Nanocoat: Formulations for the coating and transfer of different elements towards tumours



Zaragoza, 6 de junio de 2012





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1. The Research Group

Who??.

Principal Investigator: M^a Pilar Martín Duque

Postdoctoral fellow: Gracia Mendoza

Predoctoral students: Carolina Belmar Rebeca González Maria del Mar Encabo

Associate students:

Yulán Hernández Julie Movellán Mónica González





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Collaborators:

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1. The Research Group

















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Resources 1. The Research Group





"Aragon Biomedical Research Centre"





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Instituto Aragonés de Ciencias de la Saluc

Translational Research Unit

1. The Research Group



Aragon Health Institute:

-More than 160 persons (management, supporting services units, and research groups)

-Building, 7.000 sq meters, and cost more than 15 million euros (transversal support to more than 700 scientists)

-13 facilities (including, transgenesis, animal house, cytometry, pathology, microscopy, proteomics, surgery, functional tests) all with with state-of-the-art equipment, including 4 theatre rooms for surgery, microsurgery, magnetic resonance, X-rays, echography, micro-SPECT-CT.







1. The Research Group

Technologies:

Gene Therapy (adenovirus, CRAds, retrovirus, lentivirus) Cell Therapy (Mesenchymal stem cells, iPS, ES) Nanotechnology (dendrimers, NP functionalization) Molecular Imaging (MRI, PET, SPECT, BLI) Tissue Regeneration (de/recellularization organs)

Molecular diagnosis (molecular biology)







1. The Research Group

Relationships with companies:

•Contract title: "Defective adenoviral development and application for tumoral pathology" Type of contract: previous studies for a clinical Trial CPH-ADE1A-1. Company: Rhone-Poulenc From: 1998 Until: 2000 PI: Santiago Ramon y Cajal

•Contract title: Study of the implication of external genes on the development of children's tumours. Company: Rafer. Type of contract: ARAID-Ibercaja grant From: 2010 Until: 2012 PI: M^a del Pilar Martín Duque

•Current negotiations with a major pharmaceutical company: New methodologies to make iPS cells. Under development. PI: M^a del Pilar Martín Duque







Cell therapy describes the process of introducing new cells into a tissue in order to treat a disease.

Cell therapies often focus on the treatment of hereditary diseases with or without the addition of gene therapy. Cell therapy is a sub-type of regenerative medicine.











Target-Driven Therapeutics



DISEASES TO BE TREATED:

•Neurodegenerative disorders (Parkinson, Huntington, etc) + cancer (more than 250 millions)// Diabetes (17 millions)// Stroke (cardiac or brain) 4,8 millions, JUST in USA.







Mesenchymal stem cells, or MSCs, are multipotent stromal cells that can differentiate into a variety of cell types, including: osteoblasts (bone cells), chondrocytes (cartilage cells), and adipocytes (fat cells).









Recombinant adenoviruses have tremendous potential in both research and therapeutic applications. There are numerous advantages in using an adenovirus to introduce genetic material into host cells. *The virus has been used to infect many mammalian cell types (both replicative and non-replicative) for high expression of the recombinant protein*. Recombinant adenoviruses are especially useful for gene transfer and protein expression in cell lines





Nature Reviews | Drug Discovery





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A limiting step in adenoviral uptake is the entry into target cells, which is mediated by the coxsackievirus– adenovirus receptor (CAR) and cellular $\alpha\nu\beta$ integrins.

In many cell types, these receptors are either absent or expressed at low levels, leading to poor transduction efficiency by adenovirus.

For instance, most stem cells and fibroblast-type cells are poorly infected by adenoviral vectors because of low expression of CAR.









2. The Product. b) Innovative mechanisms of action

Solution: Nanotechnology



One <u>nanometer</u> is one thousand million part of one meter.







2. The Product. b) Innovative mechanisms of action Viral manipulation:

-Costly

-Difficult

-Long period of time

Viral coating:

-Cheap

-Easy

-Quick









2. The Product. b) Innovative mechanisms of action



Incubate with cell cultures







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2) The Product. c) Differential features facing the market

ViraDuctinTM Adenovirus Transduction Reagent is designed specifically to increase the efficiency of adenoviral transduction without regard to the level of CAR expression on the surface of the target cells.

ViraDuctin[™] Adenovirus Transduction Reagent is a proprietary formulation



http://www.cellbiolabs.com/adenovirus-transduction





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2) The Product. d) Current status of development







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2) The Product. d) Current status of development

Other in vitro results:

-Flow cytometry

-Western-Blot

-MSCs differentiation

(to be shown under confidentiality agreement)







2) The Product. d) Current status of development







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2) The Product. e) IPR protection



OFICINA ESPAÑOLA DE PATENTES Y MARCAS

ESPAÑA



 Número de publicación: 2 335 077
 Número de solicitud: 200803745
 Int. CL: *A61K 31/785* (200601) *A61K 38/08* (200601) *A61P 35/00* (200601)



SOLICITUD DE PATENTE

A1

farmaindustria

Fecha de presentación: 30.12.2008	Solicitanteis: Instituto Aragonés de Ciencias de la Salud Avda, Gómez Laguna, nº 25 – 9 - A OL 2 S0009 Zaragoza, ES Fundación Agencia Aragonesa para la Investigación y el Desarrollo
Fecha de publicación de la solicitud: 18.03.2010	💮 Inventories: Martin Duque, Maria del Pilar
Fecha de publicación del folieto de la solicitud 18.03.2010	() Agente: Azegra Sãez, Maria Pilar

O Tituio: Formulaciones para el recubrimiento y transporte de diversos elementos hacia los tumores.









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2) The Product. f) Pitfalls & Risks to be considered



3. Partnering Opportunities

-Some SME has shown interest on this methodology, however

WE ARE OPEN TO ALL KIND OF NEGOTIATIONS// SUGGESTIONS!!







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THANK YOU VERY MUCH INDEED!!





