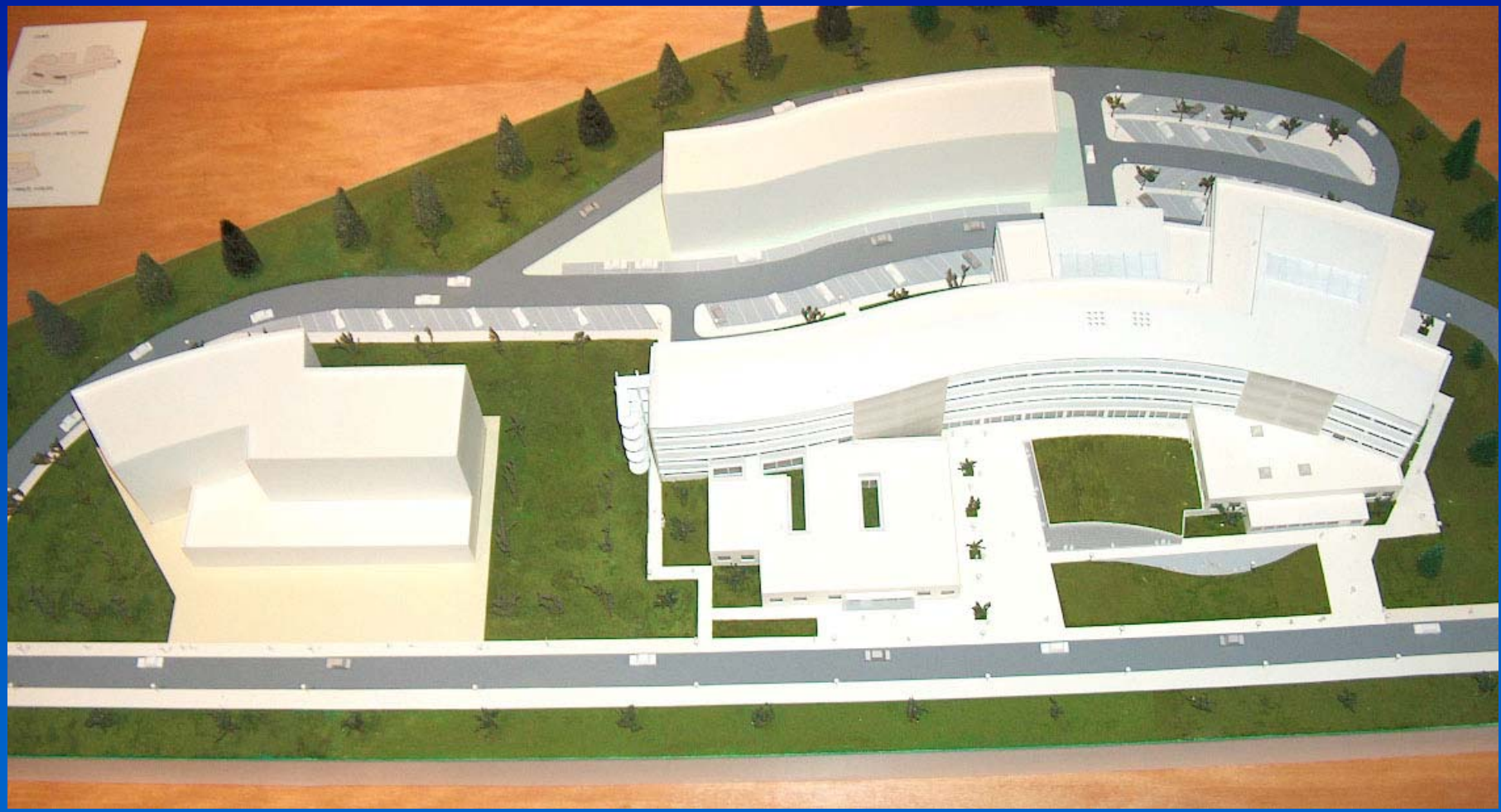
- **Science and Academic Medicine (MD/PhD programs)**
- **Academic Medical Centre**

  Strengthening the clinical network (*e-programs*)
  Improvement on Quality on Education and Provision of Health Services
  Engagement on active EMC / CPD programs
  Public Education on Health Issues

- **New Facilities for Research and Education**

  ***Câmara Pestana* Building**
  Institute of Advanced Education

NEW PROJECTED FACILITIES



NEW FACILITIES

Areas for Research Laboratories

Microbiology (Advanced)
Immunology

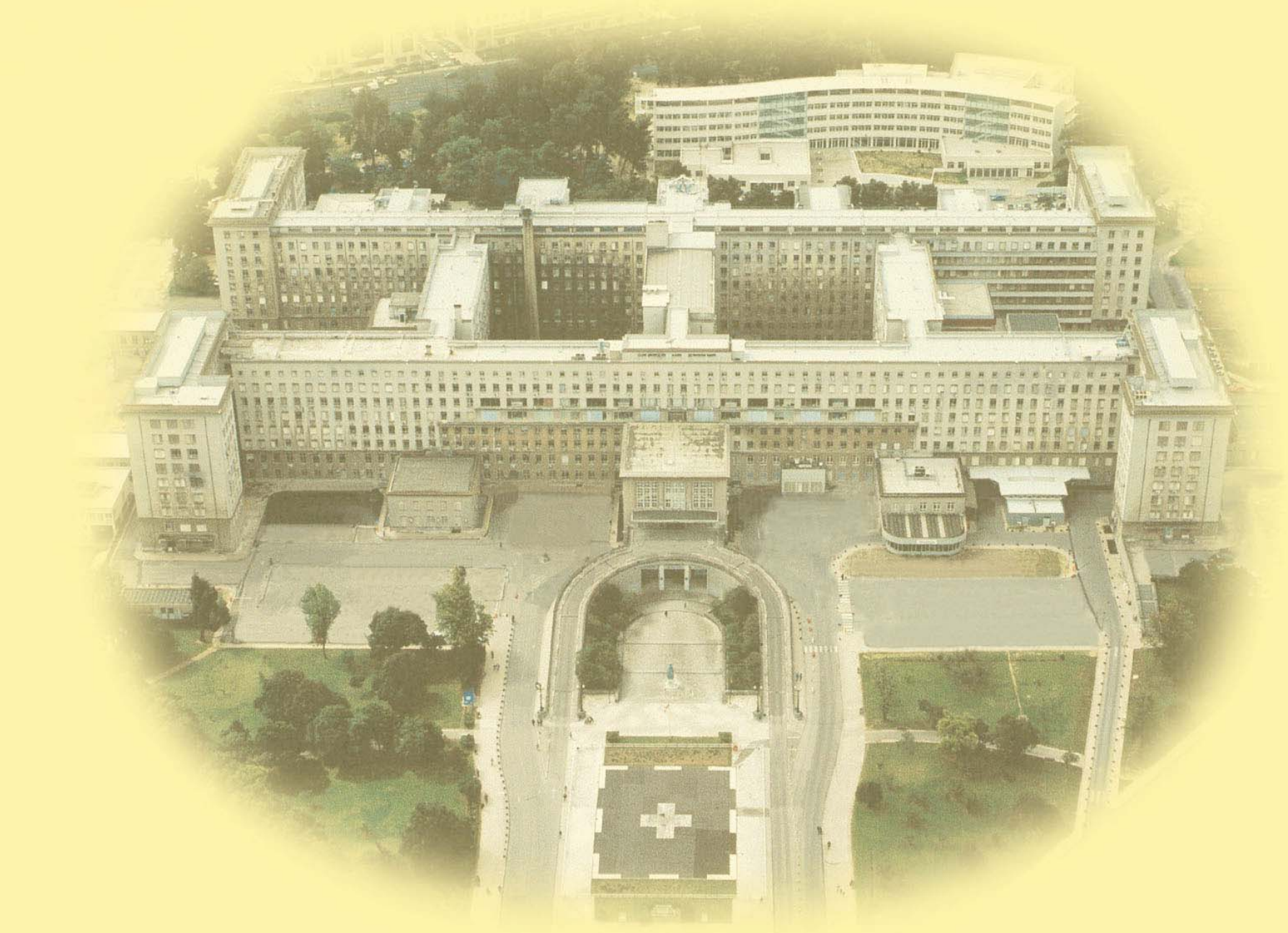
Virtual Reality Institute

Training and Education (Surgery, Trauma)
Robotic Surgery

MUCH TO DO

- Implementation (monitoring) of the new Curriculum
- Partnership for Clinical Teaching (resources, payment, quality improvement)
- Scientific development and international participation (*networking*)
- New areas (research / teaching) for understanding disease and to alleviate human suffering (new diseases, tropical medicine)
- New information technologies to disseminate knowledge

FACULTY OF MEDICINE - UNIVERSITY OF LISBON



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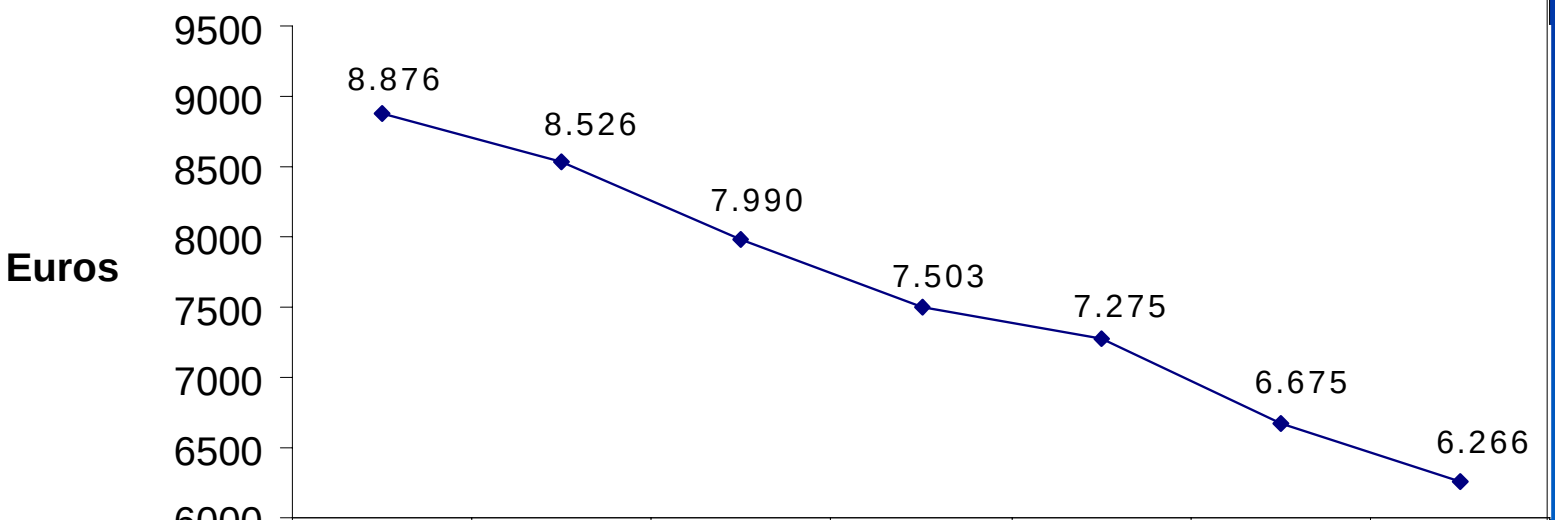
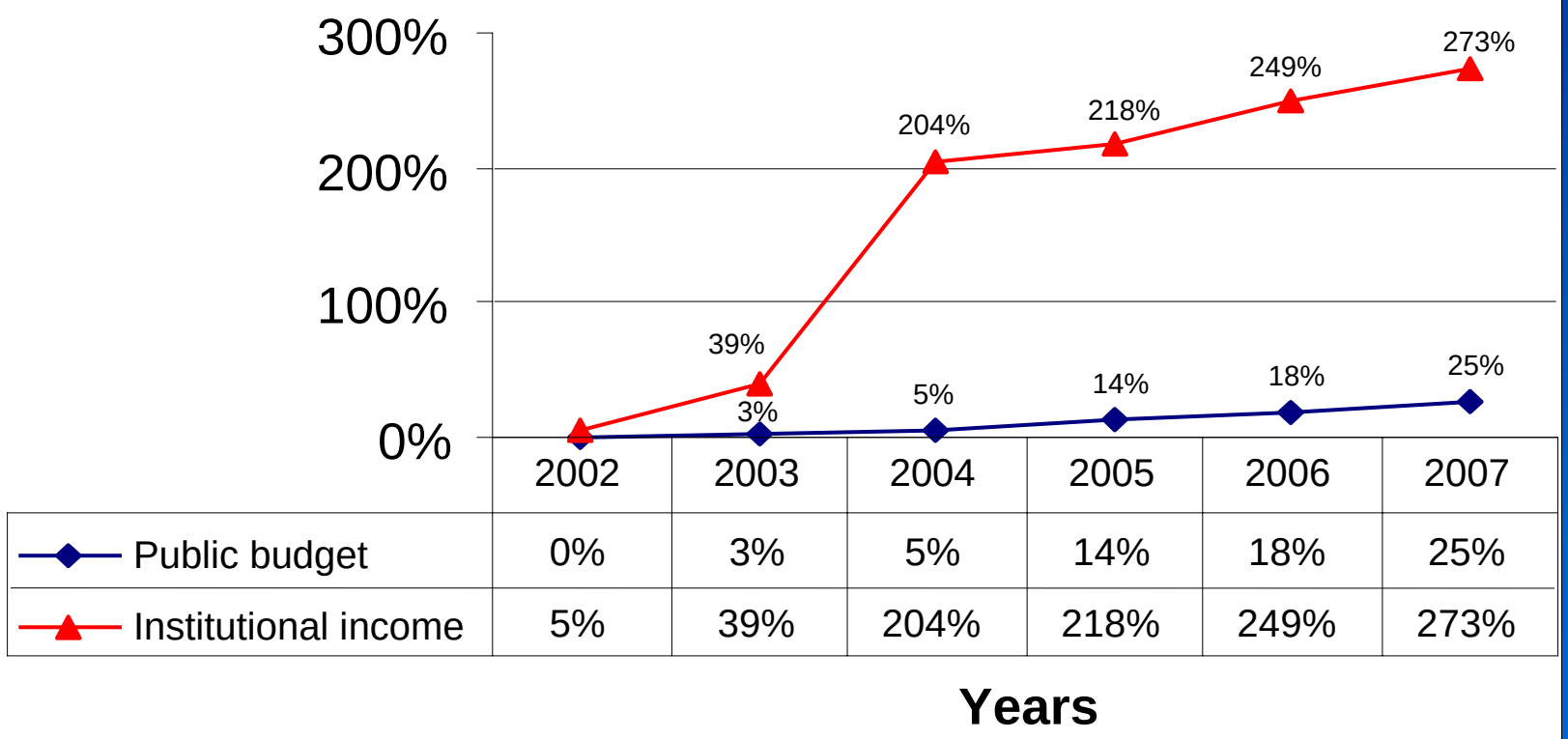
Public financial contribution per student



	2001	2002	2003	2004	2005	2006	2007
	8876	8526	7990	7503	7275	6675	6266

Total Budget Evolution: Public and Institutional



	2002	2003	2004	2005	2006	2007
Public budget	0%	3%	5%	14%	18%	25%
Institutional income	5%	39%	204%	218%	249%	273%

FACULTY OF MEDICINE - UNIVERSITY OF LISBON

Number of new admissions to FMUL

	2005 / 2006	2006 / 2007
MEDICINE	340	360
• *Numerus Clausus*	275	295
• UMa	30	33
• Others	35	34
• Graduates	-	8
• Female/Male	60/40%	65/35%
MICROBIOLOGY	40	40
NUTRITION	20	20

PUBLICATIONS

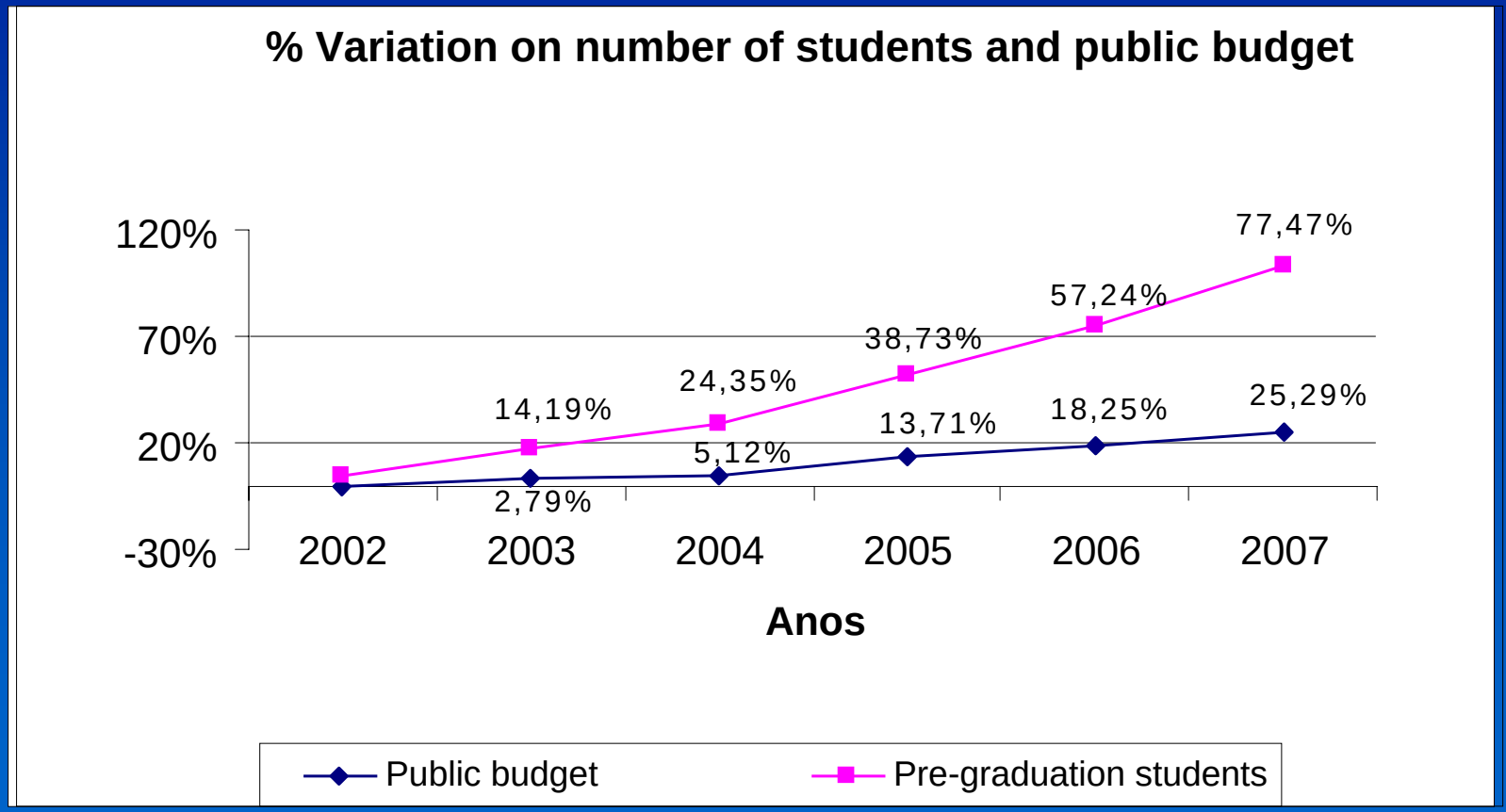
FacMed Lisbon or FacMed Lisboa or Hosp

Santa Maria or Inst Mol Med

420 records

Document type	***Nº publications***	***%***
ARTICLE	217	51.6667 %
REVIEW	20	4.7619 %
EDITORIAL MATERIAL	17	4.0476 %
LETTER	15	3.5714 %
MEETING ABSTRACT	151	35.9524 %

FACULTY OF MEDICINE - UNIVERSITY OF LISBON



E-LEARNING

- **Availability of pedagogic contents**

- **Discussion Forum**
- **Introduction to Clinical Medicine**
  6th Year (professional)

- **Continuous Medical Education**

  Palliative Care
  Sleep Sciences (European course)

Collaborations in Research and Education within an Academic Medical Center

David E. Golan, M.D., Ph.D.

HMS/Portugal Collaboration

April 16, 2007

Collaborations in Research and Education within an Academic Medical Center

- Role of research and in-depth projects in education
  - Proposal for areas of concentration in the Harvard Medical School curriculum
  - Student-faculty collaboration on a textbook of pharmacology
- Collaborations among sciences and disciplines within the institution
  - Core facility for single-molecule research
  - Research collaborations among multiple laboratories

Role of Research and In-Depth Projects in Education:

Proposal for Areas of Concentration in the Harvard Medical School Curriculum

Concentration with In-Depth Project Rationale

- Provide graduate-level experiences in specific Concentrations to foster scholarship, discovery, leadership and service
- Foster self-directed and life-long learning
- Foster academic rigor and critical analysis
- Develop common and Concentration-specific skill sets for in-depth exploration and career preparation
- Provide opportunities for close faculty mentoring around a collaborative project
- Provide opportunities for production of a thesis or scholarly work
- Build on and strengthen existing in-depth experiences at HMS

Concentration with In-Depth Project Proposal

- Integral component of curriculum, not “enrichment”
  - Requirement for graduation with MD degree
- Three broad Concentrations
  - Biology in Medicine
  - Medicine in Society
  - Patient Oriented Research

Concentration with In-Depth Project Goals: Biology in Medicine

- Learn to identify important problems in biology and medicine that merit further investigation
- Make an individual contribution to medical knowledge by actively engaging in biomedical investigation
- Understand the connections among basic biomedical research, patient oriented research, and studies in medicine and society

Concentration with In-Depth Project Goals: Medicine in Society

- Learn to identify critical social and ethical problems in medicine
- Develop skills to identify needs and engage diverse communities in research and intervention
- Make an individual contribution to medical knowledge by actively engaging in an in-depth project in social science or humanities
- Understand the connections among basic biomedical research, patient oriented research, and studies in medicine and society

Concentration with In-Depth Project Goals: Patient Oriented Research

- Undertake didactic and mentored practical training in translational research, human pharmacology, biostatistics, clinical epidemiology and clinical trials
- Make an individual contribution to medical knowledge by actively engaging in patient oriented investigation
- Understand the connections among basic biomedical research, patient oriented research, and studies in medicine and society

Concentration with In-Depth Project Curriculum

- Concentration elements span entire MD curriculum
  - Year 1 (January block): Core courses for all three Concentrations
    - Research design and methods (4 weeks)
    - Two critical reading courses (2 weeks each)
  - Years 1-2: Elective courses, develop project proposal
  - Years 1-4+: Conduct in-depth project (minimum of 4-6 months full-time equivalent)
  - Final year: Write and submit thesis or scholarly work

Concentration with In-Depth Project
Advising, Mentoring, Infrastructure

- Longitudinal advising for each Concentration throughout the medical school years
- Mentoring of in-depth project
- Resources and infrastructure support for:
  - Directors of Concentrations
  - Board of Scholarly Advisors
  - In-depth project mentors
  - Students

Design Group on In-Depth Educational Experiences

Members and Subgroups

David Golan, co-chair
Eleftheria Maratos-Flier, co-chair

Biology in Medicine Subgroup

Thomas Michel (chair)
Ehrin Armstrong
Stephen Blacklow
Joseph Bonventre
Constance Cepko
Thomas Fox

David Golan
Anne Nicholson-Weller

Medicine in Society Subgroup

Elizabeth Miller (chair)
Elizabeth Armstrong
Karimi Gituma
Mary Jo Good
Vanessa Harris
Howard Hiatt

Kenneth McIntosh
David Urion

Patient Oriented Research Subgroup

Eleftheria Maratos-Flier (chair)
Emery Brown
Julie Buring
Gary Curhan
Maurizio Fava
Douglas Hanto

Amanda Munoz
J. Woodrow Weiss

Research Design and Methods Course Subgroup

David Golan (chair)

Elizabeth Armstrong
Emery Brown
Julie Buring
Elizabeth Miller
Anne Nicholson-Weller

Student-Faculty Collaboration on a Textbook of Pharmacology

Student-Faculty Collaboration on a Textbook of Pharmacology
Background

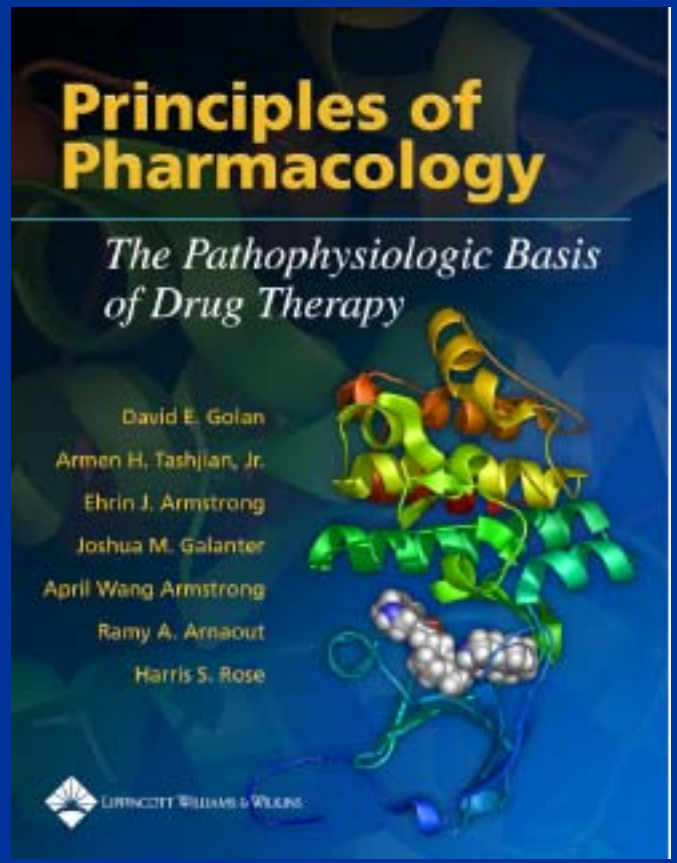
- Principles of Pharmacology course in the New Pathway curriculum at Harvard Medical School
  - Mechanism-based
  - Pharmacology in the context of biochemistry, physiology, and pathophysiology
- Students recognized the need for a new textbook of pharmacology structured in the same way as the course
- Students approached course director in April 2000 with proposal to write a textbook together

Student-Faculty Collaboration on a Textbook of Pharmacology Implementation

- Students and course director met for 6 months to plan critical features of textbook
  - Mechanism-based
  - Pharmacology grounded in biochemistry, physiology, and pathophysiology
  - Clinical cases used to introduce each system
  - High-quality art program to illustrate pathophysiology and mechanisms of drug action
- Draft textbook chapters critically reviewed by students in pharmacology course
- Students and faculty collaborated in all phases of writing and editing the book's 52 chapters

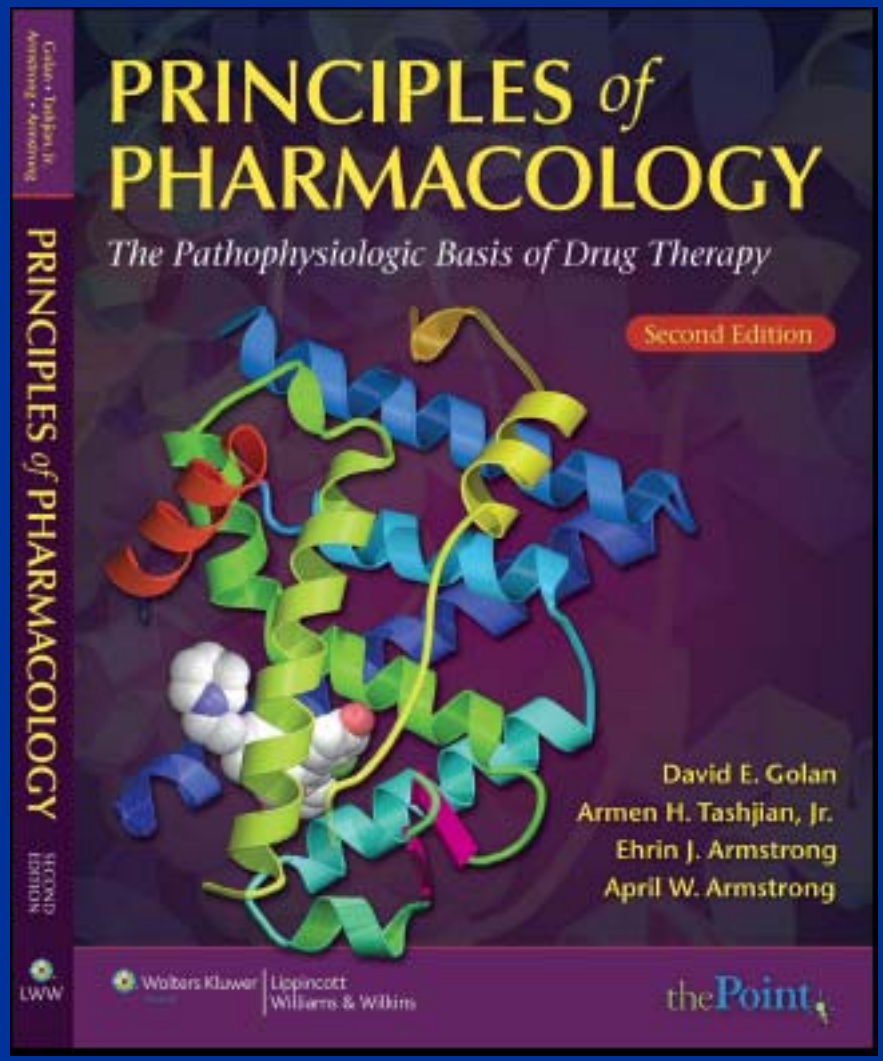
Principles of Pharmacology: The Pathophysiologic Basis of Drug Therapy

- Published in April 2004
- Now a leading textbook in the field
- Translated into four languages



Second Edition!

- To be published on April 27, 2007
- Portuguese translator needed…



Collaborations Among Sciences and Disciplines within the Institution:

Core Facility for Single-Molecule Research

Core Facility for Single-Molecule Research
Scientific Capabilities

- **Single-molecule fluorescence imaging**
  - Total internal reflections fluorescence
  - Fluorescence resonance energy transfer
- **Single-molecule manipulation**
  - Flow-stretching
  - Magnetic tweezing
  - Optical trapping
- **$600,000 proposal to NSF**
- **$100,000 institutional support**

Core Facility for Single-Molecule Research
Major User Groups

- **Membrane proteins**
  - David Golan, HMS Biol. Chem. & Mol. Pharm. (co-PI)
  - Timothy Springer, HMS/CBR Pathology
  - Donald Ingber, HMS/CHB Pathology
  - David Clapham, HMS/CHB Neurobiology
  - Stephen Harrison, HMS Biol. Chem. & Mol. Pharm.
  - James Hogle, HMS Biol. Chem. & Mol. Pharm.
- **Cytoskeletal dynamics**
  - Michael Eck, HMS/DFCI Biol. Chem. & Mol. Pharm.
  - David Pellman, HMS/DFCI Biol. Chem. & Mol. Pharm.
  - Stephen Harrison, HMS Biol. Chem. & Mol. Pharm.

Core Facility for Single-Molecule Research
Major User Groups

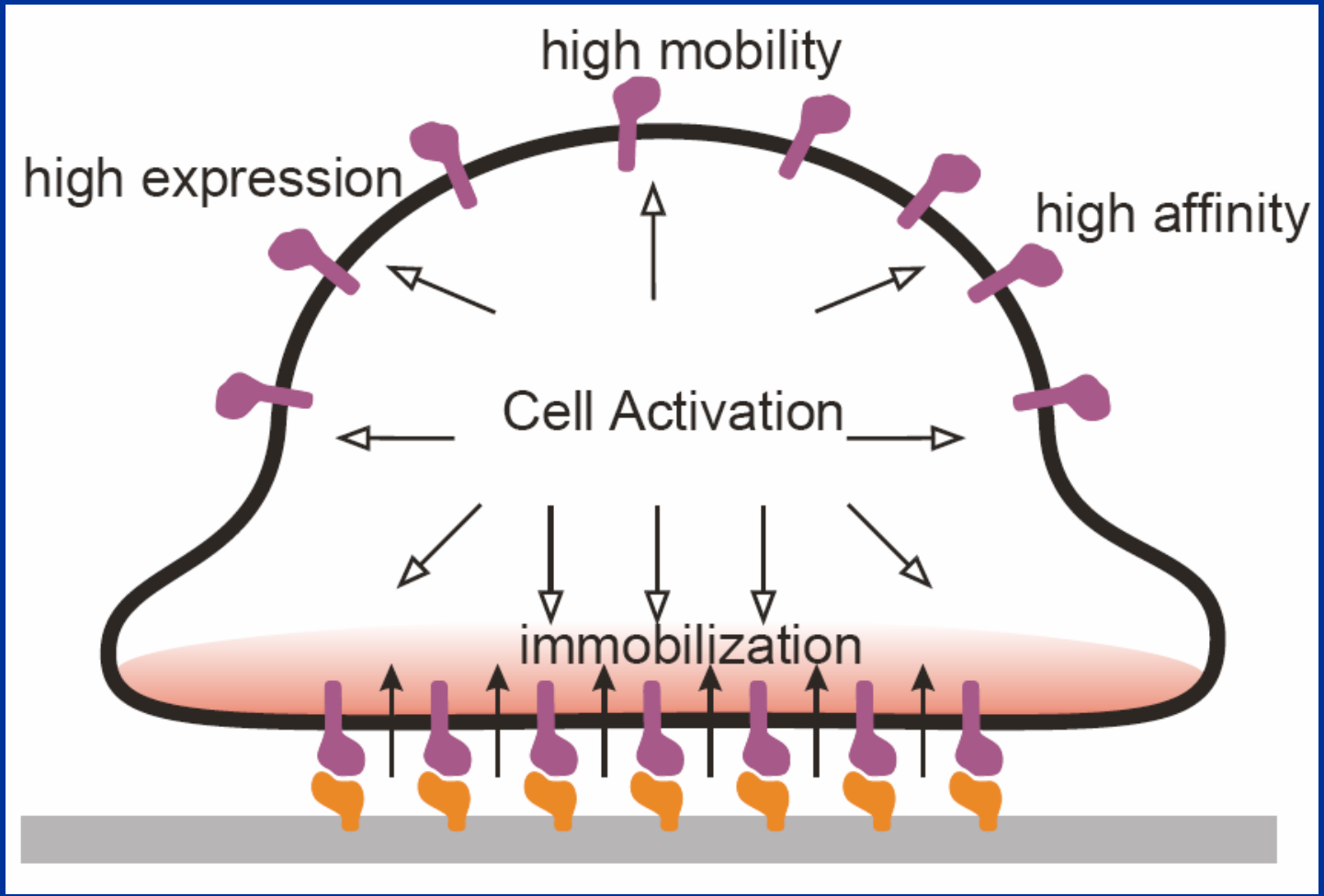
- **Nucleic acids and nucleic acid-binding proteins**
  - Antoine van Oijen, HMS Biol. Chem. & Mol. Pharm. (co-PI)
  - Stephen Buratowski, HMS Biol. Chem. & Mol. Pharm.
  - Donald Coen, HMS Biol. Chem. & Mol. Pharm.
  - Mara Prentiss, Harvard University Physics
  - Pamela Silver, HMS Systems Biology
  - Jack Szostak, HMS/MGH Genetics
- **Bioengineering applications**
  - David Weitz, Harvard University Physics/Engineering
  - George Whitesides, Harvard University Chemistry

Research Collaborations Among Multiple Laboratories

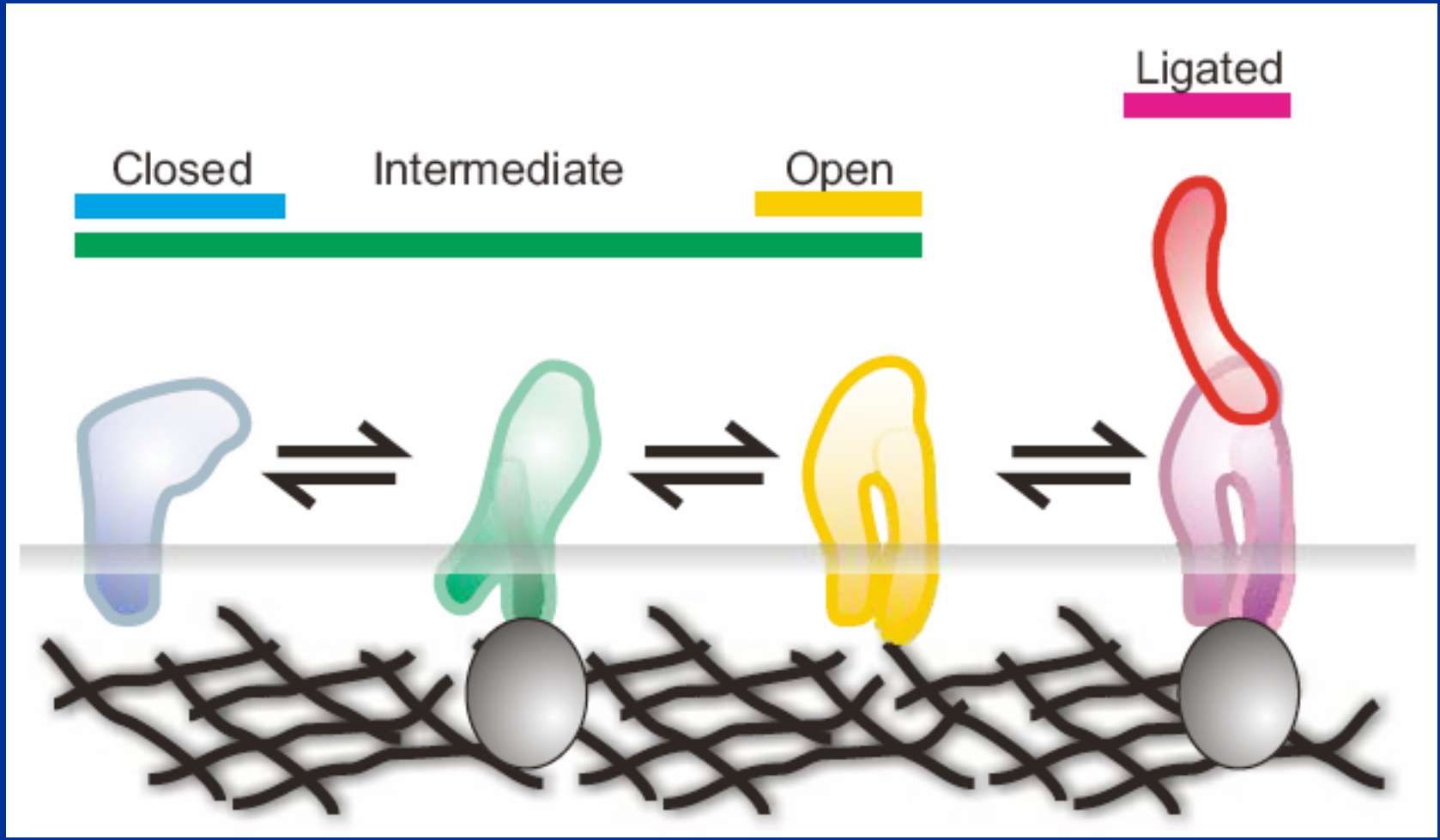
Current Research Collaborations Involving the Golan Laboratory
(All at Harvard Medical School)

- Prof. Thomas Michel, Brigham and Women's Hospital (Endothelial cell signaling pathways): 7 postdoctoral fellows, 1 PhD student, 1 MD-PhD student; 7 publications since 1998
- Prof. Gerald Pier, Channing Laboratory (*Pseudomonas aeruginosa* invasion of pulmonary epithelial cells): 3 postdoctoral fellows, 1 MD-PhD student; 3 publications since 2000
- Prof. Christopher Walsh, Biological Chemistry and Molecular Pharmacology (Site-specific labeling of membrane receptors): 2 postdoctoral fellows, 1 graduate student; 4 publications since 2005

Dynamic Regulation of Adhesion Receptor Lateral Mobility



Dynamic Regulation of Integrin Lateral Mobility



HARVARD CENTER FOR NEURODEGENERATION & REPAIR

The Power of Collaboration

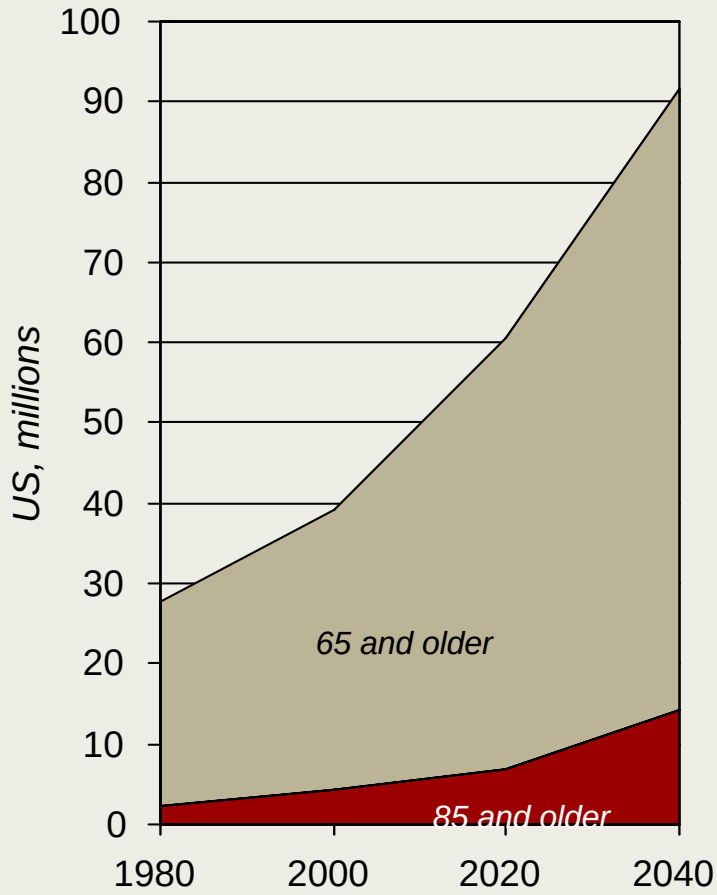
Understanding and Treating Neurodegenerative Diseases

Portugal

April 2007

The Aging Population and Neurodegenerative Diseases

- Elderly population expanding
- Age increases risk
- 10% of > 65 years have Alz Dis
- 5.1M patients today.
- By 2035, 10 million cases



The Power of Collaboration

- Individual investigator lab:
  - Disease specific
  - Limited techniques
  - Homogeneous peers
  - One institution
  - Single discipline

- **The Network:**
  - **Multiple diseases**
  - **Technically diverse**
  - **Many investigators/labs**
  - **Multi-institutional**
  - **Multidisciplinary**

The Power of Collaboration

Collaboration Requirements

- Flexible and responsive
- As big as needed
- Shared, well defined vision
- Agreed strategy
- Team behaviour
- High level support

Collaboration Risks

- Insecurity of individuals
- Loss of independence
- Need to change behaviours
- Another layer of bureaucracy

Required People/skills

Molecular biologists

Epidemiologists

Pathologists

Project managers

Physicians

Basic research → Disease mechan. → Animal models → Therapy develop. → Tech transfer → Clinical trials

Informaticians

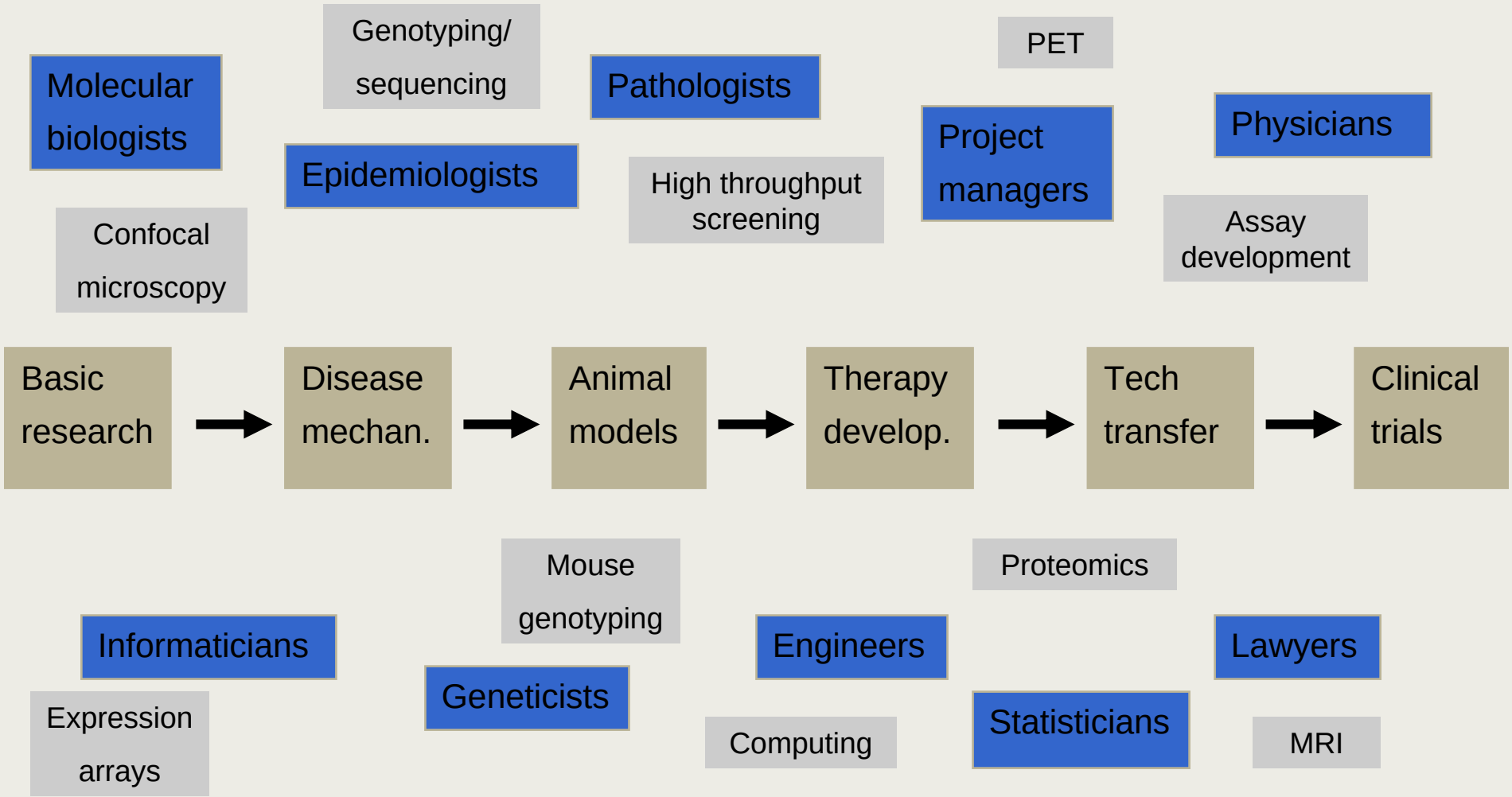
Geneticists

Engineers

Statisticians

Lawyers

Tools and Techniques



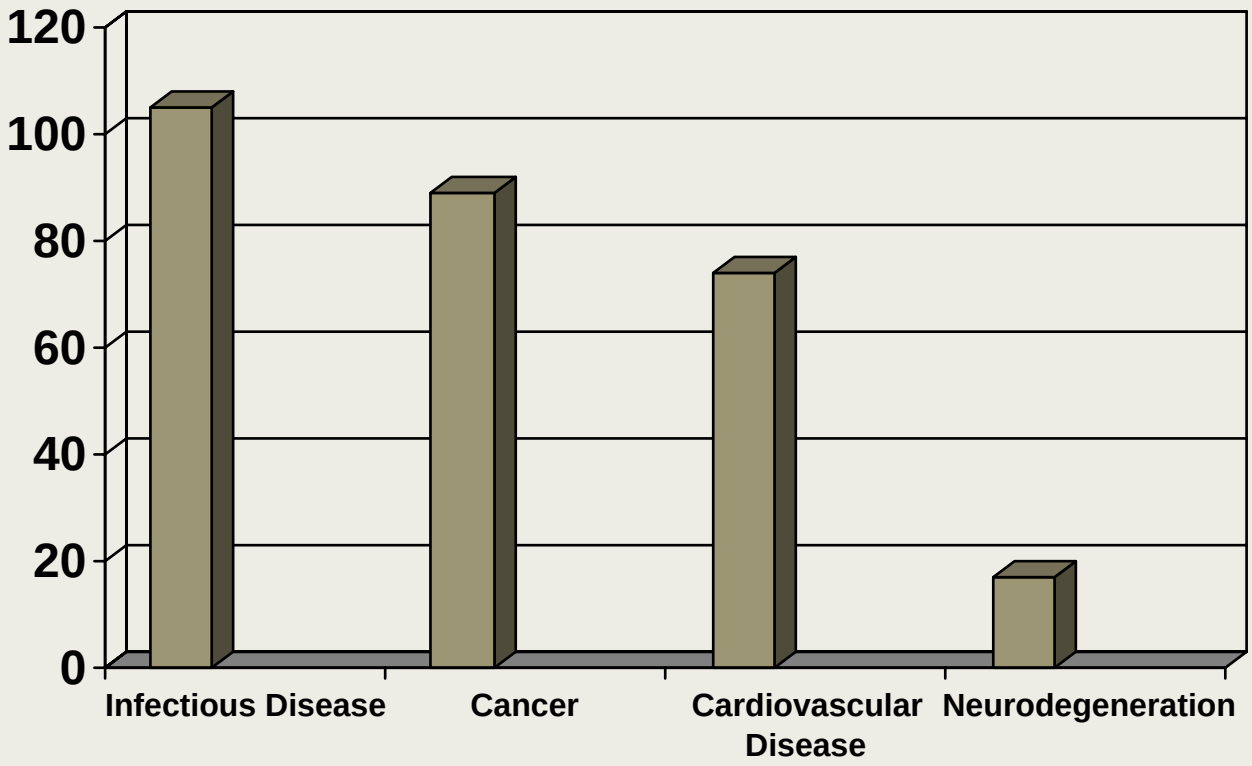
Administration / Support

- Project management
- Legal services (inter-institutional agreements/ IP etc)
- Fundraising/grant writing
- Business development
- Meetings/symposia
- Web development/communications
- Financial services

Authority & Leadership

- Requires support from institutions
- Requires $ € £
- Requires enthusiasm from senior investigators
- Requires support from industry/community

FDA-approved drugs 1995-2004



Drug Discovery

Basic research

⇩

Disease mechanism

⇩

Target identification

⇩

Assay development

⇩

Screening (lead discovery)

⇩

Lead optimization

⇩

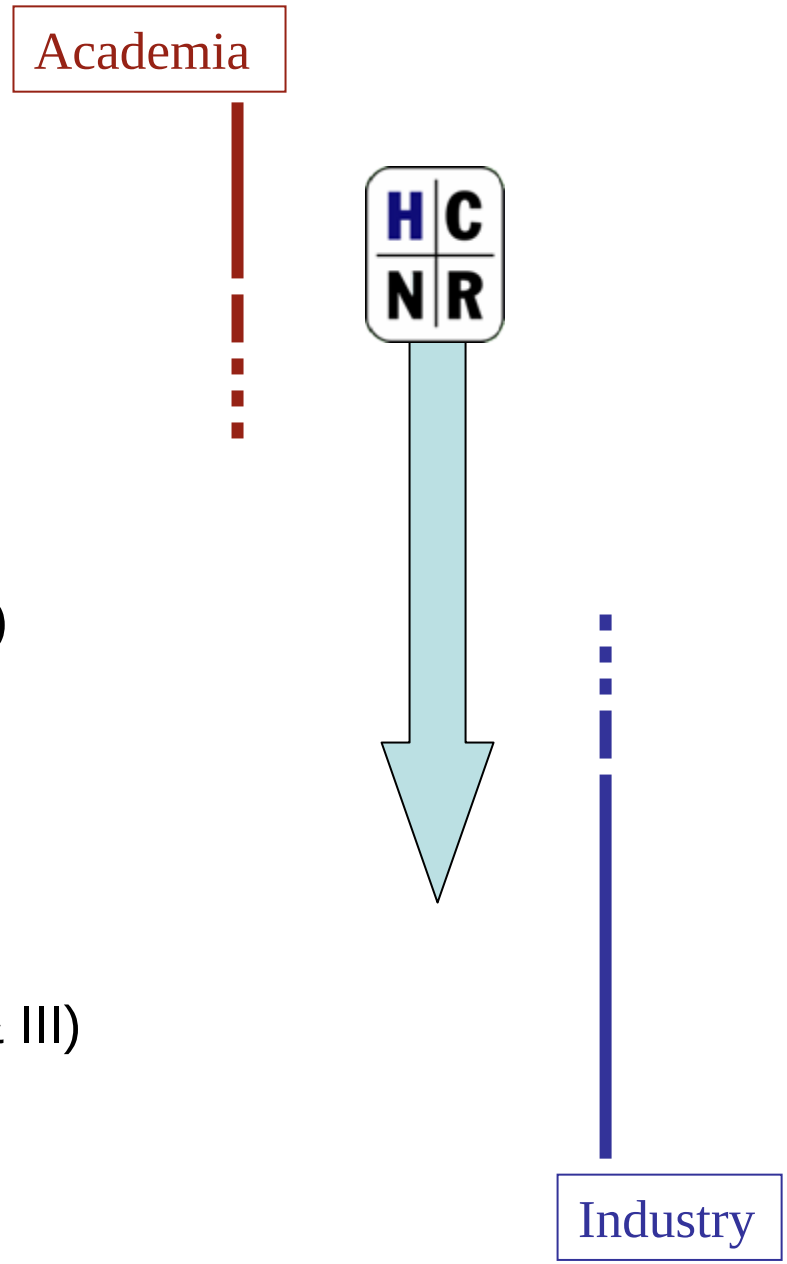
Preclinical development

⇩

Clinical trials (phases I,II & III)

⇩

Submission/approval



Lab Drug Discovery Neurodegeneration

Biotech-style group

14 full-time staff

>70 years of industry experience

3,900 sq.ft. of lab space

Highly automated

Assay development

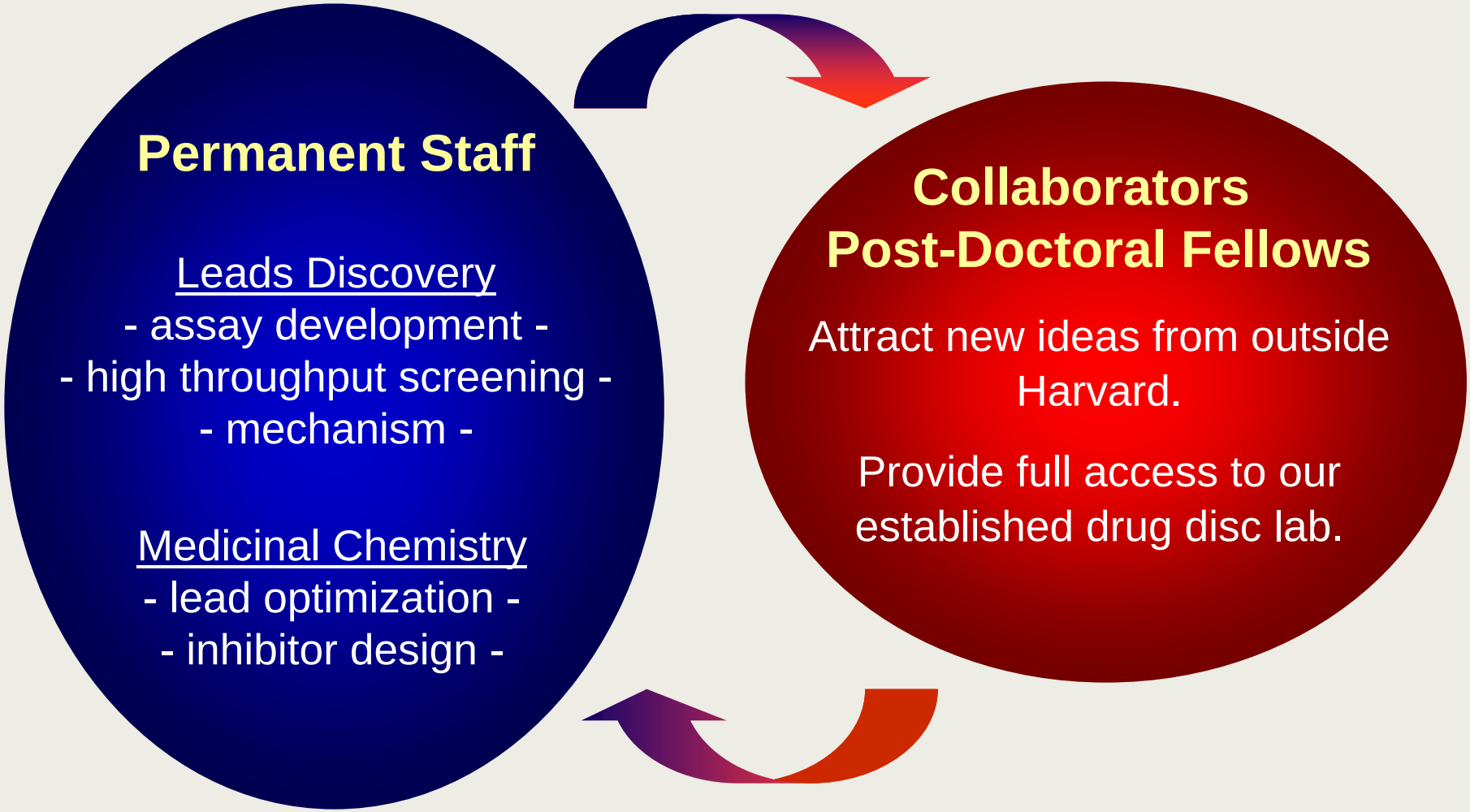
140,000 compound library

Screening

Medicinal chemistry

Animal Efficacy

Lab Drug Discovery Neurodegeneration



Lab Drug Discovery Neurodegeneration

Working on 14 projects, in parallel.

- 4 on Alzheimer's disease
- 1 on ALS
- 1 on Huntington's disease
- 2 on multiple sclerosis
- 3 on Parkinson's disease
- 3 others

Collaborating closely with 6 hospitals in Boston plus 7 other universities.

3 studies advanced to animal testing stage.