

# New Medicines based on the Adenosine Receptors Modulation



Innovation through medicinal chemistry

**Dr. Julio Castro (CEO)**

**IX Conferencia Anual de las Plataformas Tecnológicas**

**Barcelona, 15 y 16 de Marzo, 2016**

# Palobiofarma: Introduction

Spanish Biotech company founded in 2006 and based in Pamplona; Navarre

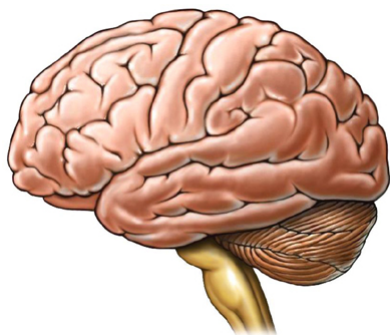
**Mision:** Discovery of new medicines dealing with modulators of the **adenosine receptors**

**Vision:** Discover the first marketed drug based on a selective **adenosine receptor** modulator

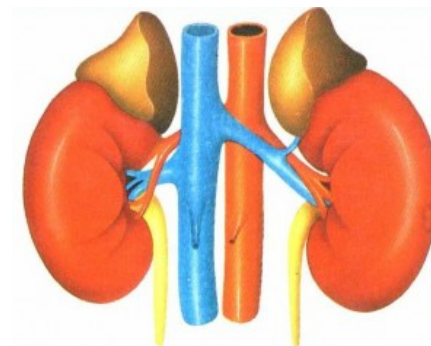
VC-backed since 2010, with a total of **4Mio €** raised private financing

Additionally the company has been supported by around **5 Mio €** in public funding (ENISA+CDTI+MINECO+EUROPEAN FUNDING)

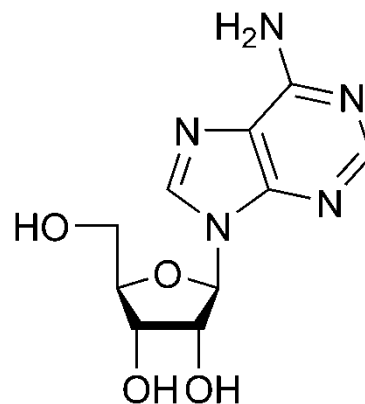
# Adenosine Receptors as Therapeutic Targets: Challenge



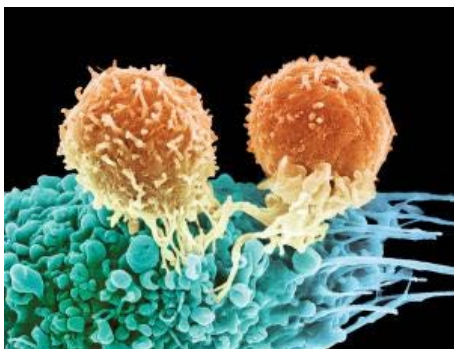
**Broad CNS effects**



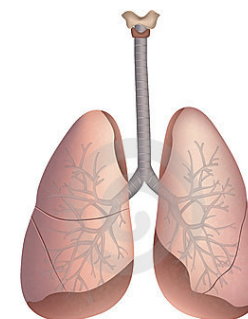
**Broad renal effects**



A1; A2a; A2b, A3



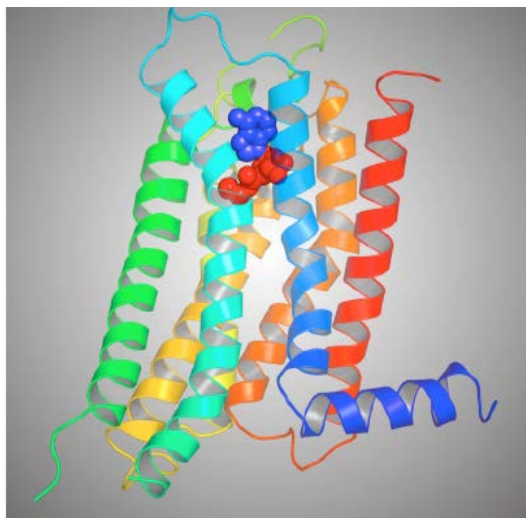
**Immunomodulatory effects**



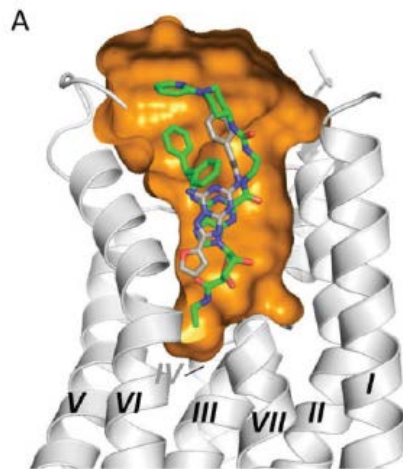
**Broad pulmonary effects**

## Opportunity: Structure-based design

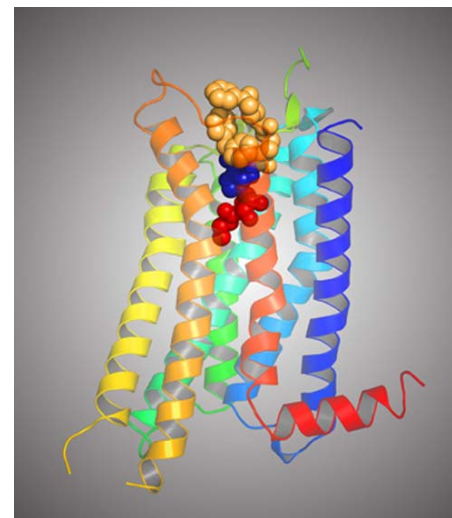
The recent determination of X-ray structures of the Adenosine receptors has made these targets accessible to structure-based ligand discovery



**2006**; Stevens et al  
Bound to the Antagonist  
ZM 241,385



**2010**; Stevens et al  
Bound to the Agonist  
UK 432, 097



**2011**; Heptares  
Bound to several  
Agonists and Antagonists

# Company Assets

Using the structure-based approach we have been able to generate over the past 9 years following assets:

- Proprietary compound library with over **8000 compounds** targeting adenosine receptors
- Broad intellectual property covering **15 different novel classes** of selective adenosine receptor modulators
- **Seven drug discovery programs, including the nomination of 5 development candidates in five different therapeutic indications**

# Current Development Pipeline

1Q 2016

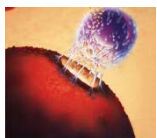
2017



**PBF-680: A1 antagonist**  
Asthma/COPD



**Phase I and POC**  
**completed**  
**Phase IIa in progress**



**PBF-509: A2a antagonist**  
Lung Cancer



**Phase I HV Completed**  
**Phase Lung Cancer in**  
**progress (Licensed)**



**PBF-999: A2a/PDE-10 Inhibitor**  
Huntington's Disease



**Phase Ia HV**  
**completed**



**PBF-677: A3 antagonist**  
Glaucoma



**Phase Ia HV**  
**In progress**



**PBF-1129: Ado Modulator**  
Pulmonary Fibrosis



**IND in progress**  
**Phase I to start**  
**3Q 2016**

# Current Development Pipeline

1Q 2015

2017



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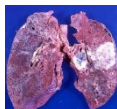
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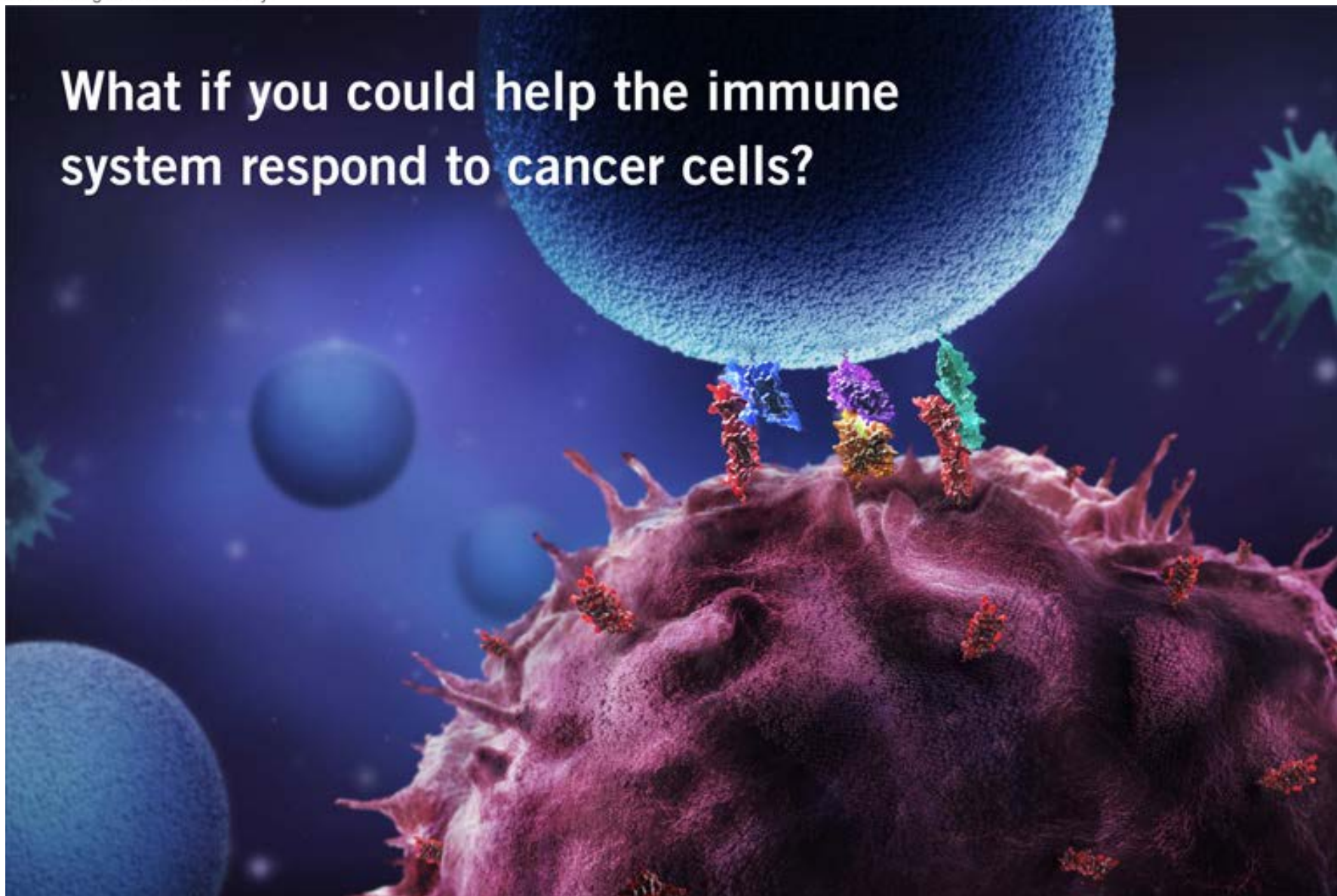


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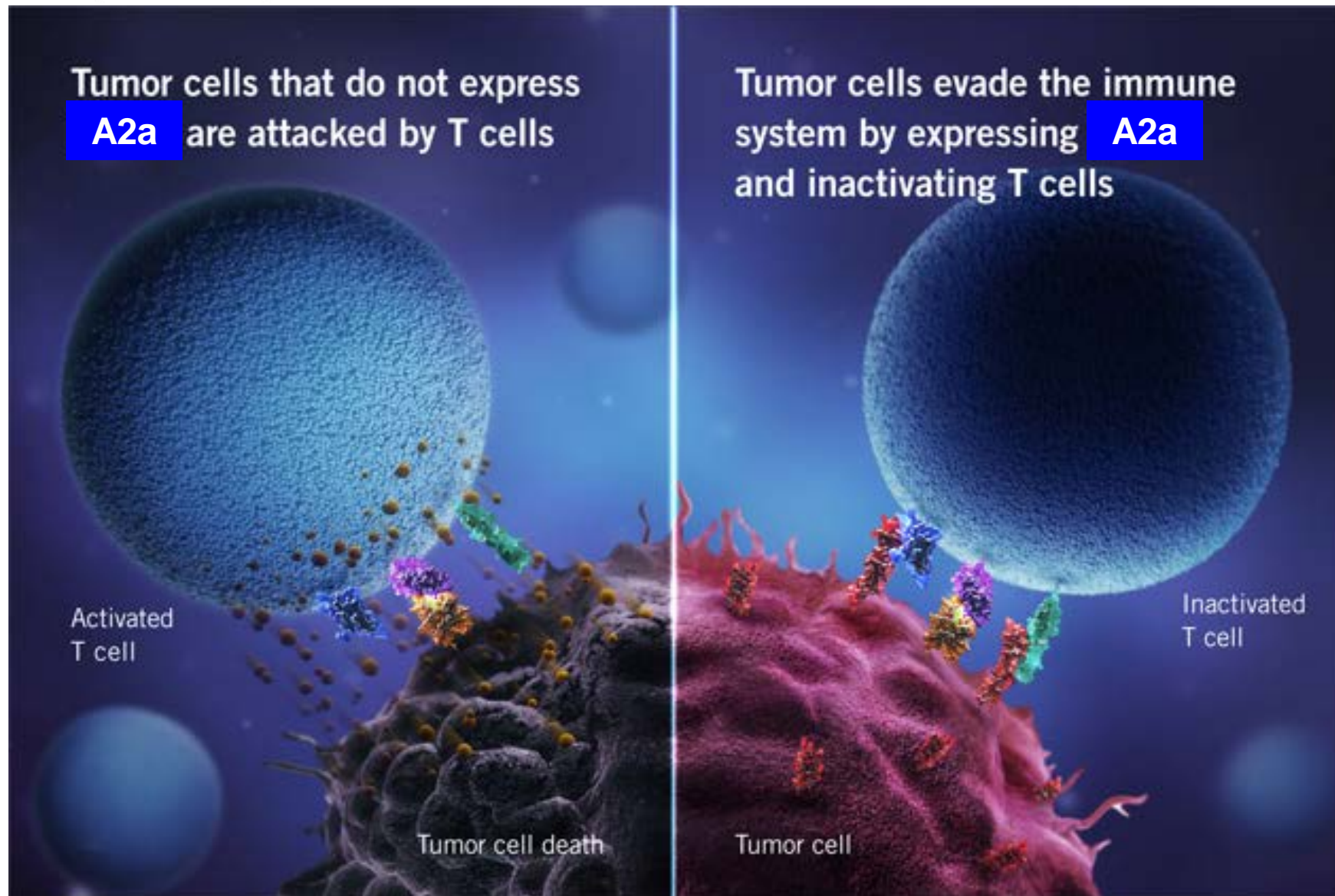
# Cancer Immunotherapy

**What if you could help the immune system respond to cancer cells?**





# Cancer Immunotherapy: Key role of the adenosine environment



# The Novartis Deal: One of the Best Global Deals of 2015

## Palobiofarma signs licensing agreement with Novartis to develop novel adenosine-based immuno-oncology treatments

*Wednesday, 21 October 2015*

Palobiofarma, the Adenosine-focused Biotech Company based in Pamplona, Navarre, Spain, announced that they have entered into a licensing agreement with Novartis.

Under the terms of the agreement Novartis will acquire exclusive global rights to develop, manufacture and commercialize Palobiofarma's adenosine A2A receptor antagonist PBF-509, currently entering Phase I clinical trials in Non-Small Cell Lung Cancer. Additionally, Novartis will get access to several adenosine-related patents from Palobiofarma related to the role of adenosine in immunotherapy.

Palobiofarma will receive an **upfront payment of \$15 million USD** and is eligible to receive near-term clinical, development and commercial **milestones** in an amount over **450 Million USD** successful projects as well up to **double-digit tiered royalties** on net sales.

# Projected Pipeline for the next two years

4Q 2015

2017



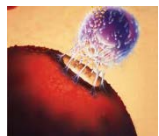
**PBF-680: A1 antagonist**  
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Allergen Trial  
Completed  
**Licensed**



**PBF-509: A2a antagonist**  
Lung Cancer



Phase I HV Completed  
Phase I Lung Cancer in  
progress  
**Licensed**



Phase I  
combo in  
Lung Cancer  
In progress



**PBF-999: A2a/PDE-10 Inhibitor**  
Huntington's Disease



Phase Ia HV  
completed



POC in HD  
In progress



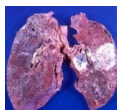
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Phase Ia HV  
In progress



POC  
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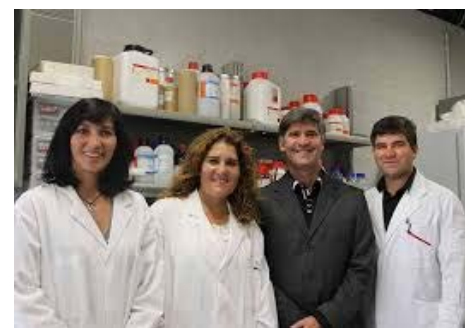
Phase I  
Completed  
**Licensed**



# Noviembre/2015: Palobiofarma se alza con el Premio *Emprendedor XXI* en la categoría CRECES



## (1) Well trained Team



- **Julio Castro**, PhD (CEO):
  - PhD in Chemistry at the University of Konstanz, Germany (1998)
  - > 15 years of pharmaceutical research experience (Bayer, Almirall and Oryzon Genomics)
- **Juan Camacho**, PhD (CSO and founder)
  - PhD in Chemistry at the University of Jena, Germany (1997)
  - > 10 years of pharmaceutical research experience with adenosine receptors (IMB Jena)
- **Nahomi Castro**, PhD (Development Responsible)
  - PhD in Biology at the University of Frankfurt, Germany (2000)
  - > 8 years of experience leading preclinical and clinical programs (Advancell, Salutis)
- **Lyhen Gonzalez**: (CFO and Founder)
  - Graduated in Biochemistry (1996)
  - Leading Company Administration since the foundation
- **Alely Gessa** (IP Responsible)
  - Graduated in Biochemistry (1996)
  - > 6 years of experience managing Intellectual Property



## (2) Key Investors



**Inveready** is one of the leading early-stage venture capital companies in Spain, with five investment funds. Inveready invests in technology companies with high growth potential and innovative business models. Inveready has extensive experience in different areas, with more than 40 portfolio companies that are leaders in their respective sectors.

**Invested in Palobiofarma in 2010**



**Fitalent** is the venture capital arm of the multinational consulting group Everis. This venture capital firm is creating an ecosystem of companies operating in the same market to create synergies and competitive advantages. In all, Fitalent has participated in ten scientific-technology based companies.

**Invested in Palobiofarma in 2012**



A financial instrument of the Government of Navarra to promote business projects in the region that can contribute to the region's development. Basically, **Sodena** works to try and ensure all viable projects in the self-governing region of Navarra should be able to receive financing to carry them out.

**Invested in Palobiofarma in 2013**

### (3) Excellent Collaborators



IDIFARMA  
PHARMACEUTICAL RESEARCH, DEVELOPMENT AND INNOVATION



## (4) Key Advisors



**Carlos Buesa:** Founder and CEO of the epigenetic company Oryzon Genomics



**Josep Ma Echarri:** Founder and CEO of the Technology Investment Group Inveready



**Scott Antonia:** Professor of Oncology Chair, Department of Thoracic Oncology Co-Leader, Immunology Program, Moffitt Cancer Center



**Clive Page:** Professor of Pharmacology, King's College London and Director of the Sackler Institute of Pulmonary Pharmacology, King's College



**John Stagg:** Professor at the Montreal Institute for Cancer Research



**Carlos Iglesias:** Founder and CEO of the Clinical CRO Salutis



**Enric Carbonell:** European Patent attorney and over twenty-five years of patent experience. Partner of ABG patent company



**Javier García:** Over twenty years of experience in the pharmaceutical industry at Eli Lilly



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**GRACIAS!!!!!!**