

Institute for Bioengineering of Catalonia (IBEC)

Jornada Farmaindustria – MINECO

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Engineering solutions for health

Who are we?



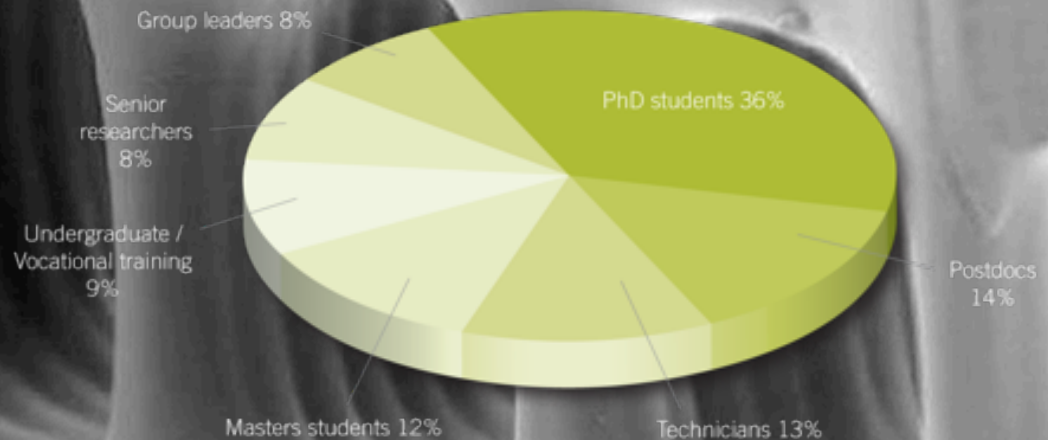
We're a multidisciplinary research centre focused on bioengineering and nanomedicine

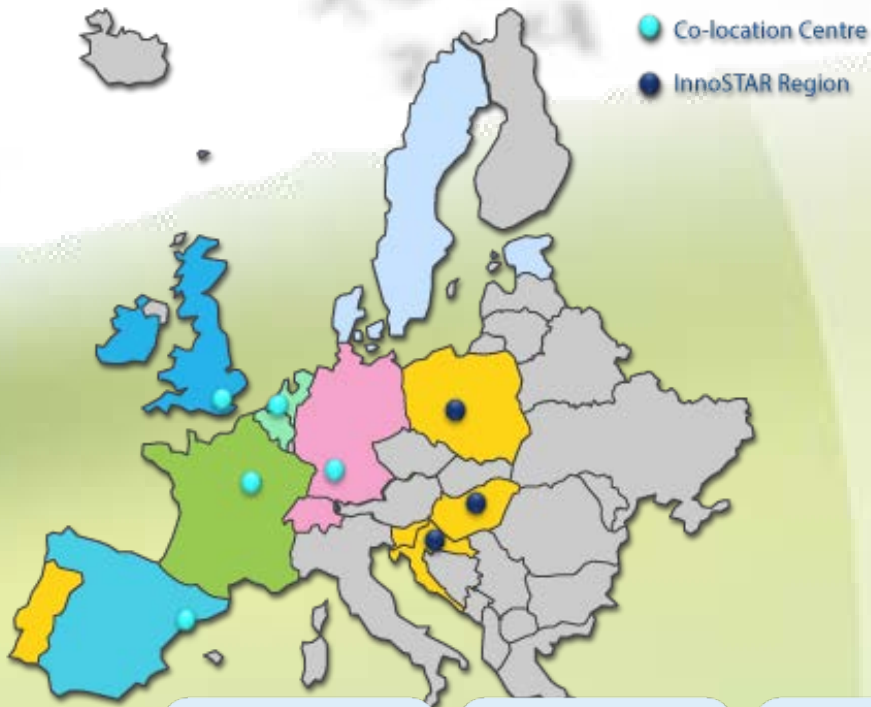


A growing organization with a staff of c.250 researchers and expert technicians, with more than 30% coming from abroad

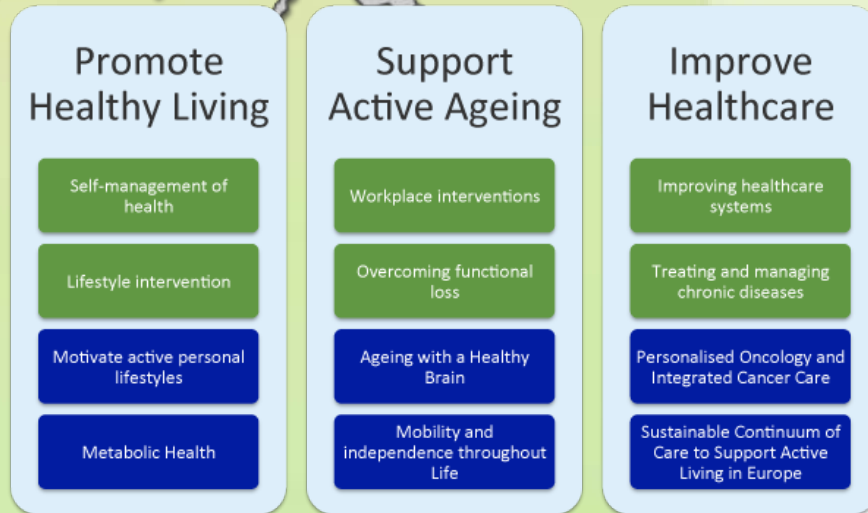


35
71% of staff are under 35





EIT Health: A consortium of 144 European companies, research institutes and universities - including IBEC - was selected by the European Institute of Innovation and Technology to be the Knowledge and Innovation Community (KIC) on healthy living and active ageing, EIT Health.



■ Business Objectives
■ Example projects

With a total of €2.1 billion it is one of the largest public funded initiatives for health worldwide. For the next seven years, EIT Health – which also includes INSERM (France), Imperial College (UK), Roche, Siemens and Philips – will develop innovative products, education and services addressing the challenge of demographic change in Europe.

Who are we?



The Institute for Bioengineering of Catalonia (IBEC) is a
multidisciplinary research centre in
bioengineering and **nanomedicine**

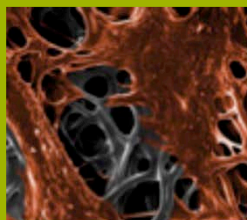


Strategic Focus to three areas of application...

...promote interaction between IBEC's multidisciplinary groups and help the institute's research remain application-oriented.



Bioengineering
for Future Medicine



Bioengineering
for **Regenerative Therapies**



Bioengineering
for Active Ageing

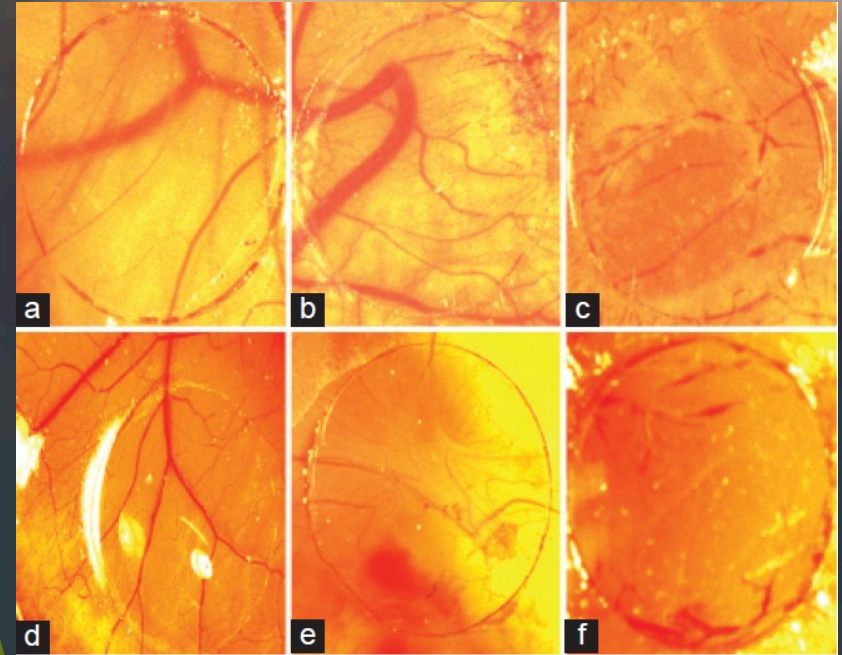


Bioengineering for Active Ageing

Wound Healing treatment

New dressing for Wound Healing, the most common chronic wounds in the over 65s. Market: elderly and diabetic patients.

Dermoglass is a special wound dressing developed to accelerate the regeneration of the skin in hard-to-heal skin ulcers, which are a major public health problem particularly for the elderly, bedridden and wheelchair-bound and which result from various causes, ranging from diabetes to a simple lack of blood supply. The IBEC group's innovative technology stimulates vascularization in the damaged tissue so that the ulcer heals more quickly, with a 80% reduction in the size of the wounds in just eight days of treatment.





Bioengineering for Active Ageing

Alzheimer Disease, early detection

Why Alzheimer's patients have no memory loss when the disease starts? Early detection is a key feature for the disease management.

Researchers discovered a new factor that participates in the lack of symptoms in the early stages of Alzheimer's disease – which is one handicap that makes the disease so hard to diagnose. Previous studies had looked at the levels of the cellular prion protein (PrPc) in advanced stages of the disease, but the new study shows – both in mice and human brains affected by Alzheimer's – an increase in protein PrPc during the early, asymptomatic stages of the disease. However, these levels of PrPc decrease as the disease progresses. When PrPc levels are low, the amount of tau – as well as its phosphorylated form that makes the tangles inside the cell – increases, contributing to the brain deterioration observed in Alzheimer's.

PRPc, sobreexpresada en las fases asintomáticas de EA

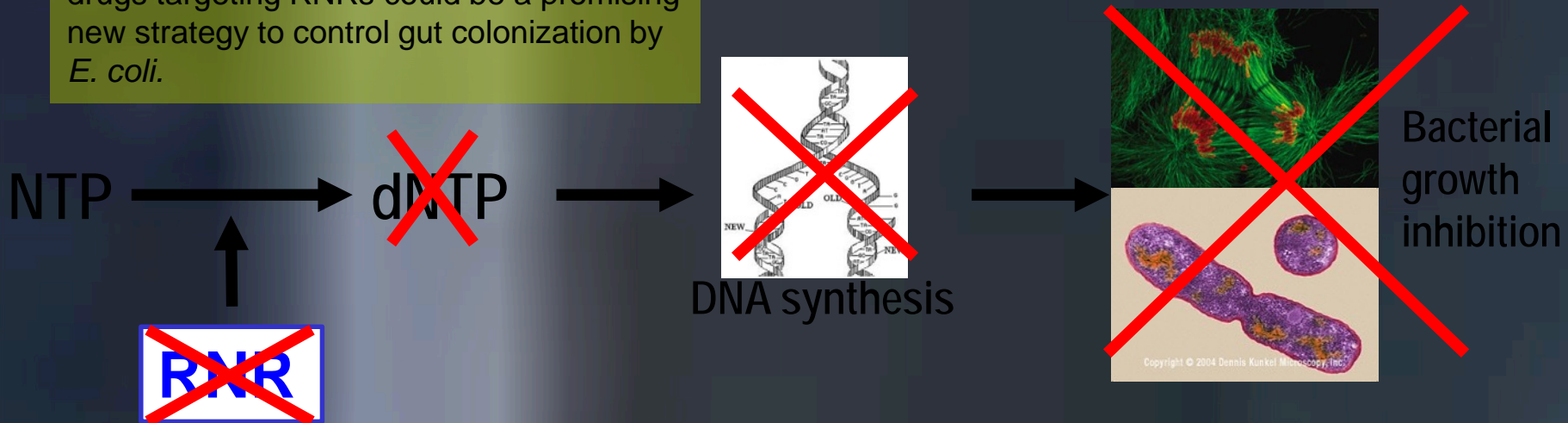
Ya conocido el papel de los niveles de la proteína celular priónica (PRPc) en estadios avanzados de la enfermedad de Alzheimer, ahora una investigación del IBEC y la UB ha descubierto que los niveles de esta proteína también tienen un aumento en las primeras fases asintomáticas de la enfermedad. Según este estudio, la expresión de PRPc observada al inicio de la EA formaría parte de una respuesta protectora del sistema nervioso en un

intento por reprimir su avance", explica José Antonio del Río, investigador principal perteneciente al IBEC. En fases posteriores y conforme avanza la EA se observaría, por el contrario, una disminución progresiva de los niveles de PRPc, señal de que el sistema ha dejado de reprimir el curso de la patología. Además, también se ha descubierto el porqué una menor actividad de TREM2 provoca un aumento del riesgo de EA o demencia frontotemporal. P32



The IBEC group found that ribonucleotide reductases (RNRs) – enzymes that provide the building blocks for DNA replication in all living cells – play an important role in *Escherichia coli* virulence and infection, which is particularly dangerous for the weak or elderly. The increased resistance to existing antibiotics and the lack of new antibiotics in development means that identifying new alternatives to treat bacterial infections is crucial, and thanks to these new findings, the development of drugs targeting RNRs could be a promising new strategy to control gut colonization by *E. coli*.

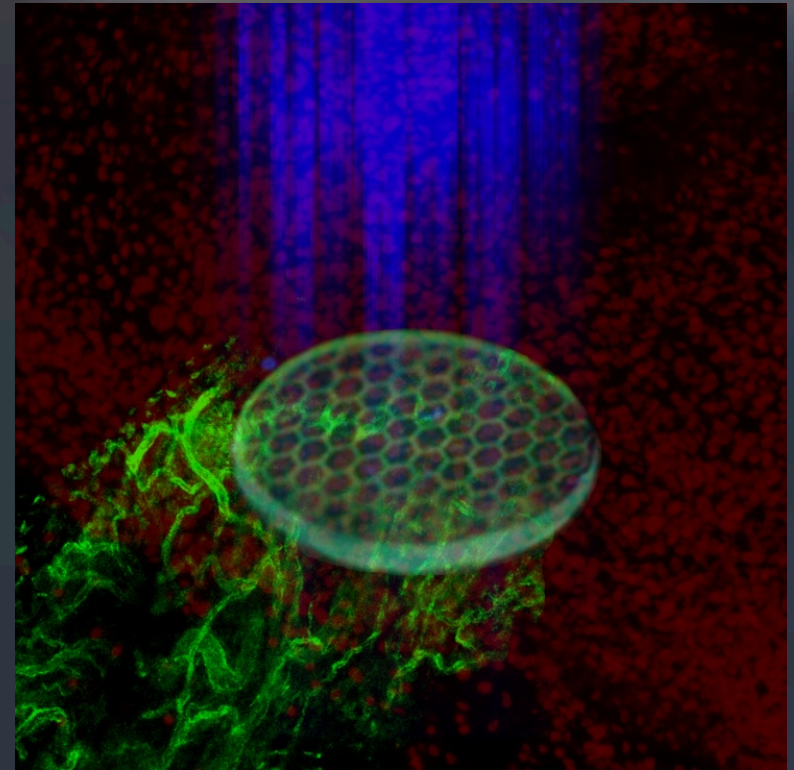
Hit-to-lead programme based on a proprietary patent on new strategies to treat biofilm forming bacterial infections





Transversal strategy to operate
with light activated drugs.
Treatment site selection.

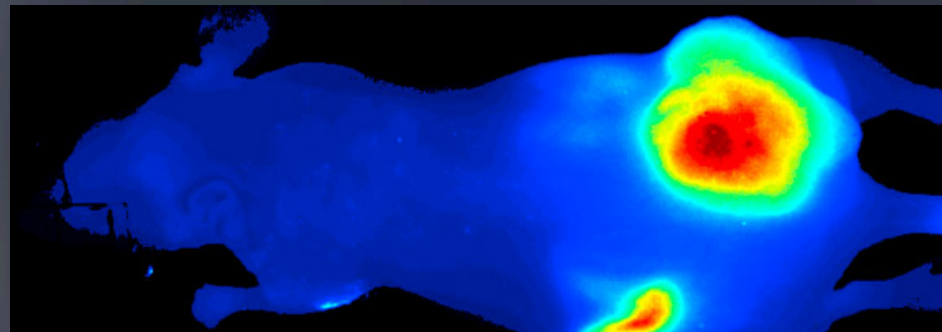
IBEC researchers developed the first light-controlled therapeutic agent whose effects focus specifically on the largest, most important class of drug target proteins – G protein-coupled receptors. Controlling drug activity with light means that the therapeutic effects can be accurately delivered locally, thus reducing their effect on other areas and the resultant side effects, and helps reduce the dosage required.





Mammary cells detect tissue stiffening, which is key to the development of breast cancer. Until now, how cells could detect tissue stiffness and why they react differently in healthy versus malignant conditions had not been understood: This study was the first ever that described a molecular mechanism of rigidity sensing by cells, demonstrating how the molecules that cells use to attach to their environment, called integrins, allow the cells to detect and adapt to tissue rigidity. This would have an enormous potential for possible therapies designed to prevent malignant alterations in tissue stiffness.

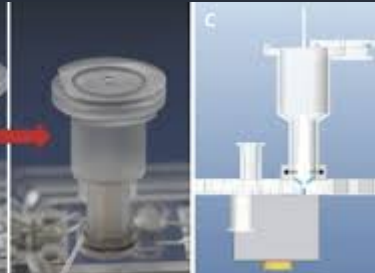
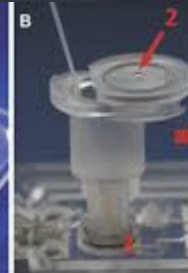
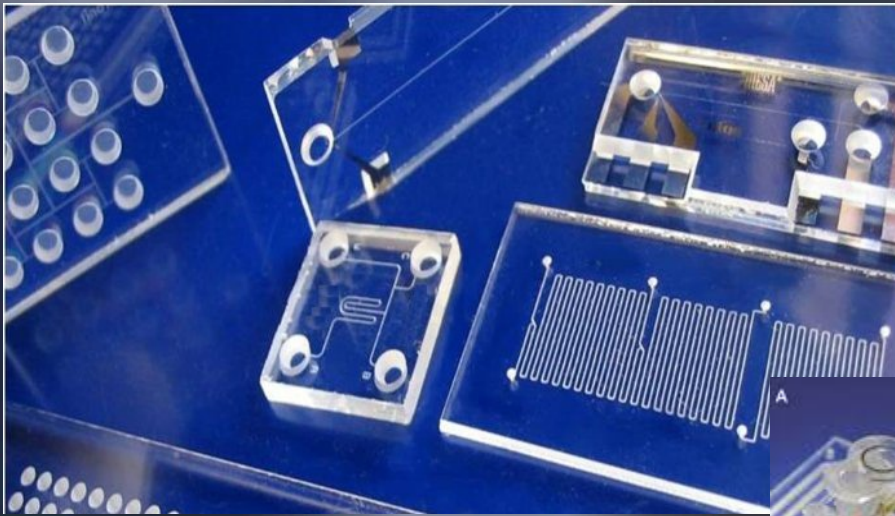
Hit-to-lead program based on a novel mechanism of action. Based on recent IP proprietary (patent).

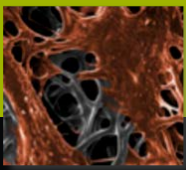




Point of care and IVD technology based on proprietary microfluidic technology.

The use of microfluidics is key to design lab-on-a-chip devices and point of care systems. We developed during last years an important depot of know how on microfluidics applied specifically to IVD devices. We have a long experience in working with the industry, we are now working now with several companies and during the next coming months a new last generation point of care device will reach the market.





Our new 3D bioprinter....

With this technology, IBEC is uniquely placed in South Europe. Only 6 in EU.

...putting IBEC at the cutting-edge of advances in tissue regeneration

The Bioprinter will allow us to fabricate spatially controlled cellular structures, using biomaterials combined with cells or thermopolymers, in which cell function is preserved. 3D cultures are more resistant, offer more realistic environments for cell function, and provide more reliable data. Our aim is to achieve human-scale tissue constructs and vascularised tissues with structural integrity.

Technology Transfer office:

MARKET DRIVEN



Select the tech transfer project



- 1. Company on Board**
- 2. Tech Transfer Project: Patent, KOL, market research, regulatory affairs, scale up limitations,**

Technology Transfer office: **MARKET DRIVEN**

- **Patents.** for market reasons and with scientific commitment.
- **IP concentration.** The less the better.
- **Tech Transfer Project.** project plan with commercial milestones
- **Agreements with the industry:**
 - Fee for service
 - Contract research
 - Strategic alliance (Joint Unit)

www.ibebarcelona.eu