KITGAG Plataform, a new faster and cost-effective technology for disease detection in liquid biopsy

Madrid, 14 de noviembre de 2017

Hello!

I am Víctor Álvarez

Pre-doctoral researcher at Metabolic Disorders Research Group of the **Health Research Institute of Santiago de Compostela (IDIS)**.

Research team

- Cristóbal Colón Mejeras (Coordinator IP researcher at Metabolic Disorders)
- Miguel Ángel García González (Senior researcher at Nephrology)
- Manuela Alonso Sampedro (Senior researcher at Internal Medicine)
- José Víctor Álvarez González (Pre-doctoral researcher at Metabolic Disorders)
- Olaya Lamas González (Pre-doctoral researcher at Renal Disorders)

Content

2. The Product
   a) Target Indications
   b) Innovative mechanisms of action
   c) Differential features facing the market
   d) Current status of development
   e) IPR protection
   f) Pitfalls & Risks to be considered
3. Partnering Opportunities

TRANSLATIONAL RESEARCH FOR BIOMEDICAL INNOVATION

Health Research Institute of Santiago de Compostela (IDIS)

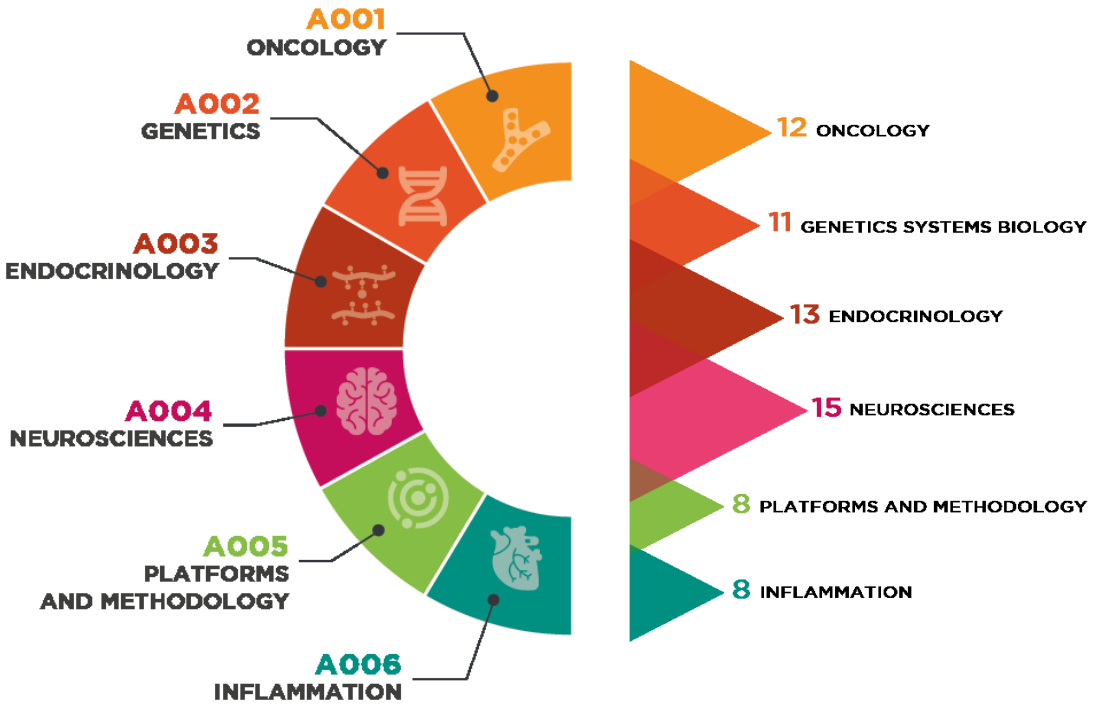
Translational research center, innovation and knowledge transfer between the **University of Santiago de Compostela** and the **Galician Public Health Service.**

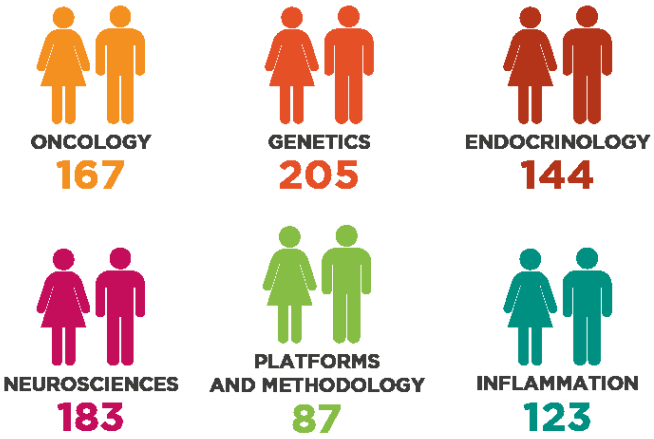
Fundación Ramón Domínguez (FRD)

Management entity of IDIS and the research activities carried out in the **Healthcare Areas of Santiago de Compostela and Lugo.**

NOT ONLY MANY GOOD PEOPLE…

6 RESEARCH AREAS	67 RESEARCH GROUPS	936 RESEARCH PEOPLE





GOBIERNO DE ESPAÑA · MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

MEDICAMENTOS INNOVADORES
Plataforma Tecnológica Española

Fundación Ramón Domínguez I+D+i biosanitaria

idis Instituto de Investigación Sanitaria Santiago de Compostela

farmaindustria

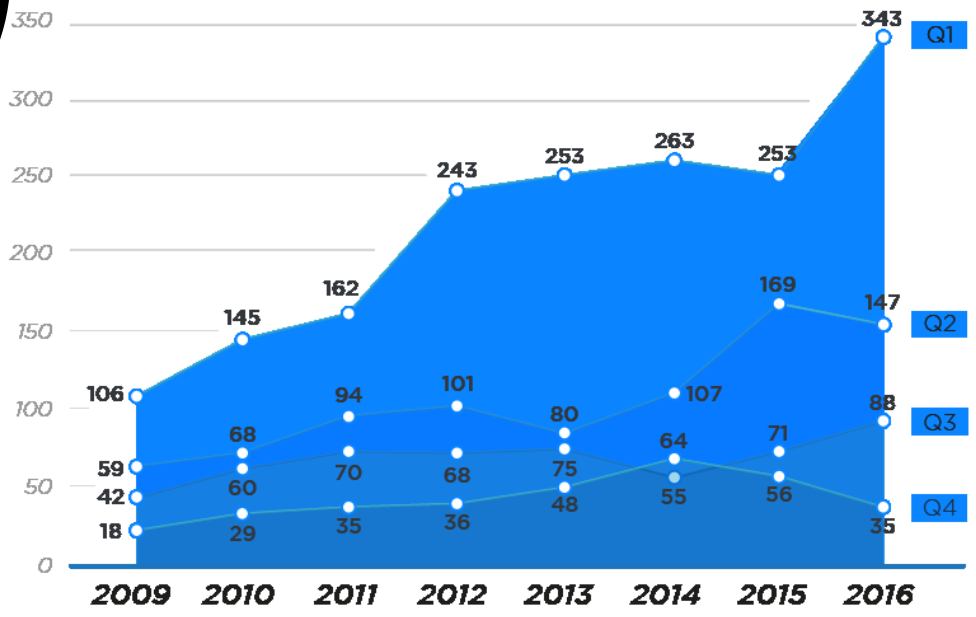
… BUT ALSO VERY GOOD RESULTS

TOTAL FUNDS RAISED
23.638.401 €

ACTIVE PROJECTS IN 2016

Clinical trials	110
Observational studies	148

New studies in 2016



Number of articles by year published in each quartile

TRANSLATIONAL FOCUS AND INNOVATION

Patents in 2016

Spin-offs

DART Detection And Radiation Technologies

NASASBIOTECH

QUBIO tech

LINCbiotech Brain health innovation

Joint Research Units

Roche

Gradiant

everis an NTT DATA Company

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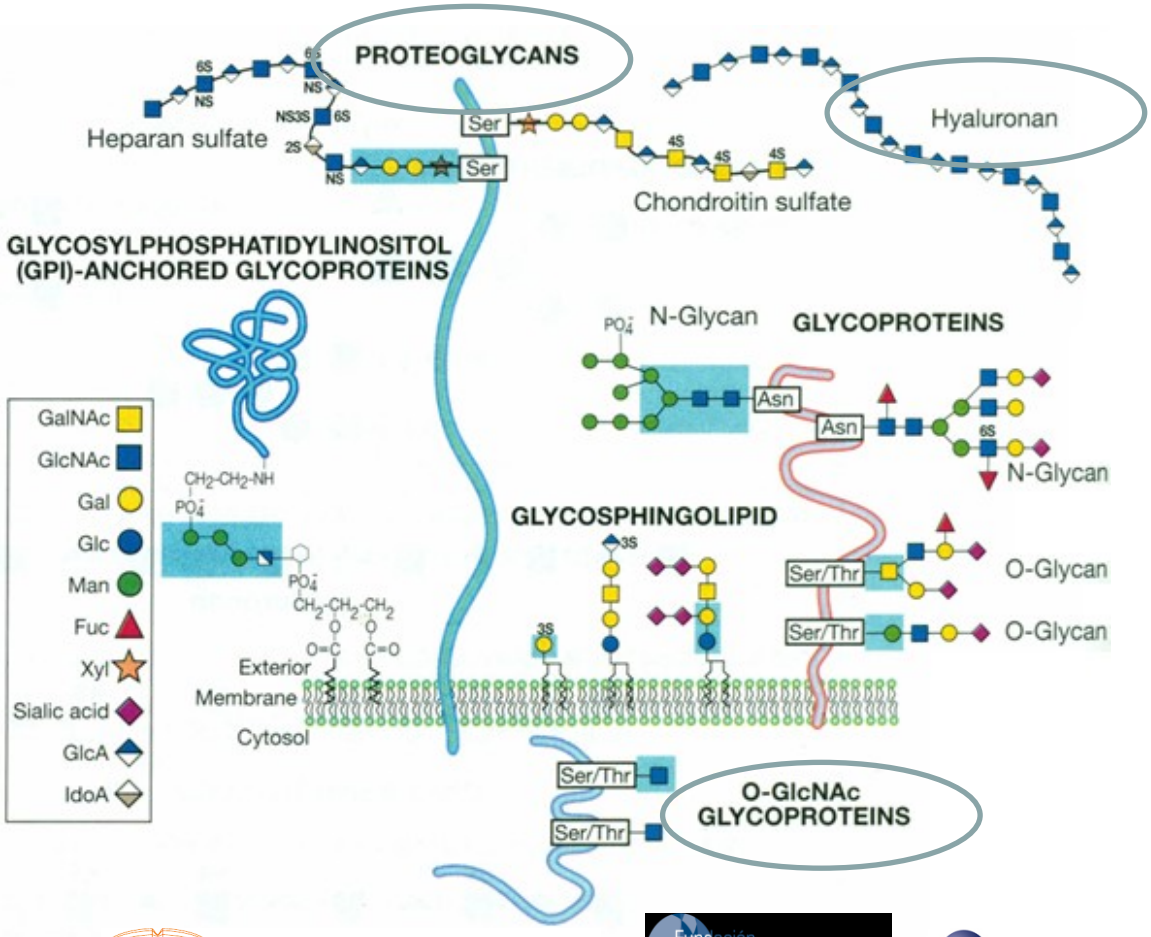
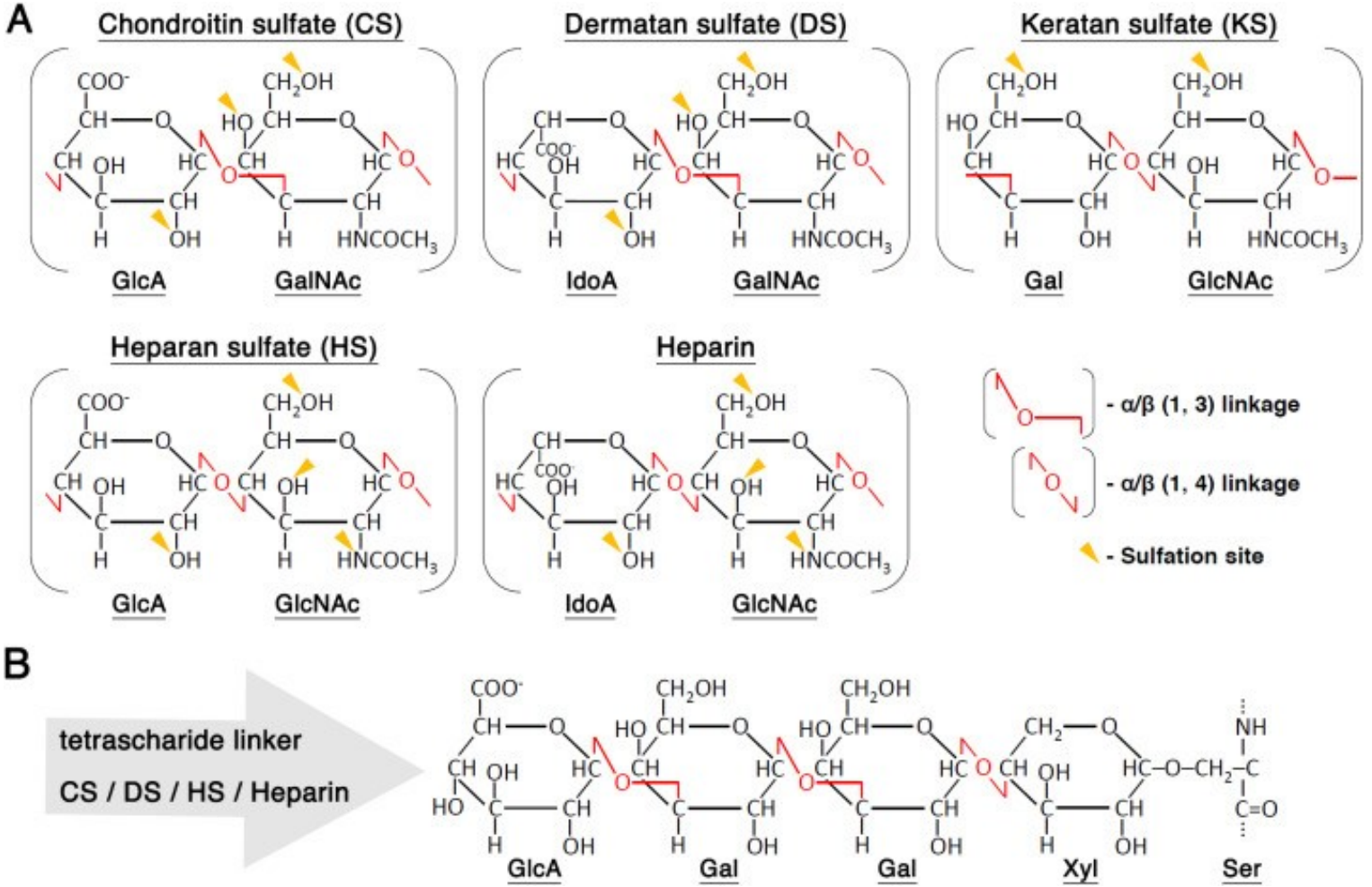
Glycans



BIOLOGICAL INTEREST OF GLYCOSAMINOGLYCANS



DMB

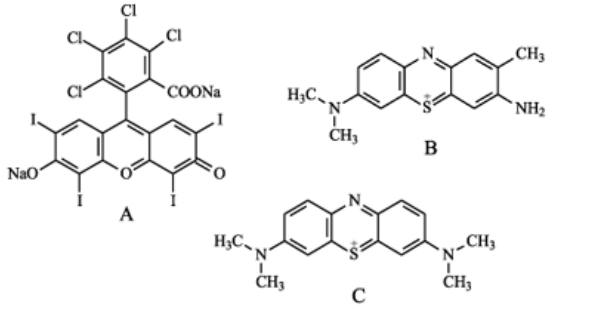
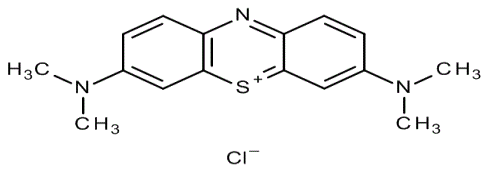
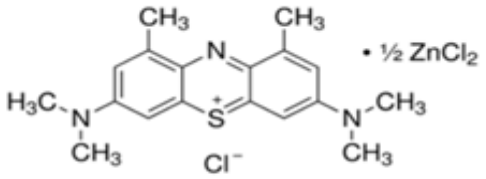


Figura 4. Estrutura química da Rosa de Bengala (A), azul de toluidina O (B) e azul de metileno (C)



Dimetylmetilene-Blue

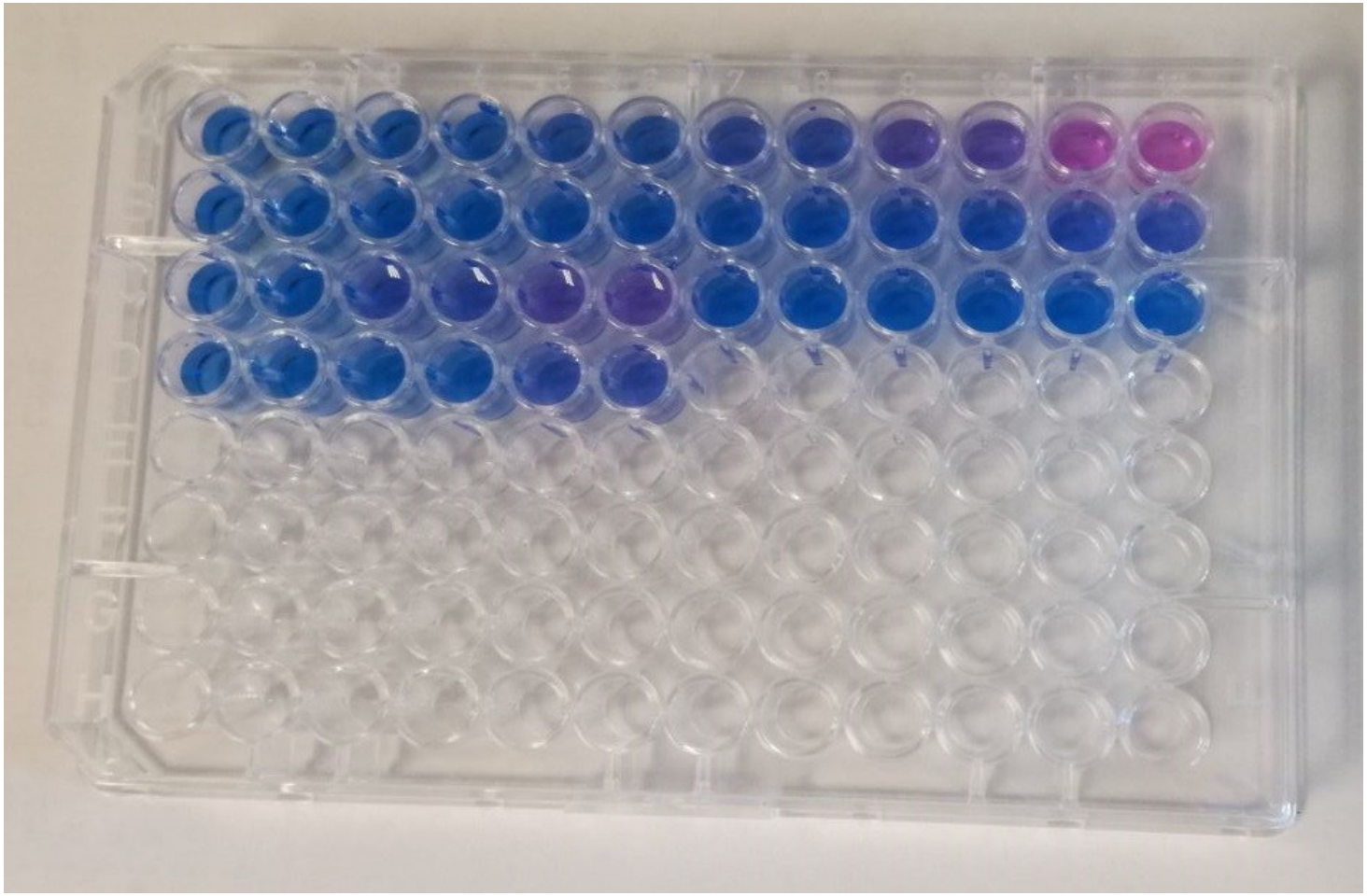


salt of zinc chloride of dimetylmetilene blue

PHYSICOCHEMICAL PROPERTIES:

- STAIN
  - BIOLOGICAL TISSEUES
  - APPLICATION IN MICROBIOLOGICAL TECNIQUES
- METALOCROMATICSS PROPERITES
  - COLOR CHANGES
    - PRESENT BY EXTRUCTURE RICH IN AMINES (GAG´S)
    - PRESENCE OF POLYANIONS
  - AGGLOMERATED
    - DUE TO THE DIMERIC AND POLIMERIC

Reaction GAGs-DMB



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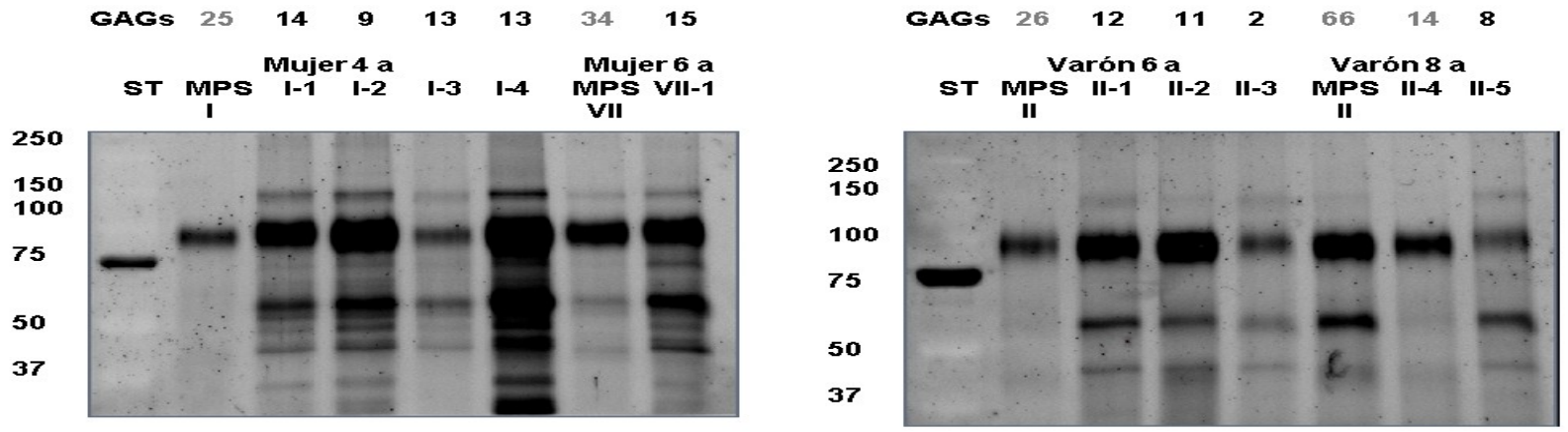
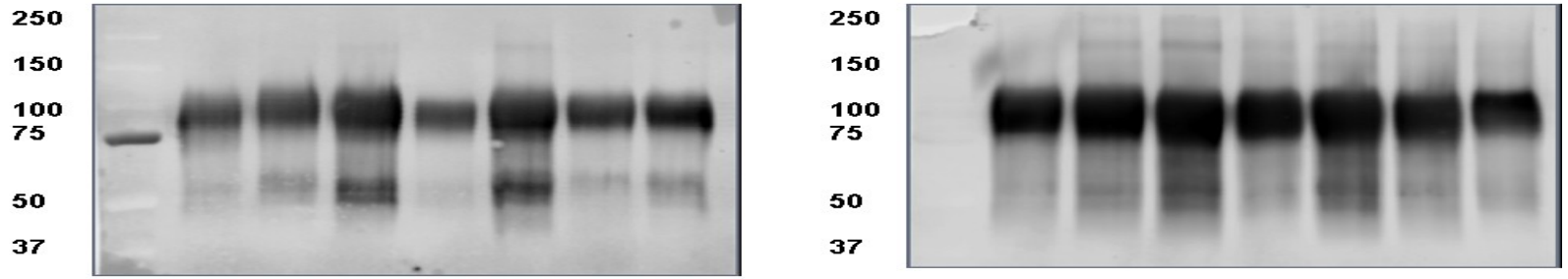
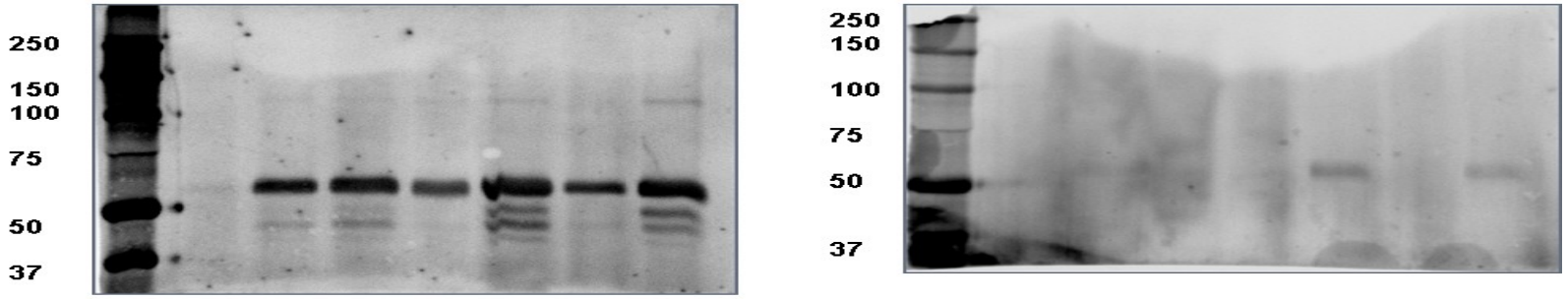
SDS-PAGE Tinción Sypro



Western Uromodulina



Western Albúmina

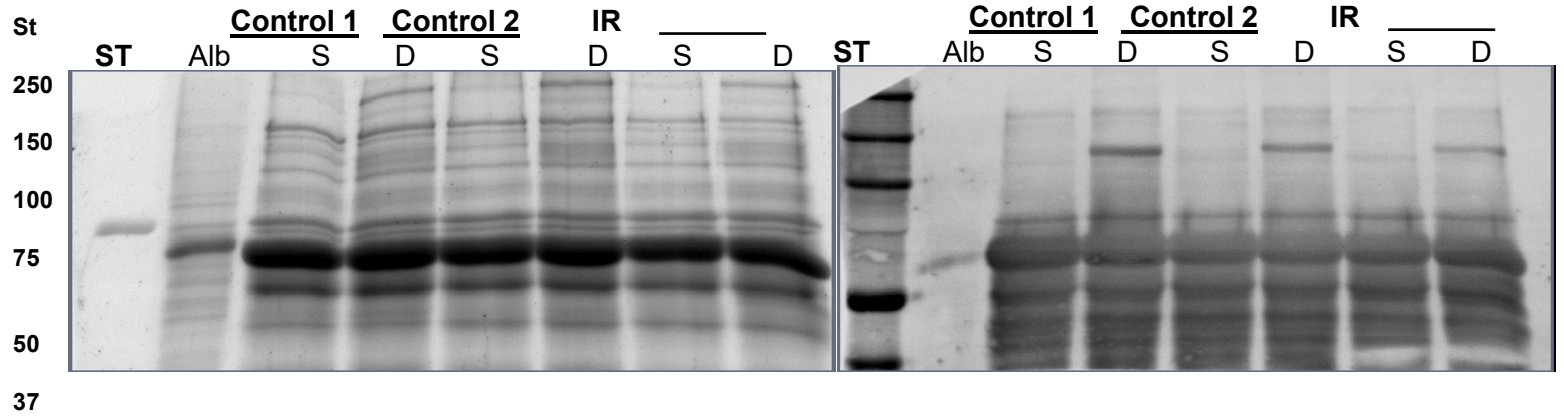


Different biological samples

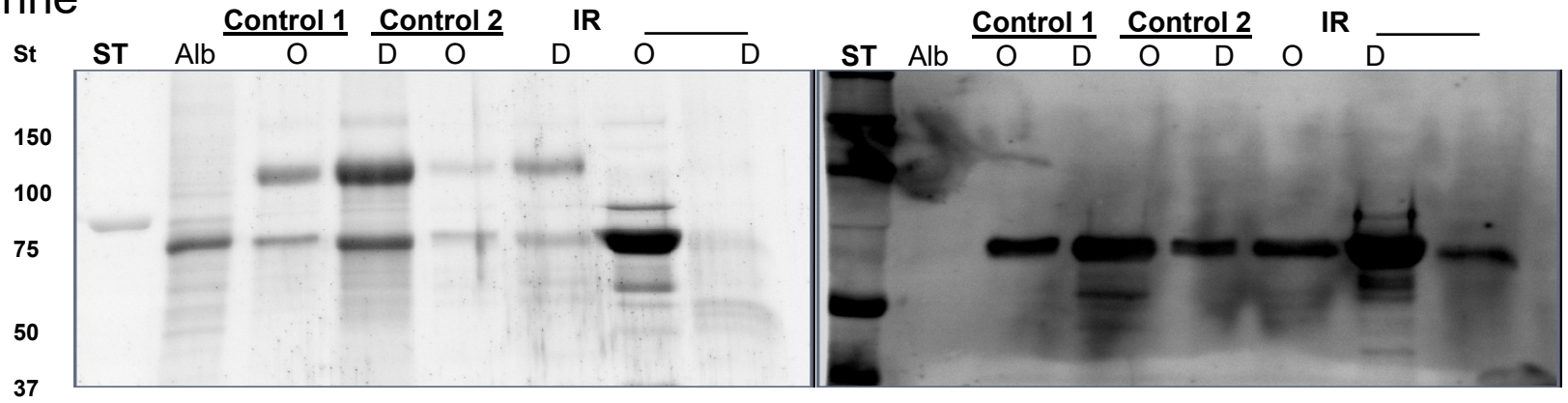
SDS-PAGE Sypro staining

Western Albumin

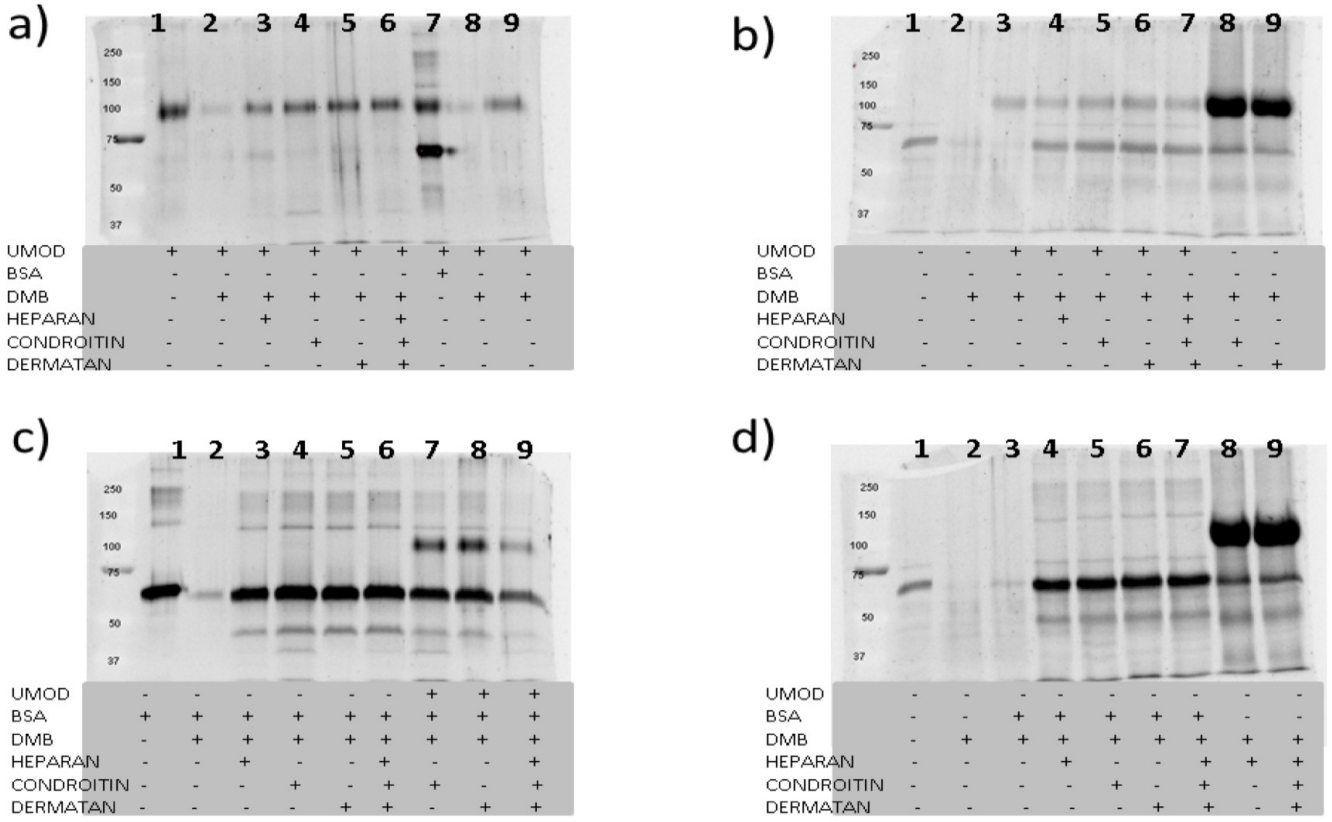
Serum



Urine

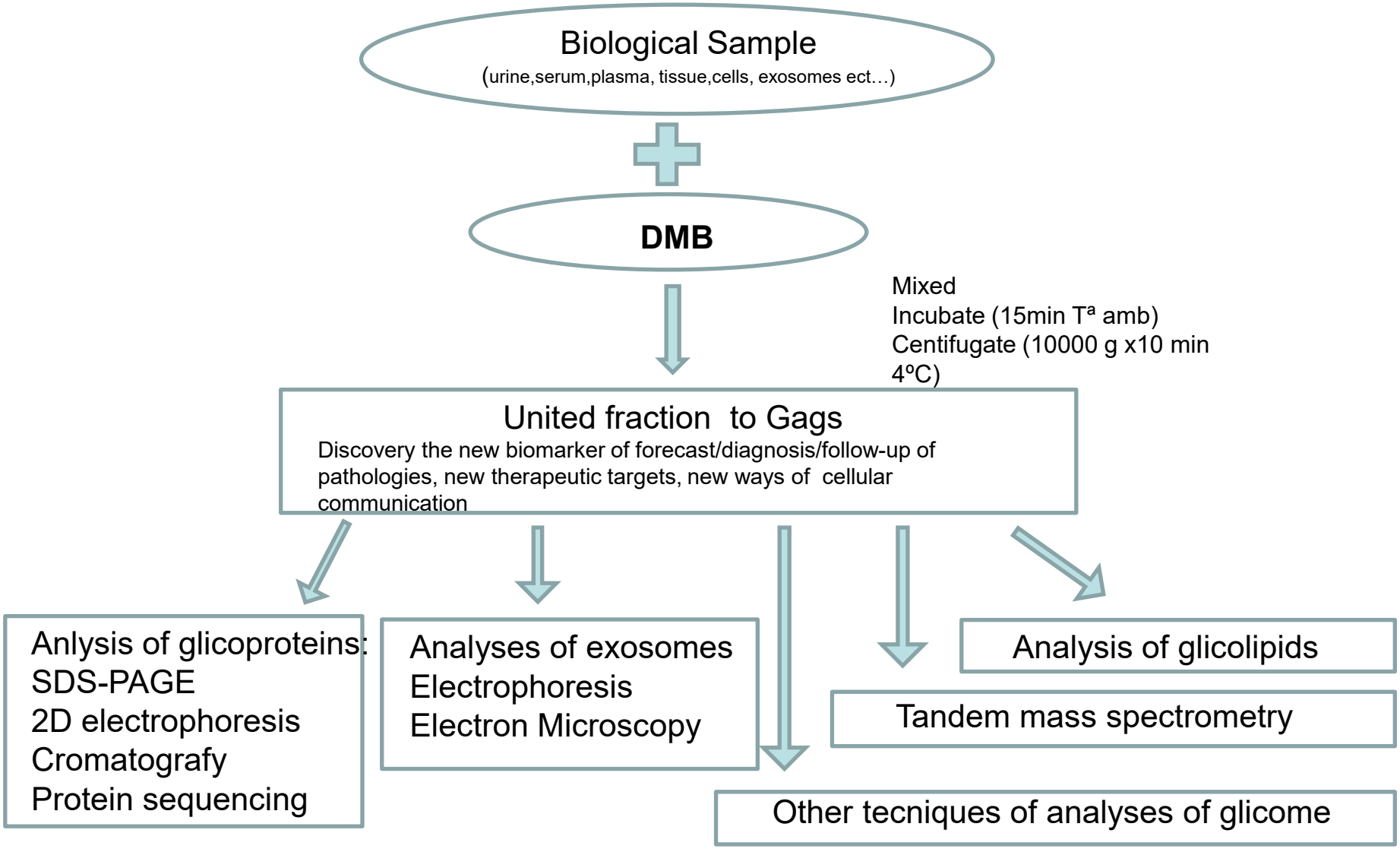


Demostration of the technique



Proteins that have the ability to bind gag's where an in-vitro assay is done.

Final Process



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MARKET APROACH - MPS

Early diagnosis could save a lot of money for Health Systems

KITGAG as a cost-effective solution:

- Reduced test time.
- Reduced sample volume 100 µL.
- Reduced costs of a chronic patient.
- Technique aligned to procedures already implanted in the hospital

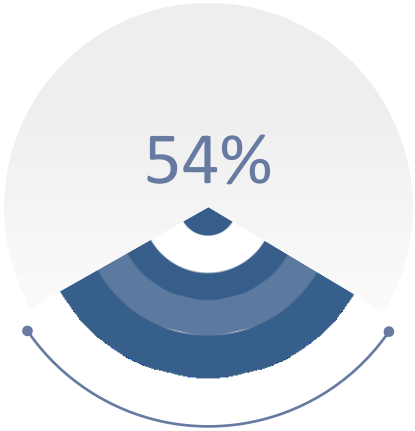
MPS Prevalence	
Type I-H	2 per 100.000
Type I-S	1 per 250.000
Type II	1 per 100.000
Type III	1 per 25.000/75.000
Type IV	1 per 40.000/200.000

- A early detected patient (neonate) with MPS I **could be cured** with a bone marrow transplant.
- If not, treatments with premium prices ($ **170,000 per patient and year** on average)

NEONATAL SCREENING: The potential market of the technology is the entire neonatal population for the realization of a screening.
+ NEW DIAGNOSIS in PATIENTS with MPS.

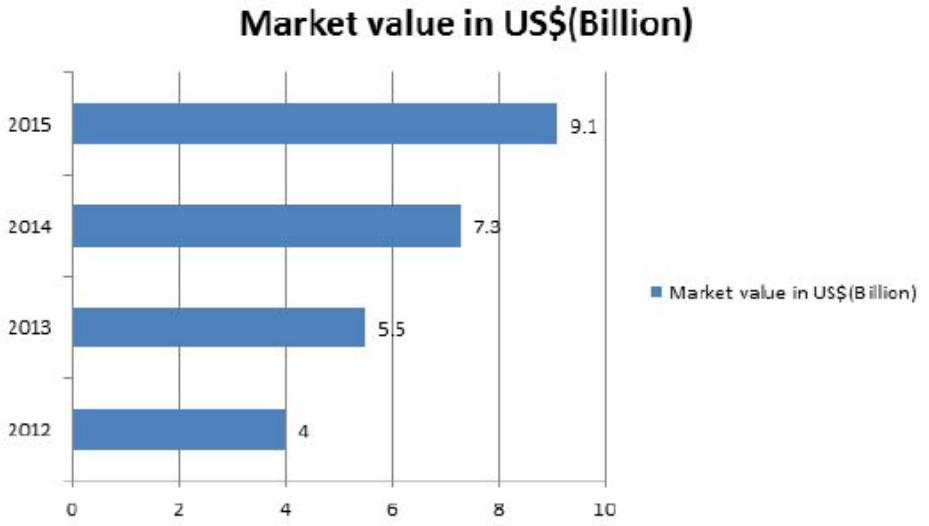
MARKET APROACH - PKD

Patient growth and increased development of new molecules



Adults with PKD

between 30-42 years old in US



clinicalnephrology.conferenceseries.com

NEONATAL SCREENING: The potential market of the technology is the entire neonatal population for the realization of a screening.
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PROYECTO find
LA IMPORTANCIA DE UN DIAGNÓSTICO PRECOZ

Algoritmo Diagnóstico de las Mucopolisa (MF

Presentación clínica compatible con MPS

Oligosac
Glucopro
Mucolipid

PROYECTO find
LA IMPORTANCIA DE UN DIAGNÓSTICO PRECOZ

Sintomatología general de las MPS

> Aspecto tosco, comú

> Disóstosis múltiple
> Talla baja
> Opacidad corneal
> Afectación válvulas cardiacas, miocardiopatía o estenosis coronaria
> Alteración cognitiva
> Trastorno del comportamiento agudo

"Ninguna enfermedad es tan rara/minoritaria como para no merecer nuestra atención"
Orphanet

Observational Study

Medicine
OPEN

selective screening program for the early tection of mucopolysaccharidosis: Results the FIND project – a 2-year follow-up study

bal Colón, MD, PhD[a], J. Victor Alvarez, MS[a], Cristina Castaño, MD[b], Luís G. Gutierrez-Solana, MD, PhD[c], l. Marquez, MD[d], María O'Callaghan, MD[e], Félix Sánchez-Valverde, MD, PhD[f], en Yeste, MD, PhD[g], María-Luz Couce, PhD, MD[a,*]

AECOM

ERRORES CONGÉNITOS DEL METABOLISMO
Las Palmas de Gran Canaria 2017

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Secretaria: Carmen Delgado Pecellín
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CERTIFICADO DE PREMIO

El Presidente de la AECOM certifica que los autores

Colón C, Álvarez JV, Crujeiras P, Rodrigues D, Cocho JA, Bóveda MD, Castiñeiras DE, Couce ML.
Unidad de Diagnóstico y Tratamiento de las Enfermedades Metabólicas Congénitas. Complexo Hospitalario Universitario de Santiago de Compostela.

han obtenido el primer premio a la mejor Comunicación Oral, titulada:

Proyecto FIND. Resultados del cribado selectivo basado en síntomas para la detección precoz de las mucopolisacaridosis.

presentada en el

XII Congreso Nacional de Errores Congénitos del Metabolismo, celebrado en Las Palmas de Gran Canaria los días 18, 19 y 20 de octubre de 2017.

Dr. David Gil
Presidente de la AECOM

SECRETARÍA TÉCNICA - Ergon Time, C/ Arboleda, 1. 28221 Majadahonda. Madrid. Tlf. 91 636 29 30. aecom@ergon.es

Monodimensional Electrophoresis

MPS	Enzime	GAGs elevated
I	Alfa-L-Iduronidase	Dermatan sulfate Heparan sulfate
II	Iduronate sulfatase	Dermatan sulfate Heparan sulfate
IIIA	Heparan-N-Sulfatase	Heparán sulfate
IIIB	Alfa-N-Acetilglucosaminidase	Heparan sulfate
IIIC	Acetil-CoA-alfa-glucosaminide acetil transferase	Heparan sulfate
IIID	N-acetilglucosamine 6-sulfatase	Heparan sulfate
IVA	Galactose 6-sulfatase	Keratan sulfate Condroitin 6-sulfate
IVB	Beta-galactosidase	Keratan sulfate
VI	N-Acetilgalactosamine 4-sulfatase (arilsulfatase B)	Dermatan sulfate
VII	Beta-glucuronidase	Dermatan sulfate Heparan sulfate Condroitin 4-, 6-sulfate

Heparan
Dermatan
Condroitin

Control Standar VI II

Samples in proyect FIND

- 409 patiens from all over Spain, Ceuta and Melilla
- **22 casos MPS**:
  - 5 MPS-I
  - 3 MPS-II
  - 4 MPS-IIIA
  - 2 MPS-IIIB
  - 5 MPS-IVA
  - 3 MPS-VI

NefroCHUS

Laboratorio de Genética de las Enfermedades Renales

SERVIZO GALEGO de SAÚDE

Strategic accion in Galicia for policystic kidney disease

Establishment of a registry and genetic diagnosis as a measure of coste/efficient prevention. Result 1º year

María Lara Besada Cerecedo[1], Ana María Barcia de la Iglesia[1], Nisrine Arhda[2], Beatriz Sobrino[3], Jorge Amigo Lechuga[3], Ángel Carracedo[3], Grupo de Investigadores GAL-CIST* y Miguel A. García-González[1]

[1]Laboratorio de Genética y Biología del Desarrollo de las Enfermedades. Instituto de Investigación Sanitaria (IDIS) (Santiago de Compostela), [2]Servicio de Nefrología. Hospital Clínico Universitario (Santiago de Compostela). [3]Fundación Pública Galega de Medicina Xenómica (Santiago de Compostela).

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Laboratorio de Genética de las Enfermedades Renales

Work team

SERVIZO GALEGO de SAÚDE

Galician Consorcio for the Policystosis *GAL-CIST*

RESEARCHERS	WORK PLACE
PABLO BOUZA PIÑEIRO	Hospital Arquitecto Marcide
JESUS CALVIÑO VARELA	Complexo Hospitalario Universitario Lucus Augusti
LUZ MARIA CUIÑA BARJA	Complexo Hospitalario de Pontevedra
CANDIDO DIAZ RODRIGUEZ	Complexo Hospitalario Universitario de Santiago
JOSE MARIA LAMAS BARREIRO	Complexo Hospitalario Universitario de Vigo
ALFONSO OTERO GONZALEZ	Complexo Hospitalario Universitario de Ourense
BEATRIZ PAZOS ARIAS	Hospital de Povisa
MIGUEL PEREZ FONTAN	Sociedad Gallega de Nefrología
ANGEL ALONSO HERNANDEZ	Hospital Clínico Universitario de la Coruña
FERNANDA ARROJO ALONSO	Hospital Arquitecto Marcide
SECUNDINO CIGARRAN GULDRIS	Nefrología Hospital Costa de Burela
Miguel Ángel Garcia González	NefroChus
Lara Besada Cerecedo	NefroChus
Ana María Barcia de la Iglesia	NefroChus
Carmen Vázquez	CHUS
Marta Durán	CHUS

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Laboratorio de Genética de las Enfermedades Renales

PROPOSAL

SERVIZO GALEGO de SAÚDE

- Establish a population strategy model (genetic cascade study) coordinated among the reference hospitals of all health areas of the Autonomous Community of Galicia.
- Facilitate the identification, registration and genetic diagnosis of families with polycystic kidney disease.
- Better knowledge of the disease and better monitoring of our patients.
- Minimum cost

NefroCHUS

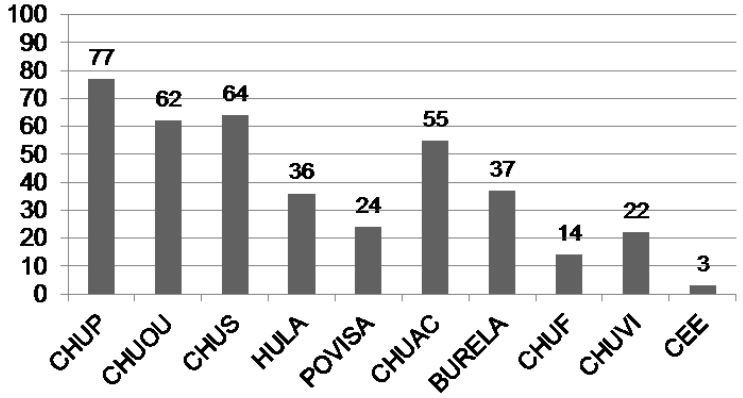
Laboratorio de Genética de las Enfermedades Renales

Results

Register of Galician families with PKD

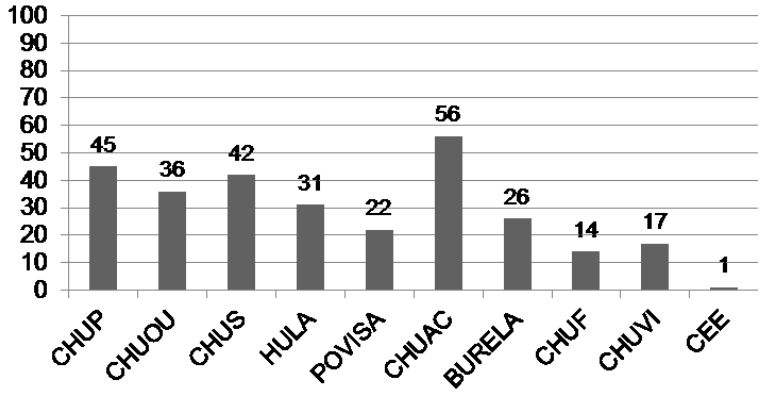
SERVIZO GALEGO de SAÚDE

Number of samples of Hospitals

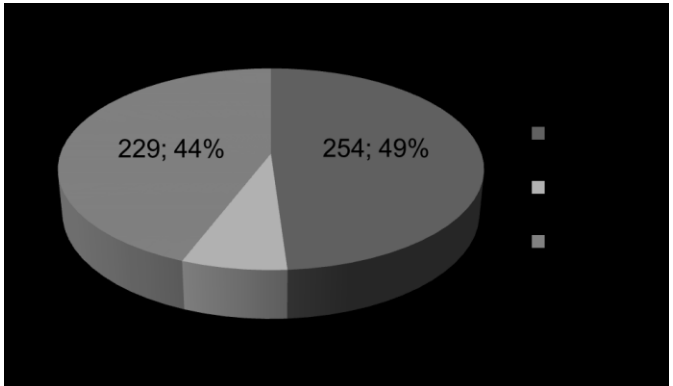


N_{Total}=394

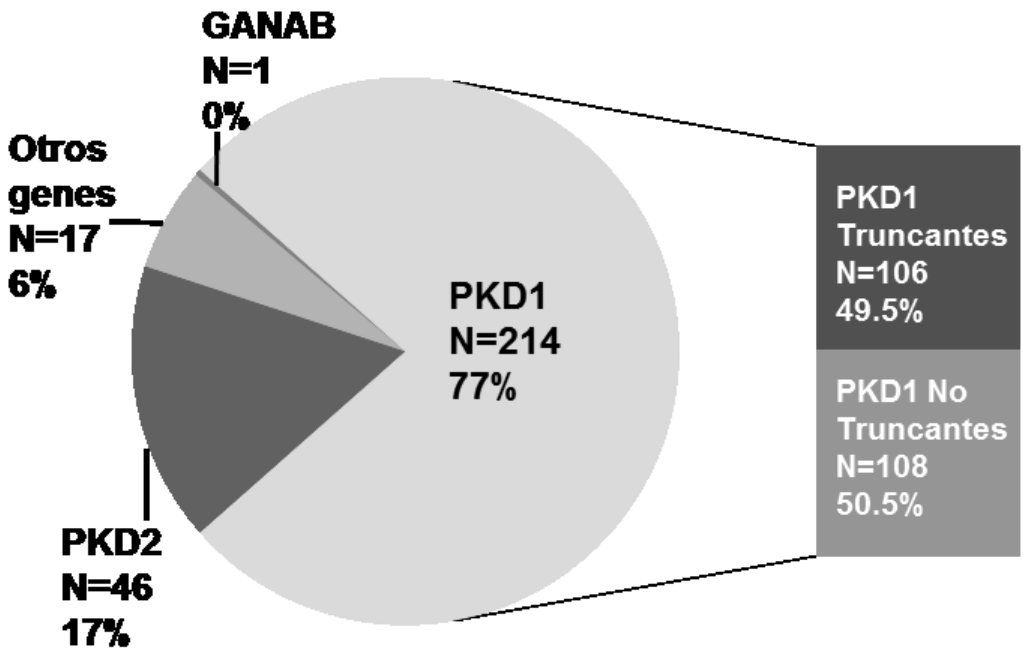
Number of families with diagnosis



N_{Total}=290



Galician population results



The 49% of the Galician population with PKD kind I, with truncanting mutation respond very well to treatment with Tolvaptan

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IPR PROTECTION

P201531297 - METHOD FOR SEPARATING THE FRACTION JOINED TO GLYCOSAMINOGLYCANS AND USES THEREOF

Inventors

ALONSO SAMPEDRO Manuela; ÁLVAREZ GONZÁLEZ Víctor; COLÓN MEJERAS Cristóbal; GARCÍA GONZÁLEZ Miguel A.; LAMAS GONZÁLEZ Olaya.

Original Assignees

Fundación Ramón Domínguez; Universidade De Santiago De Compostela; Servizo Galego De Saude (Sergas);

Priority date 2015-09-10

Actual status: PCT application presented on 2016

Wide protection that includes many areas:

Paediatric Diseases + Nephrology + Oncology

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PITFALLS & RISKS TO BE CONSIDERED

IPR Strategy

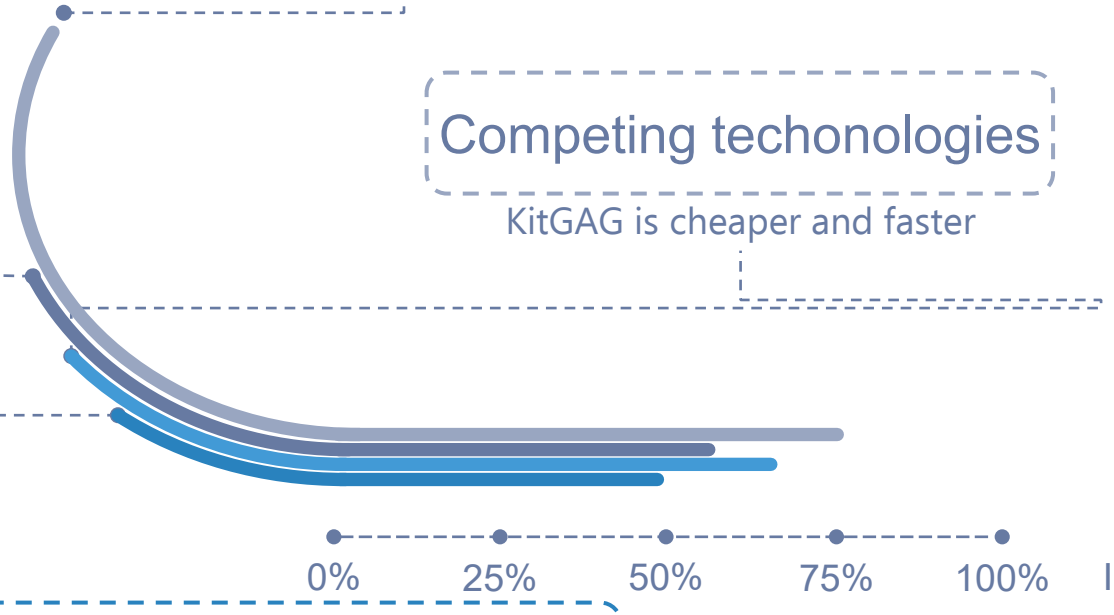
Reinforce the intellectual property strategy.
Developing a Patent Family

Priority MPS vs. PKD

Same IPR and regulatory but faster time to market.
Less competitors.

Competing techonologies

KitGAG is cheaper and faster



Insufficient results of clinical validation

So far the diagnosis is being a success more than expected

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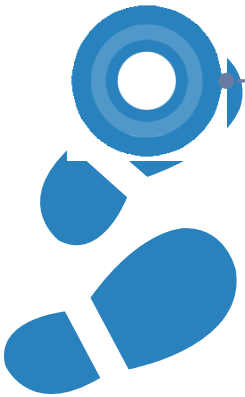
NEXT STEPS

Development of a CompanionDX tool

For MPS and PKD

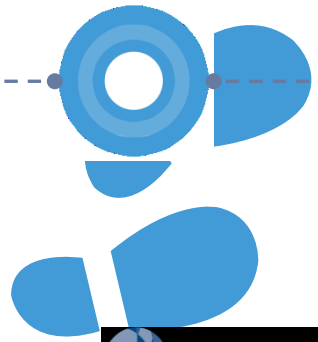
Development of a Biochemical Platform

For MPS, PKD and new uses



Ignicia proyect PRIS 2

Investment expected of regional valorization call.



Aplications for other patologies

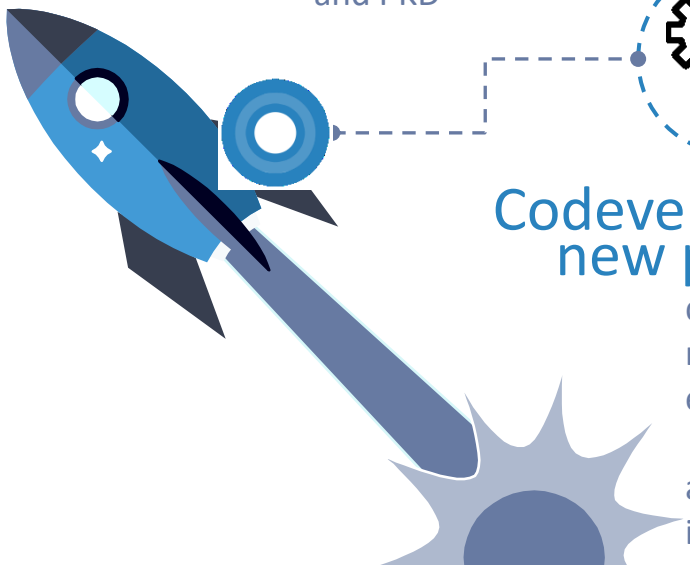
PARTNERING OPPORTUNITIES

Clinical validation

To develop an analytical validation and a first proof of concept of clinical validation as the main milestone of the proposal in MPS and PKD

Regulatory Plan

That allows estimating the investment needed and the times to achieve the value milestone (clinical validation).



Codevelopment of new products

diagnostic kit
multi-analytical analysis team
examples:
capillary electrophoresis
agarose electrophoresis
immunofixation

License Agreement

A win-win strategy

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