QURIN DIAGNOSTICS

Early detection of cancer in urine using photonic biosensors

Coenraad K. van Kalken, MD, PhD

Photonic Integration Conference

1 October 2019

Mission

QURIN DIAGNOSTICS

De Telegraaf

NIEUWS SPORT WINTERSPELEN ENTERTAINMENT FINANCIEEL MEER

Oncoloog Pinedo werkt aan revolutionaire vinding

Urinetest voor vroege kanker

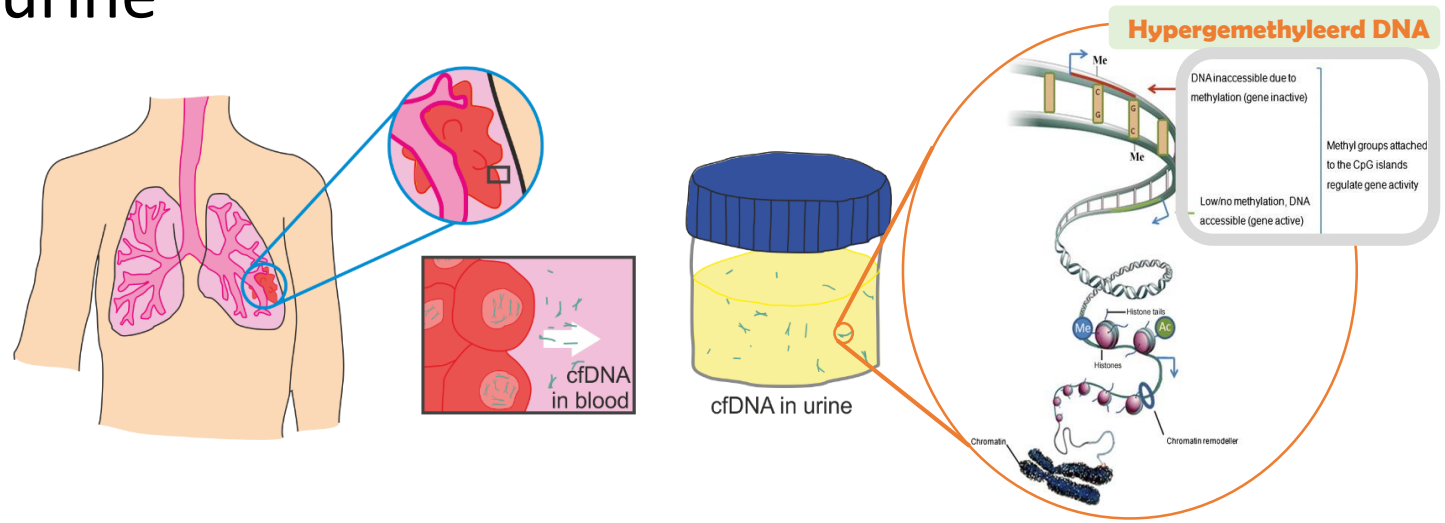
Door **EVA GABELER**
18 nov. 2017 in BINNENLAND

AMSTERDAM - Binnen enkele jaren komt er een urinetest beschikbaar waarmee 15 vormen van kanker in een zeer vroeg stadium kunnen worden vastgesteld.

Oncoloog Bob Pinedo
© RENE BOUWMAN

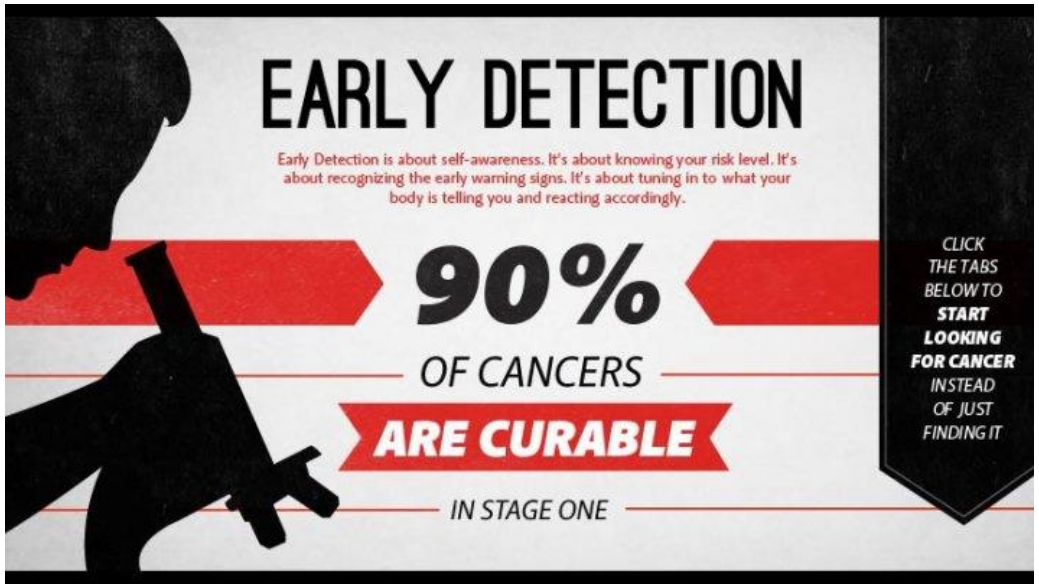
The finding

Early Detection of cancer specific DNA profiles in urine



In 2016, the Qurin founders discovered that cancer specific hypermethylated DNA profiles can be detected in urine.
Currently, marker panels for 4 cancer types are available.

Mission



An Unmet Medical Need:

Current health care systems wait for disease symptoms to occur. As a result cancer diagnoses are established in a (too) late stage of the disease. The Genova platform has delivered highly sensitive and specific biomarker panels able to discriminate early cancer from normal tissue in an unprecedented way. The results can revolutionize cancer diagnostics and therapy and save the live of millions.

The Challenge

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- Developing low-threshold, low cost and sensitive molecular diagnostics that change the paradigm

Three Pillars of Qurin

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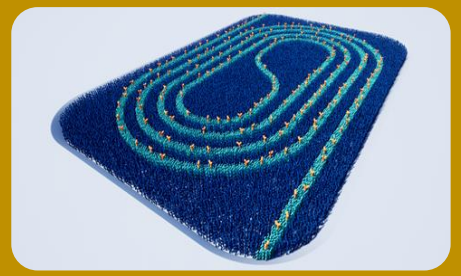
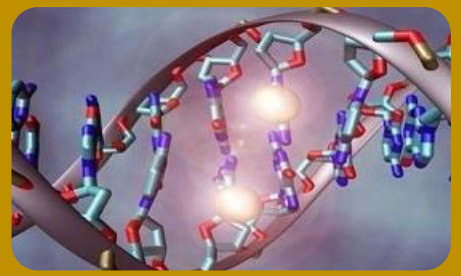
1. Diagnostic Technology



Integrate and/or develop highly sensitive and specific analysis of selected marker panels in urine for the development and validation of selected indications and certified (CE IVD) diagnostic tests.

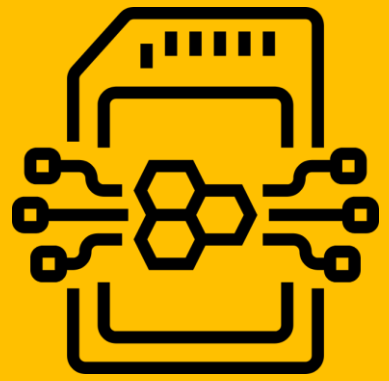
2. Biomarker Discovery



Identify or create access to advanced markerpanels for selected cancer types, including but not limited to: Cervical, Lung, Bladder, Prostate, Colon, etc.

3. Clinical Development

Establish easy-to-use urine cancer tests and urine sample procurement techniques. Access to biobanks for clinical validation/ development.



Bringing together the expertise for application-specific Biochip development

LioniX INTERNATIONAL

SURFIX nano coatings > global impact

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Photonic chip technology + **Nanocoating technology** + **Biomarker integration**

Qurin Pillar 1

Diagnostic technology for early cancer detection

Dutch Biochip Alliance

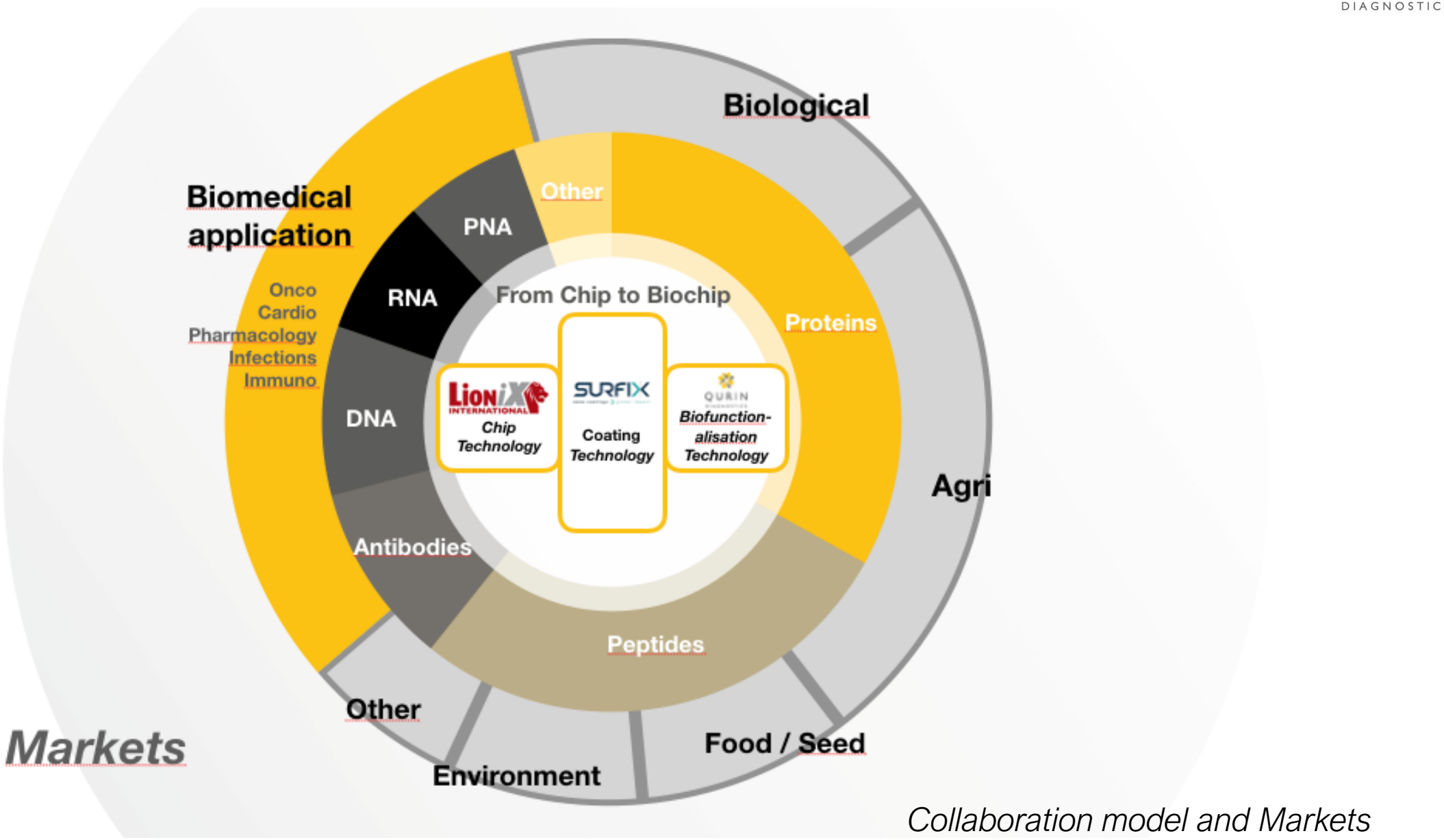
A LEADING DUTCH ALLIANCE IN BIOCHIP DEVELOPMENT: QURIN DIAGNOSTICS AND LIONIX INTERNATIONAL ACQUIRE SURFIX

15-04-2019 - Enschede, the Netherlands

As of April 15, 2019, Qurin Diagnostics B.V. and Lionix International B.V. have acquired Surfix B.V. As a supplier of custom-made nanocoatings, the capabilities of Surfix are highly complementary to the products and services offered by Qurin and LioniX International. The companies are already working together closely on early cancer detection and have realized a sensitive biochip, bringing together their respective complementary technologies for this purpose. This acquisition strengthens their relationship and mutual commitment towards bringing this technology to the global biomedical market.

Molecular ("DNA") diagnostics holds great promise for early diagnosis and personalized medicine and has clear clinical added value. Nevertheless, market penetration falls short of expectations, as the costs of current diagnostic platforms are too high. Currently available diagnostic platforms based on Polymerase Chain Reaction and Next Generation Sequencing are very expensive, time consuming, and require extensive infrastructure and highly skilled personnel. A breakthrough is needed for the desired mass implementation of molecular

Networking strategy



Collaboration model and Markets

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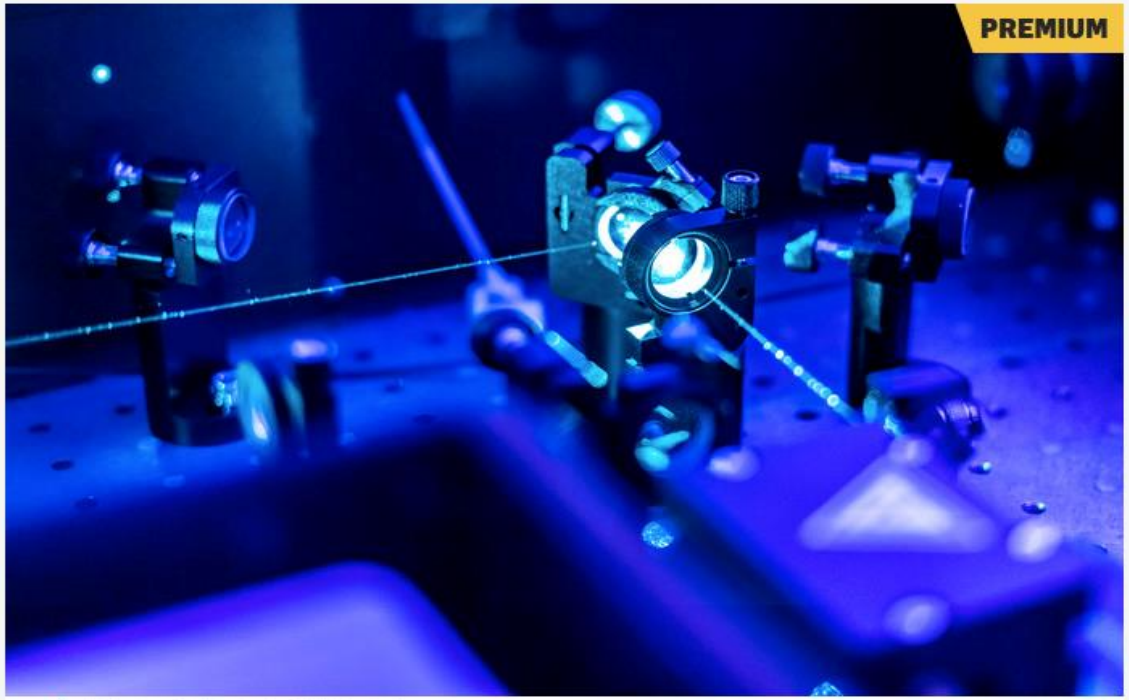
Which technology will pave the way?

Technology	Principle	Suitable for DNA analysis	Sensitivity	Specificity	Reproducibility	Cost	Multiplexing	Speed	Ease of use	Suitable for handheld	State-of-art
PCR	analyte amplification + detection	++	++	++	++	+/-	+/-	+/-	+/-	-	--
Digital PCR	analyte amplification + detection	++	+++	+++	++	-	+/-	-	-	-	+/-
micro/nano PCR	analyte amplification + detection	++	++	++	++	+	+/-	+	+	+	+
NGS	analyte amplification + detection	++	+	+	++	--	++	--	-	--	+
Microarrays	analyte amplification + detection + signal amplification	++	+	+	++	+/-	++	--	--	--	+
Lateral flow devices	detection + signal amplification	+	+	++	+/-	+	-	++	++	++	-
(Nano)biosensors	**detection + signal amplification**	**++**	**+**	**++**	**+**	**++**	**+**	**++**	**++**	**++**	**++**
SPR	detection + signal amplification	+	+	++	++	-	+	+/-	+/-	-	-
MS	detection	+/-	--	++	++	--	+	-	-	--	--
HPLC	separation	-	--	--	++	-	+	-	-	-	--
CE	separation	++	--	--	-	+/-	+	-	-	-	--
ELISA	detection + signal amplification	-	+	++	+/-	-	+/-	+/-	+/-	-	--
Immuno affinity assay	detection + signal amplification	+/-	+	++	+	-	+/-	+/-	+/-	-	--
Flow cytometry	detection	--	-	++	+	-	+/-	-	-	-	--

Photonics in NL

AD Nieuws Regio Sport Show Video Koken & Eten Abonneren



Fotonica, Shutterstock © Shutterstock

Nederland zet vol in op fotonica

Fotonica moet de nieuwe miljardenindustrie worden voor Nederland. Qua kennis lopen we nu nog wereldwijd voorop in deze techniek, die licht en electronica combineert. Maar houdt ons land dat vol?

Peet Vogels 08-05-19, 10:30

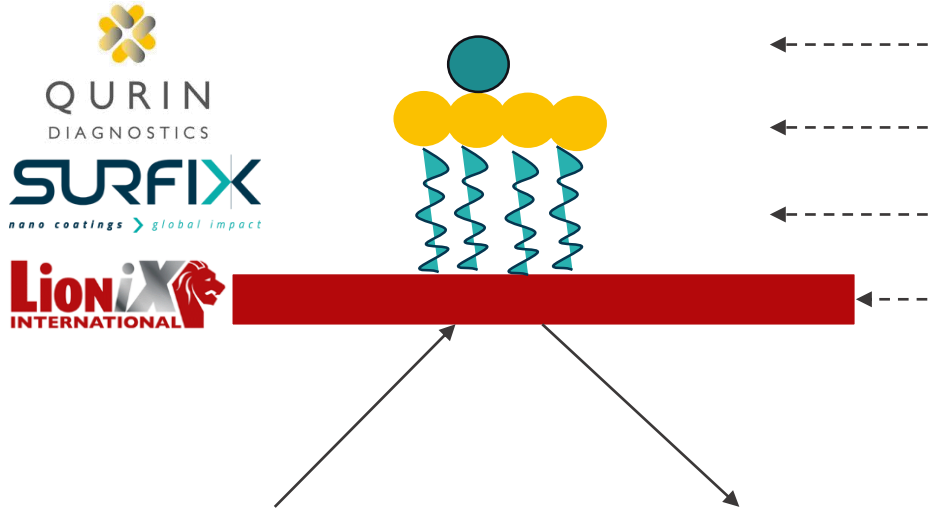
NET BINNEN

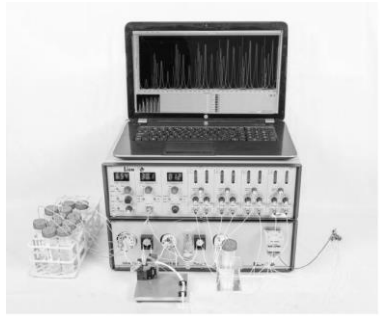
10:11 Europees Hof acht Duitse tolheffin…
09:00 Peet en Elza boeren veganistisch,…
06:10 Bedrijven die werken met gevaarli…
17-06 Voor deze ingenieuze vinding wint…
17-06 Explosie Moerdijk kost Shell 2,5 …
17-06 Ron woont met zijn zoon en betaa…
17-06 Grote ontwikkelaar: 'Huizen zijn te…
17-06 Bitcoin op hoogste niveau in jaar: …
17-06 Deutsche Bank steekt risicovol mi…
17-06 Voedsel in de supermarkt fors du…

Klik hier voor de actuele koersen

From Chip to Biochip - *Prototype*

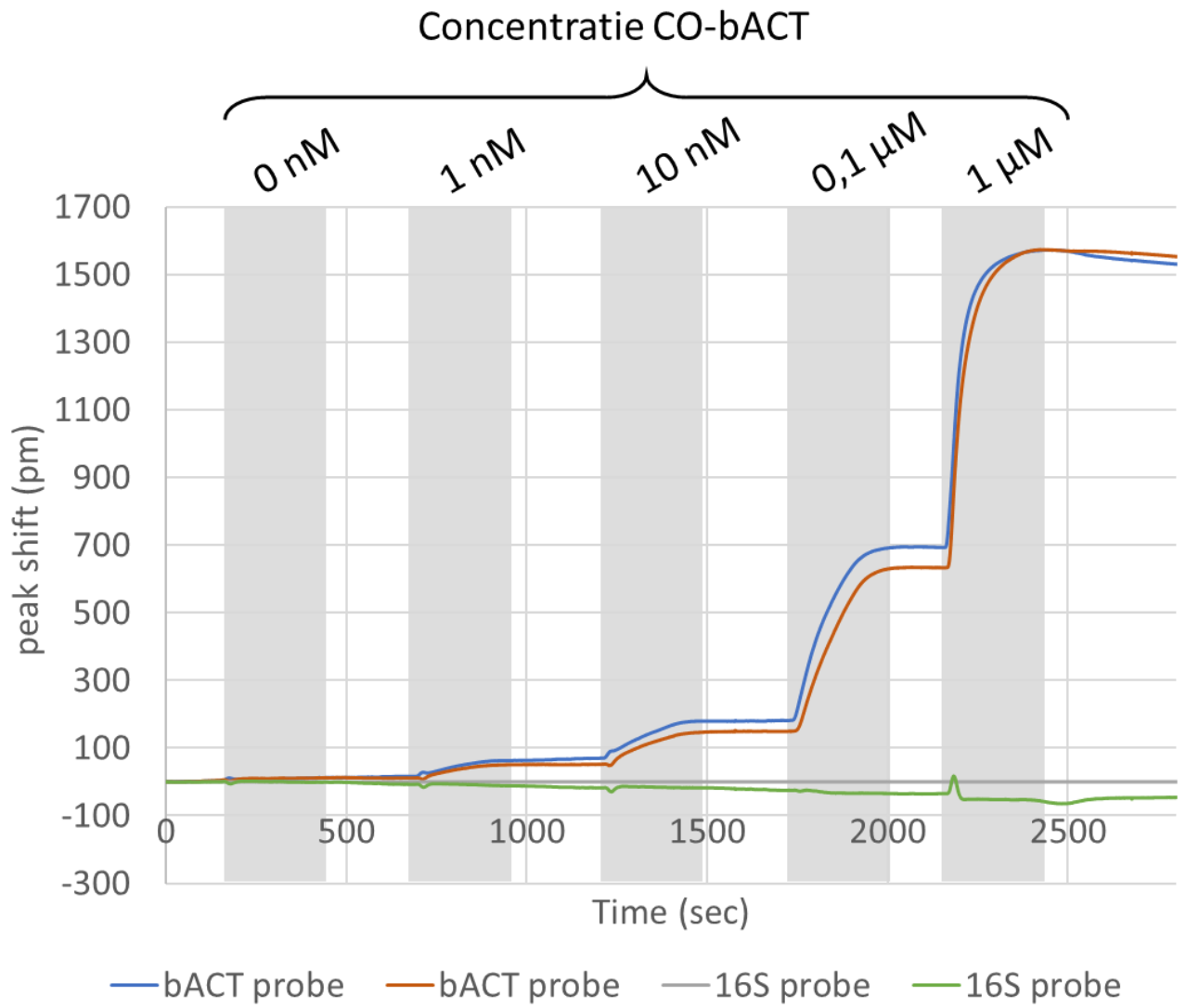
Bio-functionalization is required for diagnostic applications in wet environment





Technical set-up incl. coated chips used and tested by Nytor/Qurin with support from Lionix and Surfix

From Chip to Biochip - *Measurements*



Genova
GENOMIC RESEARCH CENTER

Qurin Pillar 2

Big Data Science accelerating breakthrough changes in cancer care

Using FinTech for Bioinformatics applications

Data science in cancer research

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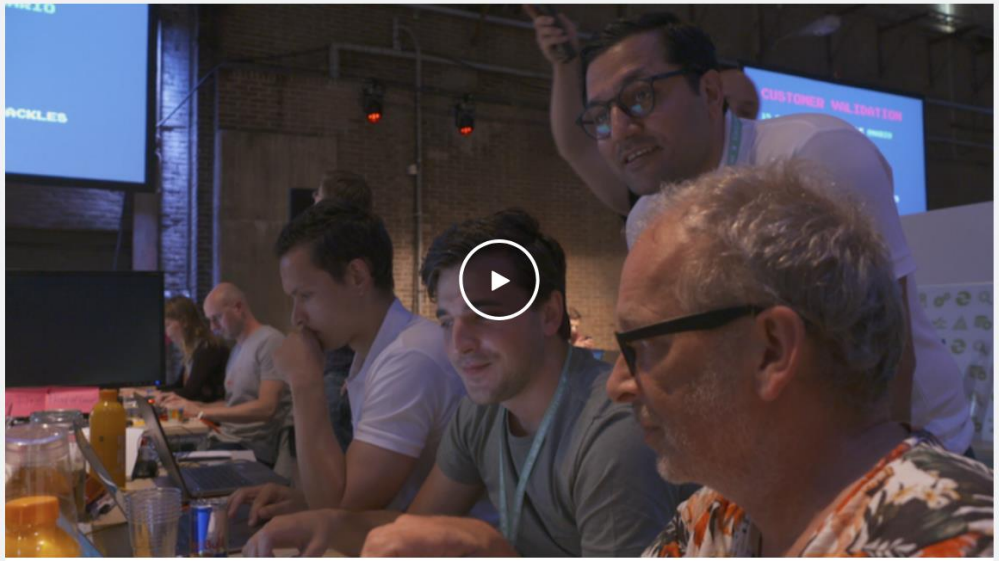
1V EenVandaag | Actueel | Gemist | Opiniepanel | De Peiling | Contact | avrotros

Actueel › Data-analisten van een bank helpen kanker genezen: hoe werkt dat?

Data-analisten van een bank helpen kanker genezen: hoe werkt dat?

11-06-2018 | Zorg en leven | Verslag: Mark de Bruijn Redactie: Frederica van Mastrigt



</> Dit item op uw eigen site plaatsen

Het is een komische cultuurclash, maar ook een voorzichtige doorbraak in betere behandeling van kanker. ICT'ers die werken in de banksector een weekend lang samen opsluiten in een oude fabriek, waar ze non-stop data van kankerpatiënten analyseren. ABN Amro organiseerde samen met het Rotterdamse Erasmus MC een zogeheten hackaton: een marathonsessie in een oude suikerfabriek.

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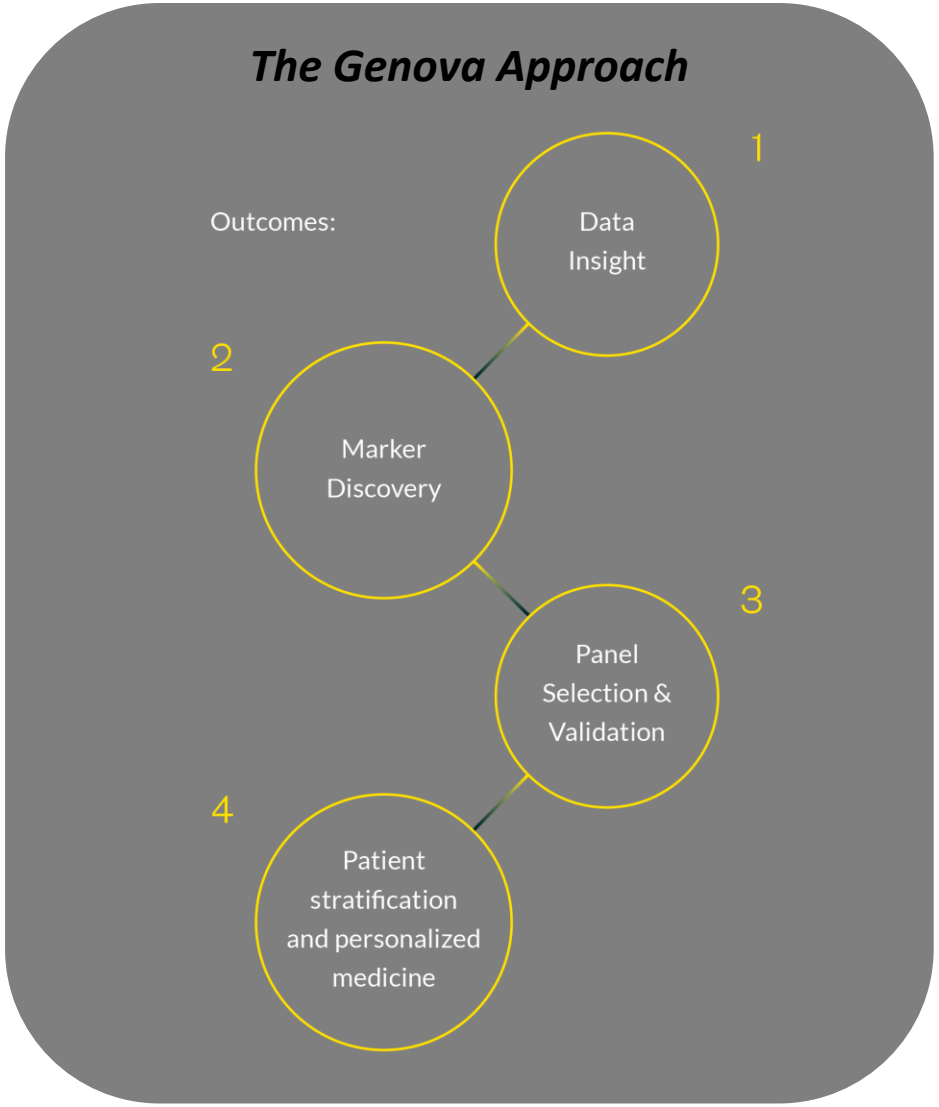
Accelerating cancer research and personalized medicine



Clinical validation strategy

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Traditional Biomarker panel selection and (clinical) validation trajectory > 5-10 years

QURIN strategy for panel selection and validation +/- 0.5 - 1 year

GLOBAL SURVEYS
(IP, literature)

GRACE

Genova
GENOMIC RESEARCH CENTER

AI guided discovery of panels

In silico validation

Erasmus MC
University Medical Center Rotterdam
Erasmus
VUmc
Radboudumc
UZA

NGS

PCR

Justification

Clinical Validation

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Qurin Pillar 3

Developing accessible and low-cost diagnostic tests for early cancer detection in urine

Shortening time to clinical validation

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Cutting back R&D by multiple years

Saving 3-5 years of research and development compared to traditional methods

Target tumor type

- Bladder cancer
- Prostate cancer
- Colorectal cancer
- Lung cancer
- Breast cancer

The Genova Approach

Phase 1: Indentification

Datamining | biomarker discovery

Phase 2: Insilico Verification

Original matrix | intended matrix | intended technology

Phase 3: Clinical validation

Integrating invitro and insilico data

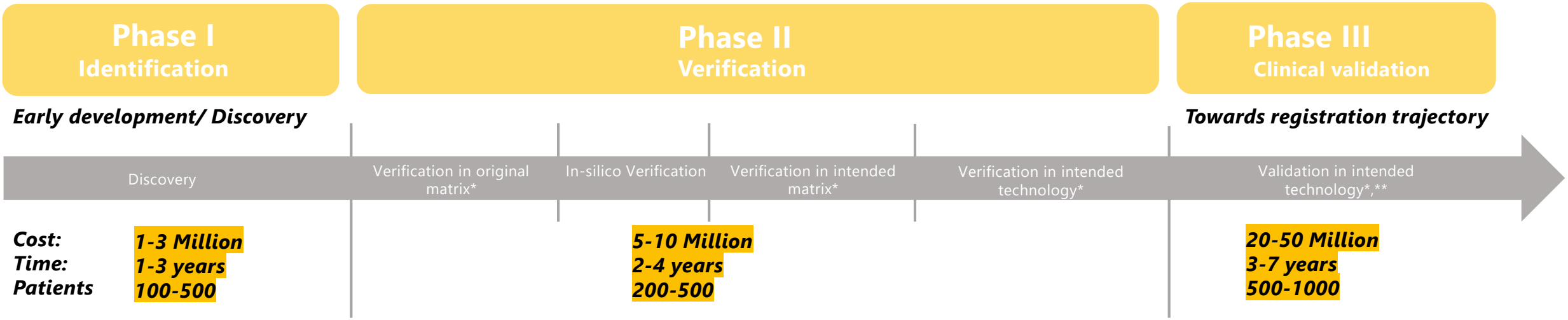
Clinical validation program Qurin biomarker panels

1. Bladder cancer
2. Prostate cancer
3. Colorectal cancer
4. Lung cancer
5. Breast cancer

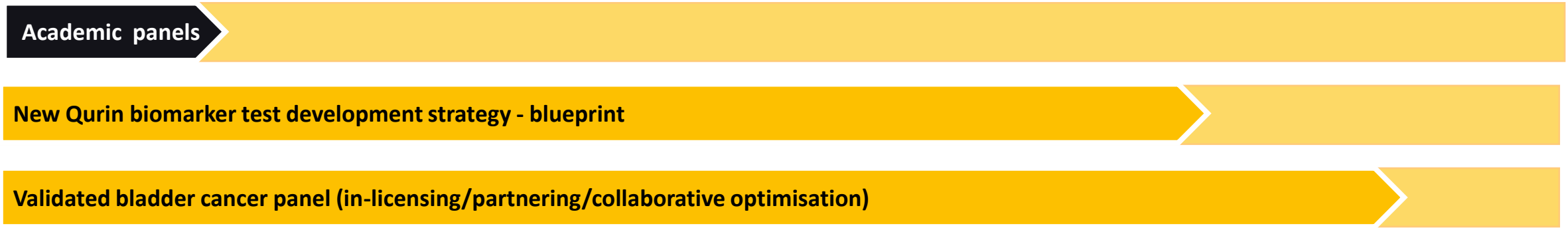
1. AI-guided preselection of 40+ panels per tumor type
2. Specificity & sensitivity > 95%
3. > Small clinical sample sizes
4. Validation by WGS & PCR
5. 4 clinical sites
6. Start Sept 2019

Innovative Biomarker panel development

Traditional vs. big data science-guided biomarker panel development model



NEW APPROACH Biomarker Pipeline :



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