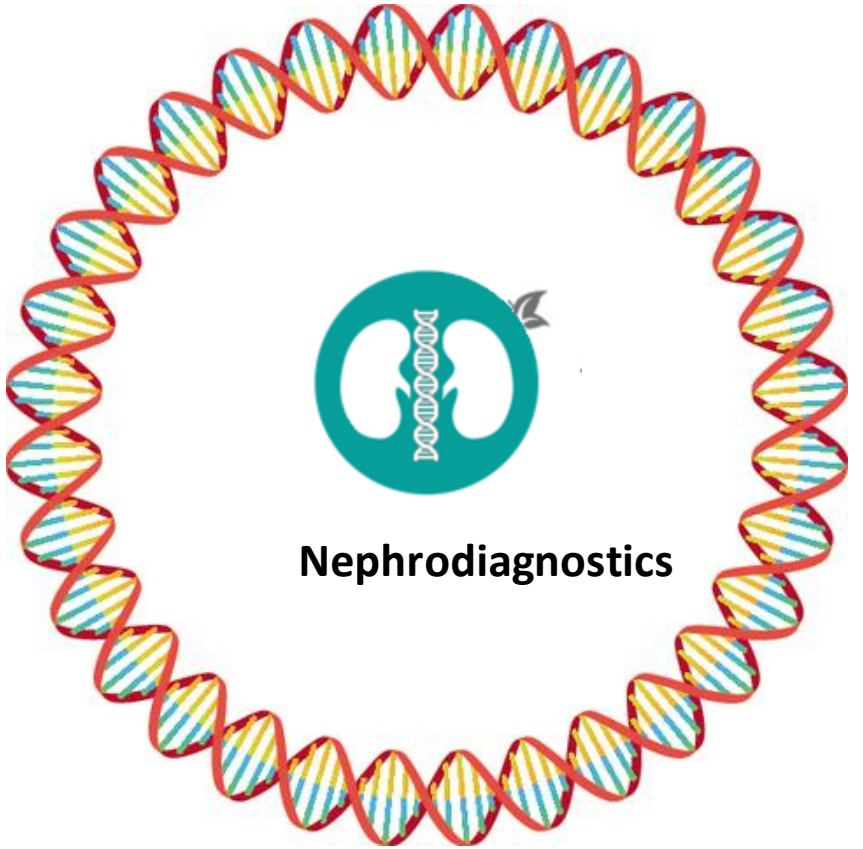
SCHENA foundation

MATERIAS®
ideas come to life



Investor Pitch Deck

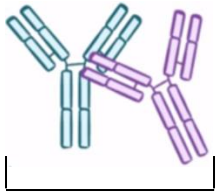
The disease

Nephrodiagnostics

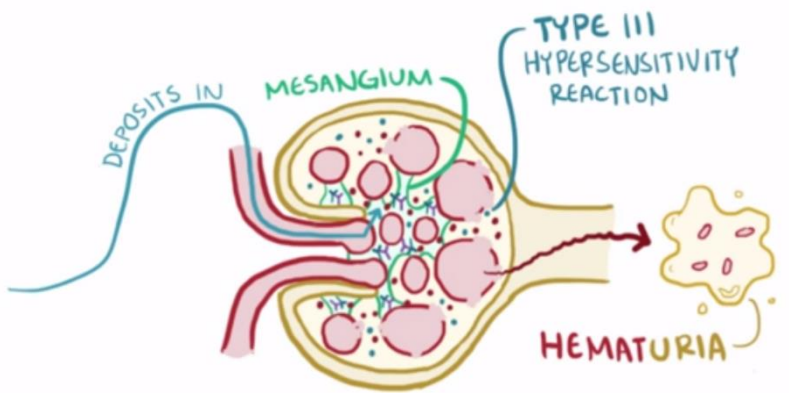
IgA nephropathy (IgAN) is the **most common form of nephropathy** (kidney disease) **worldwide**

Patogenesis

Abnormal antibody IgA1 (blue), produced by the body **due to genetic disorders**, **triggers** a reaction by **IgG** (purple), another auto-antibody



The two bound antibodies form an «**immune complex**», that **flows to kidneys**



Depositing in the kidneys, it induces an **inflammatory response**, that leads to **kidney injury** and **hematuria**

Consequences

- **Nephritic Syndrome**
- **Acute Kidney Failure**
- **Chronic Kidney Disease**
- **Renal Replacement Therapy**

Causes

The **primary cause of the disease is still unknown**; however, **genetics factors** appear to play a **key role** in susceptibility to the disease.

Therapy

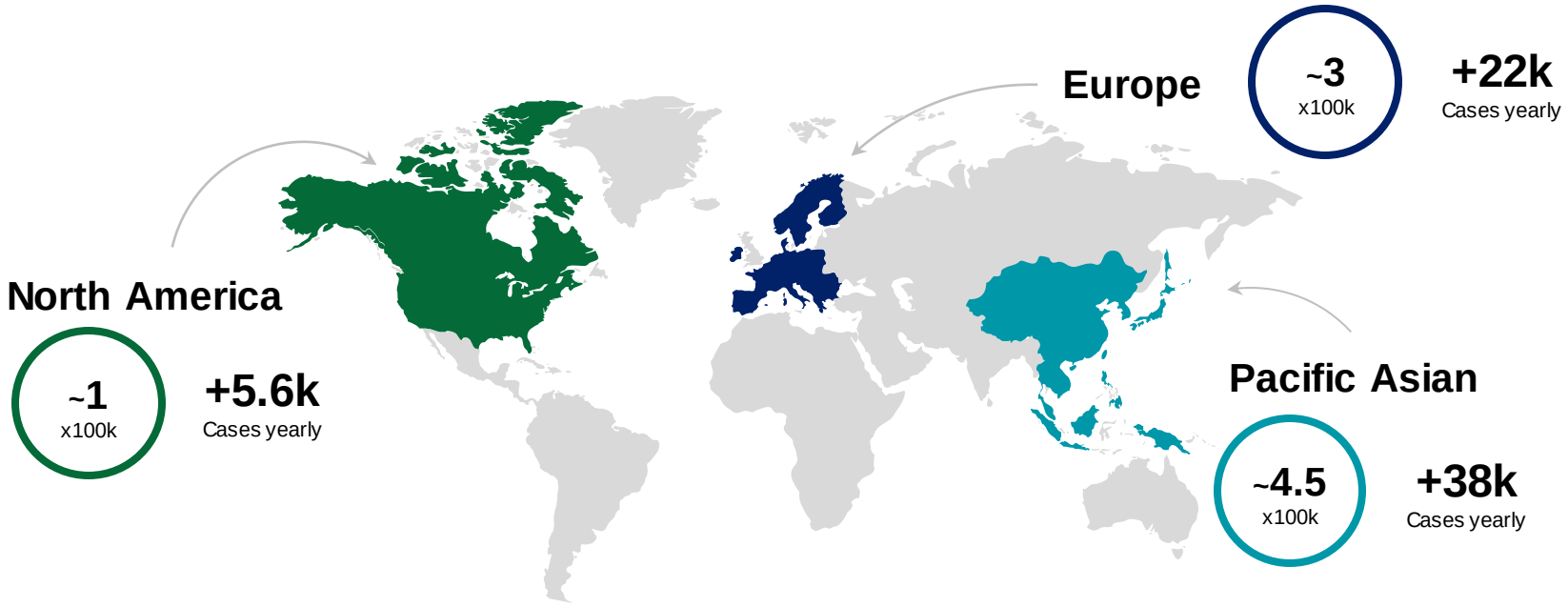
No definitive alternative therapy exists beside **renal replacement therapy**. The usage of corticosteroids or cyclosporin, azathioprine or mycophenolate mofetil **can only slow down** the progression of the disease. Diagnosis at early stage is more convenient for an efficient therapy.

The relevance of the disease

Nephrodiagnostics

Today the average disease incidence of IgAN is estimated to be 3.5 patients per 100,000 individuals per year

+265K worldwide yearly increase of people affected*



** Based on Worldwide incidence of the disease per 100.000 individuals per year.*
Source: Glomerular Diseases: Emerging Tests and Therapies for IgA Nephropathy.
Data presumably underestimated due to limited existing diagnostic analyses

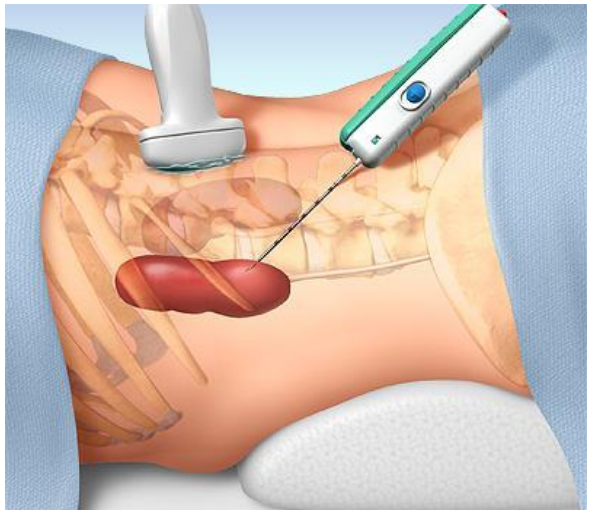
Problem

Nephrodiagnostics

The diagnosis of the disease is currently performed **exclusively by renal biopsy,** after the first symptom detected by urinanalysis

Current Patient Journey

The current diagnostic methodology has the following **limitations**:



Ultrasound-guided renal biopsy

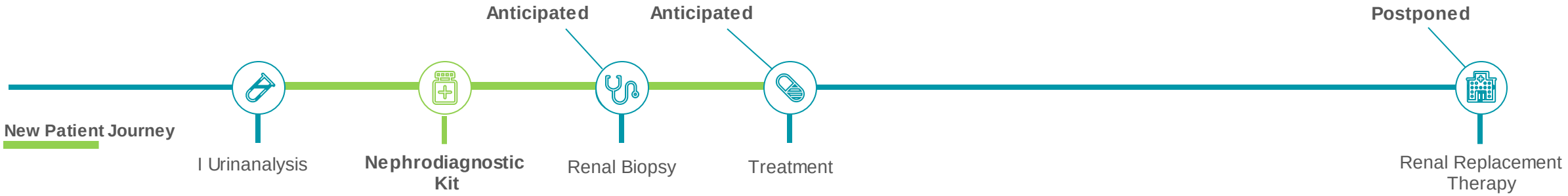
- **High invasiveness** of the operation (renal biopsy)
- **High cost (5k €)**
- **Not applicable** as **routine analysis** for diagnostic purposes
- **68% of renal biopsies can be avoided**
- **Advanced-stage diagnosis**

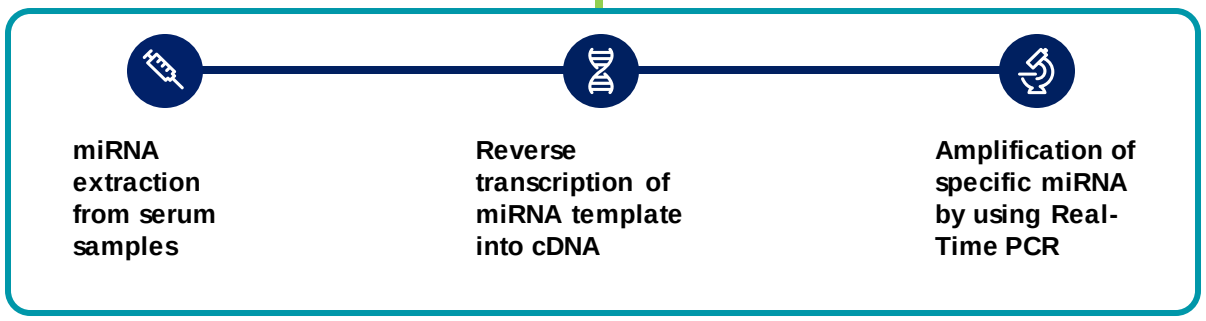
Solution

Nephrodiagnostics

Innovative Kit for preventive diagnosis of IgA Nephropathy:

Detection of increased expression levels of two mi-RNAs, let-7b and miR-148b, by blood sample analysis





The solution is protected by international patent **WO201205/6282A1**

Sensitivity 78%
Specificity 80%

Research Activities

Several research activities were made in order to develop the solution. Tests, which were applied **over 500 international** subjects (Italy, Greece, Hong Kong and Japan) were made under GLP quality system**. The value of AUC is 0.85** (diagnostic performance of miRNA combination and Gd-IgA1)

Some Scientific Publications related to the research activities:

- In a retrospective international study, circulating miR-148b and let-7b were found to be serum markers for detecting primary IgA nephropathy

- Role of let-7b in the regulation of N- acetylgalactosaminyltransferase 2 in IgA nephropathy

- Abnormal miR-148b Expression Promotes Aberrant Glycosylation of IgA1 in IgA Nephropathy

Benefits

Nephrodiagnostics

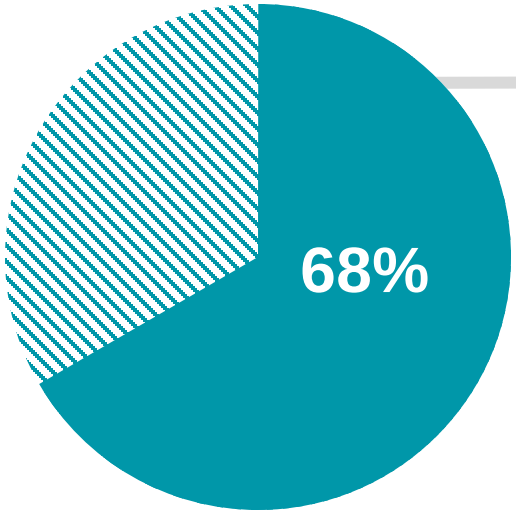
+ **68% of unnecessary biopsies avoided**
+ **Preventive diagnosis** of the disease at early stage which ensures a better treatment
+ **Enhancement of the quality of life** of the patient
+ **Non invasive test**
+ **Lower cost** compared to the current diagnosis based on renal biopsy
+ **Easy applicability** for hereditary and routine screening

Market

Nephrodiagnostics

830 K

Potential number of biopsies worldwide needed to identify the disease (yearly)
(based on percentages of biopsy-proven primary glomerulonephritis)



Average percentage of unnecessary biopsies
(Percentage of biopsies that find no evidence of the disease*)

EUR 2.8 Bn

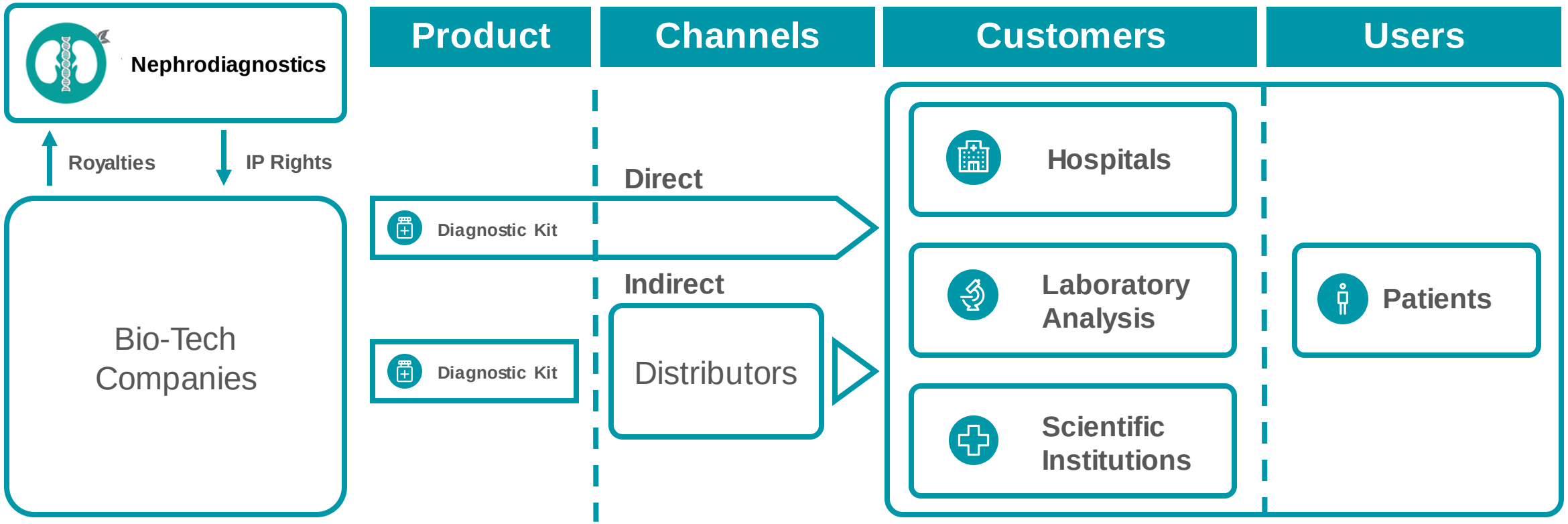
Possible costs reduction with preventive screening
(Considering EUR 5k AVG biopsy cost)

*Source: IgA nephropathy, Lai KN, TangSC,SchenaFP, Novak J, Tomino Y, FogoAB, GlassockRJ.NatRevDisPrimers.2016

Business Model

Nephrodiagnostics

The business model consists in the licensing of IP Rights to a Bio-tech company in exchange of Up-Front Fee and Royalties (expected 6%, may vary, based on the invest timing of the deal). The licensee company will produce, and possibly distribute, the **diagnostic kit able to reduce the costs associated to the painful, invasive and expensive exam of the kidney biopsy**, thus increasing patient's compliance, family members screenings and early diagnosis



Competitors

Nephrodiagnostics

Although the biopsy is the traditional approach used to definitively diagnose the IgAN, the use of this **innovative diagnostic kit ensures the detection of disease's presence or absence, by avoiding unnecessary operations**

	Nephrodiagnostics	Renal Biopsy
Invasiveness	Blood sample analysis	Surgical procedure
Detection timeframe	Almost 20 years before renal replacement therapy	Usually late traditional approach
Cost	Reagent cost for PCR technique	Direct and indirect cost due to surgery
Applicability	Easy hereditary and routine screening	Complex hereditary and routine screening
Accuracy	78%	100%

Team

Nephrodiagnostics

Nephrodiagnostics's team is formed by highly qualified **technical-scientists** in the field of **Nephrology**. The team in addition relies on a network of **knowledge in the research, industrial and financial sectors with successful entrepreneurial experiences thank to its Advisory Board**

TEAM

Francesco Paolo Schena

Chief Scientific Officer

- Emeritus Professor of Nephrology, Dialysis and Transplantation University of Bari, Italy;
- President of the Schena Foundation c/o Veterinary Medicine University Campus;
- 28th in Expertscape ranking of Expertise in IgAN Worldwide

Sharon Natasha Cox

Researcher

- Pharmacist;
- Ph.D. in Biotechnologies applied to Organ and Tissue Transplants

Rosa Ragone

Researcher

- Biologist;
- Ph.D. in Medical Biotechnologies and Molecular Medicine

Maria Emilia Mercurio

Researcher

- Biotechnologist;
- Ph.D. in Molecular and Cellular Biotechnology

ADVISORY BOARD

Luigi Nicolais

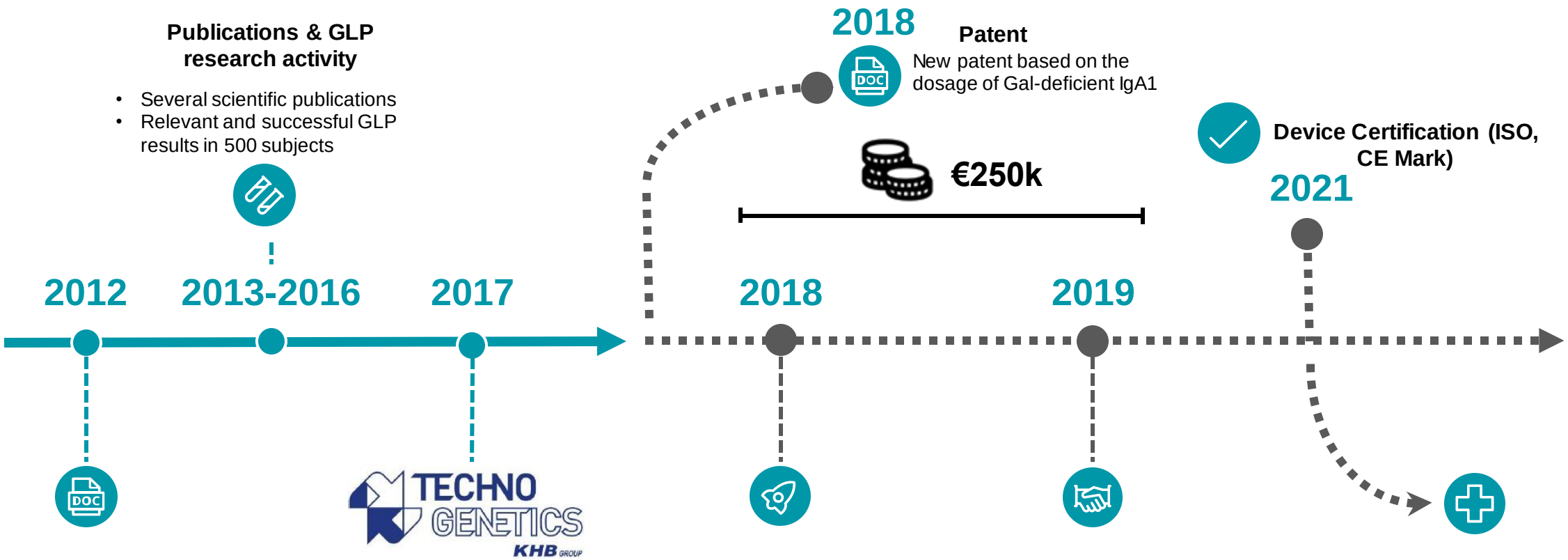
Advisory Board Chairman

- CEO Materias;
- Emeritus Professor Science and Technology of Polymers Univ. Federico II di Napoli

The team is willing to introduce a Professional for Customer & Business Development and additional Advisor members

Project Timeline

Nephrodiagnostics



Publications & GLP research activity

- Several scientific publications
- Relevant and successful GLP results in 500 subjects

Patent Publication by EPO

3/05/2012

Positive Industrial Feedback

16/02/2017

- Feasibility of kit development
- Valuable scientific content

Startup Foundation & Beginning of Clinical Investigation

- Company and trademark registration
- Partnership with Materias
- Take all necessary steps in order to clinical investigation (safety and efficacy)

Deal with Bio-Tech Company

- Completion of the certification process
- Go-to market validation

Potential therapeutic application

Research Project aimed to develop miRNA inhibitors in order to prevent or inhibit IgAN, and study **other possible applications**

Funding Requirement

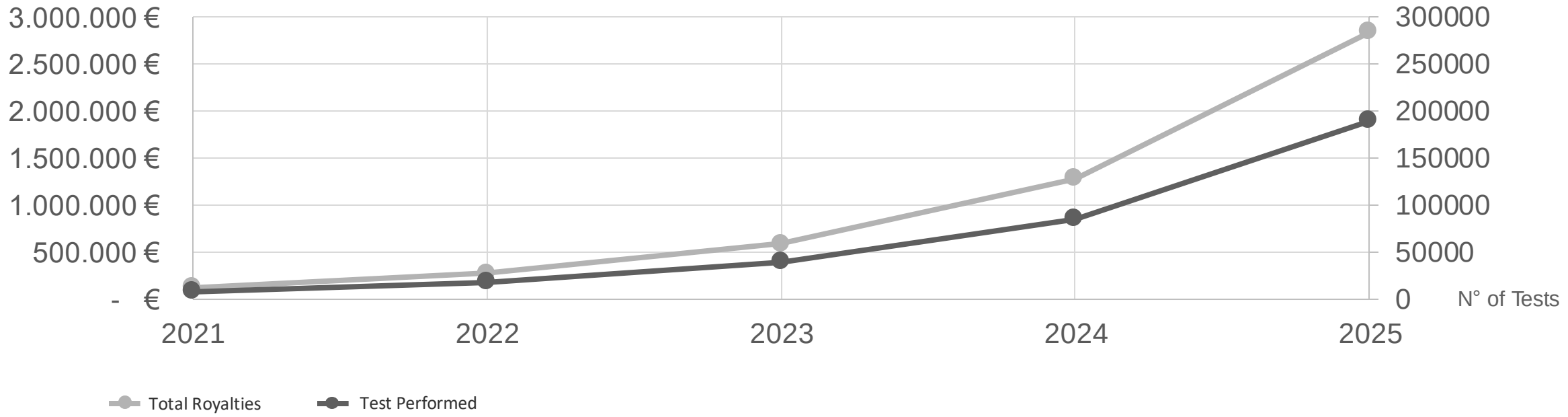
Nephrodiagnostics

Nephrodiagnostics will be founded as a **startup created by Fondazione Schena and Materias**. The funding requirement will be used to startup the company, design the **certification process** and **execute the clinical investigation** to prove safety and efficacy of the **developed solution**

Investment Category	Funding Amount Requested (€)
Startup Foundation (administrative and legal support)	5 K
International Patent Maintenance and new patent submission	15 K
Certification process design and implementation (device risk classification, CE technical file draft, finalization of clinical investigation, …)	155 K
Team salary	75 K
Total Investment	**250 K**

Financials

Nephrodiagnostics



	2021	2022	2023	2024	2025
Total Test Performed	8.100	18.241	39.264	85.726	189.881
Total Revenues	2.025.000€	4.560.150€	9.816.031€	21.431.528 €	47.470.360 €
Total Royalties	121.500€	273.609€	588.962€	1.285.892 €	2.848.222 €

Assumptions

Royalties:
6%
On Revenues

Price:
EUR 250
Based on existing PCR-based diagnostics kits

Regions:
EU, USA and Pacific Asian
(Different growth hypothesis for each region)

Attachments

International research studies and results

Nephrodiagnostics

Relevant and successful GLP results in 500 subjects from Italy, Greece (Caucasians), Hong Kong and Japan (Asians)

Training Study

Development of two-miRNA diagnostic signature on 100 IgAN patients and 119 HBDs

Logistic Regression Model based on ethnicity, and let-7b, miR-148b dosage

Validation Study

Validation in an independent cohort of 145 IgAN patients and 64 HBD (Healty Blood Donors)

To confirm the relevance of the predictive model based on the two miRNAs, we validated the diagnostic signature found in the training study in an additional and independent large cohort of 145 IgAN patients and 64 HBDs comprising individuals from the two populations.

Test Study

Test of disease specificity on 105 non-IgAN patients

In order to study whether the diagnostic signature is specific and able to discriminate IgAN from other primary glomerulonephritides, we tested the model using a group of non-IgAN patients from the two populations. We selected patients with minimal change disease, focal segmental glomerulosclerosis, and membranoproliferative glomerulonephritis type I as disease controls.

Potential integration of the Kit for IgA-Nephropaty diagnosis

Nephrodiagnostics

Gal-deficient IgA1 dosage

Total IgA

1. Coating
2. Addition of 100 µL serum x 2 + IgA1 standard
3. Incubation with biotinylated Ab anti-IgA
4. Detection with avidin-peroxidase conjugate + o-phenylenediamine-H_2O_2

Gal-deficient IgA1

1. Coating
2. Addition of 100 µL serum x 2 + IgA1 standard
3. Desialylation with neuraminidase
4. Incubation with GalNAc-specific biotinylated lectin
5. Detection with avidin-peroxidase conjugate + o-phenylenediamine-H_2O_2

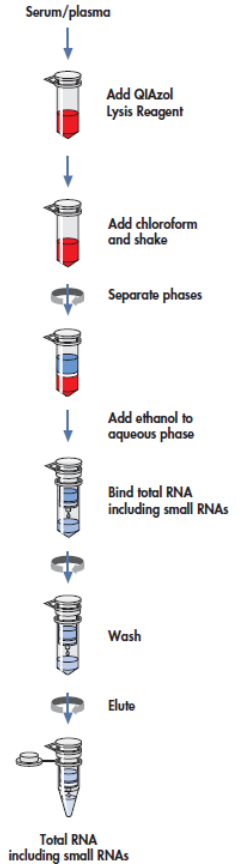
OD measurements

OD Gal-deficient IgA1 / OD Total IgA ratio

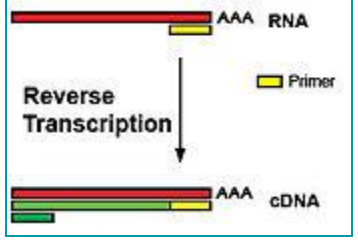
MiRNA let-7b and miR-148b dosage

1) RNA extraction

200 µL serum



2) retro-transcription of RNA into cDNA



3) Measurement of miR-148b and let-7b expression by Real-Time PCR