GOAT (Ghrelin-O-acyltransferase), a new biomarker for prostate cancer screening
Content

1. The Institution

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
Content

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3. Partnering Opportunities
1. The Institution

University of Cordoba

• Established in 1972
• 11 Faculties
• Students:
  • 16,694 undergraduate students
  • 1,245 in Master’s Programmes
  • 1,384 in Doctoral Programmes
• PhD
  • 1,384 PhD candidates
  • 228 International PhD candidates
  • 125 PhD dissertations/year
  • 21% of them with International PhD award

• U-Ranking (from Ivie/BBVA fundation): top 6 in Spain
  (top 1 in Andalusia; Total of 61 public and private Universities)
1. The Institution

Maimónides Institute for Biomedical Research of Córdoba (IMIBIC)

- Accredited by the ISCIII since 2011
- Building opening in 2015
- 10,000 m²; 5,500 m² = laboratories; 900 m² = Experimental Animal Service
- 5 scientific programmes
1. The Institution

Department of Cell Biology, Physiology and Immunology (UCO)
GC08: Hormones and Cancer Group (IMIBIC)

Research topics:
- Neuro-endocrine-metabolic (dys)regulation in tumoral pathologies, including:
  - **Prostate cancer**
  - Breast cancer
  - Pituitary adenomas
  - Neuroendocrine tumors
    - Gastro-entero-pancreatic
    - Lung NETs
    - Thyroid
    - Adrenal
  - Brain tumors
  - Hepatocarcinoma
- Study of neuroendocrine systems in metabolic diseases/pathologies:
  - Obesity
  - Diabetes
  - Etc.

Prize of the Spanish Society of Endocrinology and Nutrition for the research career of *Hormones and Cancer* group

**SEEN**
Sociedad Española de Endocrinología y Nutrición
1. The Institution

Department of Cell Biology, Physiology and Immunology (UCO)
GC08: Hormones and Cancer Group (IMIBIC)

Project leader: Raúl M. Luque, PhD
Associate Professor, University of Córdoba. Co-head, Hormones & Cancer Group at IMIBIC

- 124 peer-reviewed publications on top journals of Endocrinology and Oncology categories (h-index: 32; total number of cites: 2793)
- >35 book chapters
- >300 congress communications

Prizes and awards
- 2014: Biomedical Innovation IMIBIC-ROCHE, to the project Mamkit OBD
- 2015: First Prize IMIBIC-ROCHE to the patent Use of the GOAT levels as prostate cancer biomarker
- 2016: Prize of the Spanish Society of Endocrinology and Nutrition for the research career of Hormones and Cancer group.
- 2016 and 2017 Galileo Award (Innovation and Science; University of Cordoba)

Research projects (most relevant as PI in competitive calls and private companies)
- Caros III Institute of Health (FIS). 212.052€. 2017-2019: on Prostate cancer, as IP
- Carlos III Institute of Health (FIS). 192.692€. 2014-2016: on Prostate cancer, as IP
- IPSEN-SCRAS. 120.000€. 2011-2017
- IPSEN-SCRAS. 165.000€. 2011-2017
- Ministry of Education and Science of Spain. 60.500€. 2008- 2010

Patents:
- Ghrelin variants and their use. P201030905. 2010
- Ghrelin-O-acil transferase (GOAT) and its uses. P201531731. 2015
1. The Institution

Department of Cell Biology, Physiology and Immunology (UCO) 
GC08: Hormones and Cancer Group (IMIBIC)

Research Team: Senior, Postdoctoral, Predoctoral, Thecnitians, Bioinfomatic, Clinitians

Manuel D. Gahete, PhD
Senior Researcher (“Miguel Servet” Program) and Co-leader of the project
• 71 peer-reviewed publications; >25 book chapters; >150 congress communications
• 2010: “Andalusian Promising Researcher Award” (Joly Group and Caja Madrid Foundation)
• 2013: “Young Investigator Award” European Society of Endocrinology
• PI of research projects funded by Carlos III Institute of Health and Andalusian Government

Justo P. Castaño, PhD
Full Professor at the University of Córdoba & Co-head of Hormones & Cancer Group at IMIBIC
• 151 peer-reviewed publications; >40 book chapters; >350 congress communications
• PI of research projects funded by Government of Spain, Andalusian Government, IPSEN, etc.

Alejandro Ibáñez-Costa, PhD
Post-doctoral Researcher
• 22 peer-reviewed publications; >10 book chapters; >70 congress communications
• 2014: “Young Investigator Award” European Society of Endocrinology
• 2015: “ESE International Endocrine Scholars Programme” European Society of Endocrinology
1. The Institution

Department of Innovation Management (IMIBIC)

David Calvo Mallón: Manager of the Department
- >9 years in financial area and business management in technology-based companies
- Investment analyst in Uninvest
- Management experience in telecommunication and consultancy companies

Rosa Natera:
- Scientific and business background
- Holding a MBA applied to biotech and biomedical companies
- Experience in business development in a drug discovery spin-off and in tech transfer.
1. The Institution

Other associated research groups at the HURS, UCO and IMIBIC

- **Urology Service**
  - Fresh samples
  - Blood/Urine samples
  - Collaborative projects
  - Rio Hortega PhD student

- **Internal Medicine Service**
  - Blood/Urine samples
  - Collaborative projects

- **Pathology Service**
  - Pathological analysis
  - Collaborative projects
  - PhD students
1. The Institution

External collaborators

Gema Moreno-Bueno
Arkaitz Carracedo
Mercedes Robledo

Juan Valcarcel
Manel Puig-Domingo
Alfonso Soto

Michael Culler
Steve Swanson
Luke Selth

CRG
Ikerbasque
MD Anderson Cancer Center
CNIO
Remah Nacional

IBM
Innovation for patient care
UIC COLLEGE OF PHARMACY

IPSEN
Chicago • Rockford

Gerana Trias i Pujol Hospital
Virgen del Rocío

Novartis
Geerto de la Salud

The University of Adelaide Australia
1. The Institution

Background in the identification of novel tumoral biomarkers

1. Novel biomarkers in prostate cancer

The oncogenic role of the In1-ghrelin splicing variant in prostate cancer aggressiveness

Daniel Hormaechea-Aguilla,1,2,3,4, Manuel D. Gahe,2,3,4, Juan M. Jiménez-Vaca,1,2,3,4, Enrique Gómez-Gómez,1,2,3,4, Alejandro Ibáñez-Costa,1,2,3,4, Fernando L. López,1,2,3,4, Esther Rivero-Cortés,1,2,3,4, Andrés Samurio-Cabrál,1,2,3,4, José Valero-Rosa,1,2,3,4, Julia Carrasco-Valiente,1,2,3,4, Rafael Sánchez-Sánchez,1,2,3,4, Rosa Ortega-Salas,1,2,3,4, Maria M. Moreno,1,2,3,4, Natalia Tsomaia,1,2,3,4, Steve M. Swanson,1,2,3,4, Michael D. Call,1,2,3,4, Maria J. Requena,1,2,3,4, Justo P. Castaño,1,2,3,4, and Raúl M. Luque,1,2,3,4

Received: 20 July 2017 | Accepted: 23 August 2017
DOI: 10.1002/pro.23938

ORIGINAL ARTICLE

Somatostatin receptor subtype 1 as a potential diagnostic marker and therapeutic target in prostate cancer

Sergio Pedraza-Arévalo1,2,3,4 | Daniel Hormaechea-Aguilla1,2,3,4 |
Enrique Gómez-Gómez1,2,3,4 | Maria J. Requena1,2,3,4 | Luke A. Seith6 |
Manuel D. Gahe1,2,3,4 | Justo P. Castaño1,2,3,4 | Raúl M. Luque1,2,3,4

Contents lists available at ScienceDirect

Cancer Letters

journal homepage: www.elsevier.com/locate/canlet

Original Article

Ghrelin O-acyltransferase (GOAT) enzyme is overexpressed in prostate cancer, and its levels are associated with patient's metabolic status: Potential value as a non-invasive biomarker

Daniel Hormaechea-Aguilla,1,2,3,4,5 | Juan M. Jiménez-Vaca,1,2,3,4, Enrique Gómez-Gómez,1,2,3,4,5 |
Fernando L. López,1,2,3,4,5 | Julia Carrasco-Valiente,1,2,3,4,5 | José Valero-Rosa,1,2,3,4,5 |
Rafael Sánchez-Sánchez,1,2,3,4,5 | Rosa Ortega-Salas,1,2,3,4,5 | Francisco Gracia-Navarro,1,2,3,4,5 | Michael D. Call,1,2,3,4,5 |
Alejandro Ibáñez-Costa,1,2,3,4,5 | Manuel D. Gahe,1,2,3,4,5 | Maria J. Requena,1,2,3,4,5 |
Justo P. Castaño1,2,3,4,5 | Raúl M. Luque1,2,3,4,5

Contents lists available at ScienceDirect

Cancer Letters

journal homepage: www.elsevier.com/locate/canlet

The oncogenic role of the spliced somatostatin receptor sst5MD4 variant in prostate cancer

Daniel Hormaechea-Aguilla,1,2,3,4 | Juan M. Jiménez-Vaca,1,2,3,4 | Enrique Gómez-Gómez,1,2,3,4 |
Fernando L. López,1,2,3,4 | Julia Carrasco-Valiente,1,2,3,4 | José Valero-Rosa,1,2,3,4 |
Rafael Sánchez-Sánchez,1,2,3,4 | Rosa Ortega-Salas,1,2,3,4 | Francisco Gracia-Navarro,1,2,3,4 |
Michael D. Call,1,2,3,4 | Alejandro Ibáñez-Costa,1,2,3,4 | Manuel D. Gahe,1,2,3,4 |
Maria J. Requena,1,2,3,4 | Justo P. Castaño1,2,3,4 |
Raúl M. Luque1,2,3,4

*Matronilios Institute of Biomedical Research of Cordoba (IMIBIC). | Department of Cell Biology. Physiology and Immunology, University of Cordoba. | Center of Investigation Bioestable on Endocrinology of the Obesity and Atherosclerosis (CIBERObio). | Campus de Excelencia Internacional Agroalimentaria (AXA2), Cordoba, Spain. | Toxicology Service, HURS/IMIBIC, Cordoba, Spain. | *Department of Pathology. Cordoba, Spain. | *Department of Biostatistics, Cambridge, Massachusetts, USA.
1. The Institution

Background in the identification of novel tumoral biomarkers

2. Novel biomarkers in other tumoral pathologies

In 1-ghrelin splicing variant is overexpressed in pituitary adenomas and increases their aggressive features

Truncated somatostatin receptor variant sstTMD4 confers aggressive features (proliferation, invasion and reduced octreotide response) to somatotropinomas

In1-ghrelin, a splice variant of ghrelin gene, is associated with the evolution and aggressiveness of human neuroendocrine tumors: Evidence from clinical, cellular and molecular parameters
1. The Institution

Collaborative initiatives in research transfer

Proyectos de desarrollo tecnológico en salud (DTS)

Instituto de Salud Carlos III - Acuse de recibo

DATOS GENERALES

Asunto: Solicitud del expediente: DTS17/00061
Procedimiento: Acción Estratégica de Salud. Ayudas y Subvenciones
Organo destinatario: SG de Evaluación y Fomento de la Investigación
Número de expediente: ISCIII-AES-2017/001207
Número de asiento registrado: 201709E001282
Fecha: 25/05/2017 11:19:29
Content

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3. Partnering Opportunities

**GOAT (Ghrelin-O-aciltransferase), a new biomarker for prostate cancer screening**
2. The Product: a) Target Indications

**Prostate cancer**

- 3 millions of new cases in 2016
- > 330,000 cases/year (higher incidence in Spain)
- > Higher prevalence >900,000 cases/5-years (Spain)

**PCA3**

"proposed as the most prominent biomarker emerging as a non-PSA-based diagnostic test for Pca. Unfortunately, PCA3 has also serious limitations (i.e. lower sensitivity than PSA)"

**4KScore**

Total PSA + free PSA + intact PSA + human Kallikrein-2 (hK2). Yet: "Concentration of hK2 was not significantly different between patients with BPH or prostate cancer".

**SelectMDx**

Test measures mRNA levels of two biomarkers in urine, and lets the clinician to take decisions in order to perform biopsy or not.
2. The Product: a) Target Indications

- **Non-invasive (plasma levels)**
- **Specific and sensible**
- **Relevant to the decision**
- **Prognostic biomarker**

<table>
<thead>
<tr>
<th>Test characteristic</th>
<th>PSA (normal &lt;4 NG/ML)</th>
<th>PSA (normal &lt;3 NG/ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test positivity (%)</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Cancer detection rate (%)</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Sensitivity (%)</td>
<td>21</td>
<td>32</td>
</tr>
<tr>
<td>Sensitivity (%) for high grade cancer, i.e., gleason score ≥8</td>
<td>51</td>
<td>68</td>
</tr>
</tbody>
</table>

“Elevated PSA levels may be driven by benign conditions (i.e. prostatic hyperplasia or prostatitis)”

19 millions PCa screenings

4.7 millions abnormal PSA results

1.3 millions biopsies procedures (many unnecessary)

- Unnecessary biopsies
- Risks and Reduced QoL
- Associated cost
XVI Encuentro de Cooperación Farma-Biotech

2. The Product: b) Innovative mechanisms of action

Ghrelin

\[
\text{NH}_2 - \text{GOAT enzyme} \rightarrow \text{COOH}
\]

- GOAT (Ghrelin-O-acyl-transferase)
- MBOAT4 (Membrane Bound O-Acyl-transferase Domain Containing 4)

Pituitary

- GH
- ACTH
- PRL

Beta-cells

- \( \beta \)-cell function
- Insulin secretion

Adipose Tissue

- Adipogenesis
- Lipolysis
- Glucose metabolism

Tumoral pathologies

GHS-R


Gutierrez JA, et al. PNAS. 2008

• GOAT enzyme - MBOAT4 (Membrane Bound O-Acyl-transferase Domain Containing 4)
2. The Product: b) Innovative mechanisms of action

Ghrelin gene products, receptors, and GOAT enzyme: biological and pathophysiological insight

Original Article

Ghrelin O-acyltransferase (GOAT) enzyme is overexpressed in prostate cancer, and its levels are associated with patient's metabolic status: Potential value as a non-invasive biomarker

Daniel Hormaechea-Agulla a,b,c,d,e, Enrique Gómez-Gómez a,c,f, Alejandro Ibáñez-Costa a,b,c,d,e, Julia Carrasco-Valiente a,c,f, Esther Rivero-Cortés a,b,c,d,e, Fernando L-López a,b,c,d,e, Sergio Pedraza-Arevalo a,b,c,d,e, José Valero-Rosa a,c,f, Rafael Sánchez-Sánchez a,c,g, Rosa Ortega-Salas a,c,g, María M. Moreno a,c,g, Manuel D. Gaheta a,b,c,d,e, José López-Miranda a,c,d,h, María J. Requena a,c,f, Justo P. Cañedo a,b,c,d,e, * , Raúl M. Luque a,b,c,d,e,
2. The Product: b) Innovative mechanisms of action

GOAT in prostate cancer

GOAT is overexpressed in prostate cancer (tissues and cell lines) and can be secreted by prostate cancer cells.
2. The Product: b) Innovative mechanisms of action

**GOAT in prostate cancer**

Plasma

*GOAT* levels can be detected in plasma, where it discriminates between prostate cancer patients and controls. The difference was even bigger in the non-diabetic population.

*Hormaechea-Agulla et al. / Cancer Letters 383 (2016)*

**Non diabetic patients**

**Control** (n=19)  **PCa** (n=60)

<table>
<thead>
<tr>
<th>GOAT ng/ml</th>
<th>Sensitivity %</th>
<th>100% - Specificity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>0.4</td>
<td>20</td>
<td>80%</td>
</tr>
<tr>
<td>0.6</td>
<td>40</td>
<td>60%</td>
</tr>
<tr>
<td>0.8</td>
<td>60</td>
<td>40%</td>
</tr>
<tr>
<td>1.0</td>
<td>80</td>
<td>20%</td>
</tr>
<tr>
<td>1.2</td>
<td>100</td>
<td>0%</td>
</tr>
</tbody>
</table>

**AUC=0.854  p<0.0001**

GOAT levels can be detected in plasma, where it discriminates between prostate cancer patients and controls.

The difference was even bigger in the non-diabetic population.
Most importantly, **GOAT** levels can be detected in **urine**, where it discriminates between prostate cancer patients and controls.

**Urine GOAT** levels are higher in prostate cancer patients after prostate massage.

*Hormaeche-Agulla et al. / Cancer Letters 383 (2016)*
2. The Product: c) Differential features facing the market

GOAT vs. PSA

• **Higher sensitivity than previous methods**
  • GOAT levels in plasma: (cut-off 1.22 ng/mL) 81.1% sensitivity
  • GOAT levels in urine: (cut-off 1.061 ng/mL) 75% sensitivity

• PSA levels in plasma:
  ➢ cut-off 3 ng/mL: 32% sensitivity for any prostate cancer and 68% for high-grade cancers (Gleason ≥8)

<table>
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<th>TEST CHARACTERISTIC</th>
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<tr>
<td>Sensitivity (%) for High Grade Cancer, i.e., Gleason Score ≥ 8</td>
<td>51</td>
<td>68</td>
</tr>
<tr>
<td>Specificity (%)</td>
<td>91</td>
<td>85</td>
</tr>
<tr>
<td>Positive Predictive Value (%)</td>
<td>30</td>
<td>28</td>
</tr>
</tbody>
</table>

**TABLE 2. PSA Screening Test Characteristics as a Function of Threshold for a Positive Test**

Wolf *et al.*, CA Cancer J Clin 2010

• **Easy to assess**
  ➢ GOAT levels can be measured using **simple, easy to use and rapid methods**: ELISA plate reader in contrast to other assays that require qPCR or automated systems.
2. The Product: c) Differential features facing the market

**Improvement in terms of invasiveness, time of analysis, sensitivity and specificity**

<table>
<thead>
<tr>
<th></th>
<th>GOAT</th>
<th>PSA</th>
<th>PCA3</th>
<th>4KScore</th>
<th>SelectMDx</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assay type</strong></td>
<td>ELISA</td>
<td>ELISA</td>
<td>PCR</td>
<td>ELISA</td>
<td>PCR</td>
</tr>
<tr>
<td><strong>Sample type</strong></td>
<td>Plasma, urine</td>
<td>Plasma</td>
<td>Urine (post-massage)</td>
<td>Plasma</td>
<td>Urine</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>Few hours</td>
<td>Few hours</td>
<td>14 Days</td>
<td>Few days</td>
<td>Days</td>
</tr>
<tr>
<td><strong>Resources needed</strong></td>
<td>Plate reader</td>
<td>Plate reader</td>
<td>External assay</td>
<td>External assay</td>
<td>External assay</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>81%</td>
<td>32%</td>
<td>65%</td>
<td>89%</td>
<td>–</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>68%</td>
<td>85%</td>
<td>73%</td>
<td>61%</td>
<td>–</td>
</tr>
</tbody>
</table>

Hormaechea-Agulla et al., Cancer Lett 2016 10.1016/j.canlet.2016.09.022
Cui et al., SciRep 2017 10.1038/srep25776
Wolf et al., CA Cancer J Clin 2010 10.3322/caac.20066
http://mdxhealth.com
http://4kscore.com
2. The Product: d) Current status of development

Fostering innovation to improve people’s health
Training in key areas to ensure quality improvement of your project
Networking and expert advice to generate business opportunities
2. The Product: d) Current status of development

GOAT (Ghrelin-O-acyltransferase): New Biomarker for PCa Screening (CI00015)

CaixaImpulse
2017, CaixaForum Barcelona

Raúl M. Luque, Manuel D. Gahete, Alejandro Ibáñez-Costa, David Calvo-Mallón, Justo P. Castaño
IMIBIC / Universidad de Córdoba
Advantage of the asset

GOAT behaves as a better diagnosis tool than PSA (or other methods)

- Higher sensitivity than previous methods
  - GOAT levels in **plasma**: (cut-off 1.22 ng/mL) **81.1% sensitivity**
  - GOAT levels in **urine**: (cut-off 1.061 ng/mL) 75% sensitivity
  - PSA levels in **plasma**:
    - cut-off 3 ng/mL: 32% sensitivity for any prostate cancer and **68%** for high-grade cancers (Gleason ≥8)
- Easy to assess
  - GOAT levels can be measured using a simple ELISA plate reader in contrast to other assays that require qPCR or automated systems

Wolf et al., CA Cancer J Clin 2010

Valorization Strategy

- Current Status: promising results
  - 113 plasma samples cohort
  - 113 urine samples cohort
  - 64 tissue samples cohort
  - Good preliminary results

Valorize this tool

![Caixa][image]

- Expected Results
  1) Expand to 1000-1300 plasma/urine samples cohort
  2) Perform a regulatory and transfer plan and a budget Impact study

Generate a **STRONG PROOF OF CONCEPT** and a find a way for the **TRANSFERRING OF THE ASSET**
Valorization Plan

Main goal and different objectives

1. **To obtain a strong proof-of-concept** (expanding this tool to a larger, more significant cohort of patients: >1,000-1,300 patients, MULTICENTER study; Explore the feasibility and validity of **GOAT as prognostic tool** compared with PSA).

2. **To continue and implement the protection of the asset (patent)**. Patent as PCT (November, 2016) and the International Search Report was encouraging. We plan to **transfer the patent** into national phases during the project period.

3. **To perform a Market Research and Budget Impact study** comparing **GOAT** with the gold standard, **PSA**, and other available technologies and its impact in the healthcare system.

4. **Delineate a Business Plan** to be presented to the investors.
2. The Product: d) Current status of development

**Conditions, assumptions and constrains**

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Assumptions</th>
<th>Constrains</th>
</tr>
</thead>
<tbody>
<tr>
<td>- To obtain the necessary samples to increase the cohort and purchase the kits and materials for experimentation</td>
<td>- To obtain a strong proof of concept with the bigger cohort in order to be interesting for the industry and to reach a license agreement.</td>
<td>- There are no constrains identified, which could be directly affecting project development.</td>
</tr>
<tr>
<td>- To hire a trained person to perform the experiments and tests</td>
<td>- To maintain the protection of the asset and to start the protection through national phases</td>
<td>- Ethically the hospital committee has approved the project.</td>
</tr>
<tr>
<td>- To preserve the intellectual protection of the asset</td>
<td>- To obtain a good Market Research and Budget Impact Study, as well as the Business Plan.</td>
<td></td>
</tr>
<tr>
<td>- To subcontract the Market Research and Budget Impact Study, as well as the Business Plan.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Quality Plan**

The host organization has been certified in the UNE 160022:2014 (ANECOR) quality management system in research, development and innovation.

Particularly, an **executive committee** will be designated, which will be responsible for: 1) the close **follow-up** of the project progress; 2) the organization of regular **scientific and executive meetings**; and 3) the **promotion of the asset**.

- **Manuel Tena-Sempere** (Deputy Scientific Director of Basic Research at the IMIBIC)
- **Laura Sampietro-Colom** (Deputy Director of Innovation and Head of the Health Technology Assessment (HTA) Unit at the Hospital Clinic of Barcelona)
- **Francisco Gracia-Navarro** (Director of Evaluación y Acreditación de la Agencia Andaluza del Conocimiento)
2. The Product: d) Current status of development

- **Laboratory Experimentation & Proof-of-concept**: GOAT levels will be assessed to better define the cut-off values and to compare with PSA behavior (1,000-1,300 patients, MULTICENTER study)

- **Market Research and Budget Impact Study**: The goal of this activity is to have more reasons to engage companies to acquire the asset.

- **Business Development Plan generation**: business development plan will more profoundly pursued at this point to increase the presence of GOAT evaluation in different forums and to present it to the different companies in order to advance in licensing relations.

- **Preparation of materials for transferring**: i.e. “Pitch deck / technology offer” to present the technology to the industry and possible licensors.
2. The Product: d) Current status of development

<table>
<thead>
<tr>
<th>Activities</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>1</td>
</tr>
<tr>
<td>A2</td>
<td>2</td>
</tr>
<tr>
<td>A3</td>
<td>3</td>
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<tr>
<td>A4</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Experimentation &amp; Proof of concept</td>
<td>1</td>
</tr>
<tr>
<td>Market Research and Budget Impact Study</td>
<td>2</td>
</tr>
<tr>
<td>Business Development Plan generation</td>
<td>3</td>
</tr>
<tr>
<td>Preparation of Material for Transferring</td>
<td></td>
</tr>
</tbody>
</table>

Experts in scientific area and in business/tech transfer area:

- Manuel D. Gahete: A1, A2, A3, A4
- Justo P. Castaño: A2, A3, A4
- Alejandro Ibáñez: A1, A2, A3
- David Calvo: A2, A3, A4
- Rosa Natera: A2, A3, A4
2. The Product: d) Current status of development

GOAT levels are being assessed in a bigger cohort of patients to further support the proof-of-concept. The first preliminary result in a subpopulation of this cohort, further confirm the data obtained previously:

Contacts have been established in other hospitals to obtain samples from additional cohorts of samples in order to further validate the asset.

Initial cohort => N=113 samples
Additional validation (shown above) => N=273 samples

Full cohort > 1200 samples in total
2. The Product: d) Current status of development

**GOAT** is being explored as a putative biomarker of Prostate Cancer Progression

**GOAT** levels seem to be associated to the aggressiveness of the Prostate Cancer.

The full cohort (>1200 patients in total) is being followed to determine the capacity of GOAT to predict the development and aggressiveness of Prostate cancer.
2. The Product: d) Current status of development

- A2. Market Research and Budget Impact Study
- A4. Preparation of materials for transferring

Oriol Sola-Morales

HITT Health Innovation Technology Transfer

Value Creation
- Pricing
- RWD Epidemiologic Research
- Policy Survey
- Evidence Generation Committee evaluations
- Early compound evaluation

Comparative Analysis Trends
- KSH Engagement
- Portfolio Negotiation
- Company Positioning
- Communication tools Awareness

Capacity

Collaboration

XVI Encuentro de Cooperación Farma-Biotech
2. The Product: e) IPR protection

Level of development and protection of the asset

"GHRELINA-O-ACIL TRANSFERASASA (GOAT) Y SUS USOS"

- Spanish Patent (P201531731) was requested on December 27th, 2015

- Patent extension to PCT was carried out on November 28th, 2016, patent number: PCT/ES2016/070844.
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2. The Product: f) Pitfalls & Risks to be considered

**Risk Plan**

<table>
<thead>
<tr>
<th>POSITIVE</th>
<th>NEGATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIGH IMPORTANCE</strong></td>
<td><strong>HIGH IMPORTANCE</strong></td>
</tr>
<tr>
<td>- Early licensing of the asset</td>
<td>- Bad proof of concept results</td>
</tr>
<tr>
<td></td>
<td>- Appearance of a good novel biomarker</td>
</tr>
<tr>
<td></td>
<td>- KOLs negative opinion of the asset</td>
</tr>
<tr>
<td><strong>MEDIUM IMPORTANCE</strong></td>
<td><strong>MEDIUM IMPORTANCE</strong></td>
</tr>
<tr>
<td>- Access to new funds through other grants or private investors</td>
<td>- Industry not interested in GOAT after valorization</td>
</tr>
<tr>
<td></td>
<td>- Negative Market Research or Budget Impact study</td>
</tr>
<tr>
<td><strong>LOW IMPORTANCE</strong></td>
<td><strong>LOW IMPORTANCE</strong></td>
</tr>
<tr>
<td>NA</td>
<td>- Delay in receiving the materials</td>
</tr>
</tbody>
</table>

**Contingency Plan (three main risks)**

- **Bad proof of concept results:**
  - To identify subgroups of patients wherein GOAT could be a good biomarker (i.e. diabetic, obese or elderly patients),
  - To combine GOAT with other biomarkers to develop a stronger test
  - To explore the utility of GOAT as prognostic, instead of diagnostic, tool.

- **Negative Market Research or Budget Impact study:**
  - To implement methodological improvements
  - To explore putative combinations with other markers in order to increase the power of the asset.

- **KOLs negative opinion of GOAT.**
  - To prepare scientific papers and documents comparing PSA with GOAT in order to convince scientific society of GOAT abilities and possible impact.
Content

1. The Institution

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
3. Partnering Opportunities

**Commercialization**
We are looking for a company that would also carry out the market launch

**Licensing strategy**
We are looking for an early license to a company that can finance the clinical development

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"COLLABORATION is the best way to became the traslational research into reality."

We offer you the opportunity to participate in the development, manufacturing and exploitation of an strategic opportunity in prostate cancer biomarker area.

**Co-development**
We are looking for an collaboration agreement with the industry which allows:

- Analysis of combination of GOAT with other biomarkers
- Development of a new ELISA kit
GOAT (Ghrelin-O-acyltransferase), a new biomarker for prostate cancer screening