



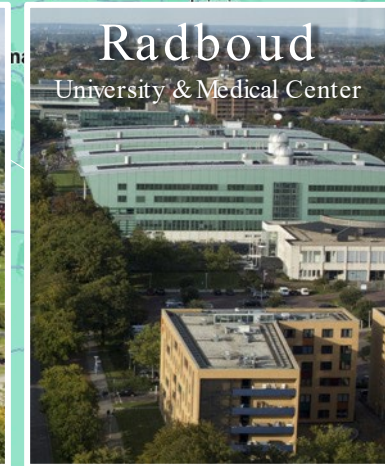
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**imec, Wageningen University & Research,
Radboud University and Radboudumc**

Sensor & digital innovations for Precision Health

Annelies Goris

Disclosure belangen spreker

Potentiële belangensverstrengeling	Geen / zie hieronder
OnePlanet research center, samenwerking van imec met Wageningen Universiteit, Radboud universiteit en Radboud Medisch Centrum, is een onafhankelijk onderzoekscentrum (stichting zonder winst oogmerk,) op het gebied van nanotechnologie, kunstmatige intelligentie voor landbouw, voeding en gezondheids applicaties. Onderzoek wordt gefinancierd door overheden en door het bedrijfsleven via deelname aan onderzoeksprogramma's of bilaterale samenwerkingen.	
Voor bijeenkomst mogelijk relevante relaties met bedrijven	Bedrijfsnamen
• Sponsoring of onderzoeksgeld • Honorarium of andere (financiële) vergoeding • Aandeelhouder • Andere relatie, namelijk....	• • • •



ONEPLANET MISSION

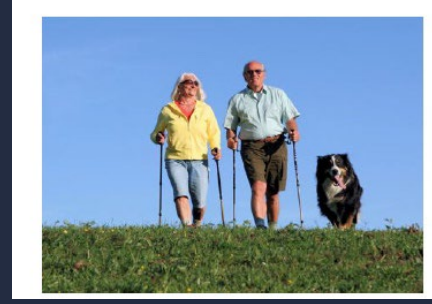
Create chip and digital innovations with & for partners



Healthy Environment



Healthy Food/Nutrition



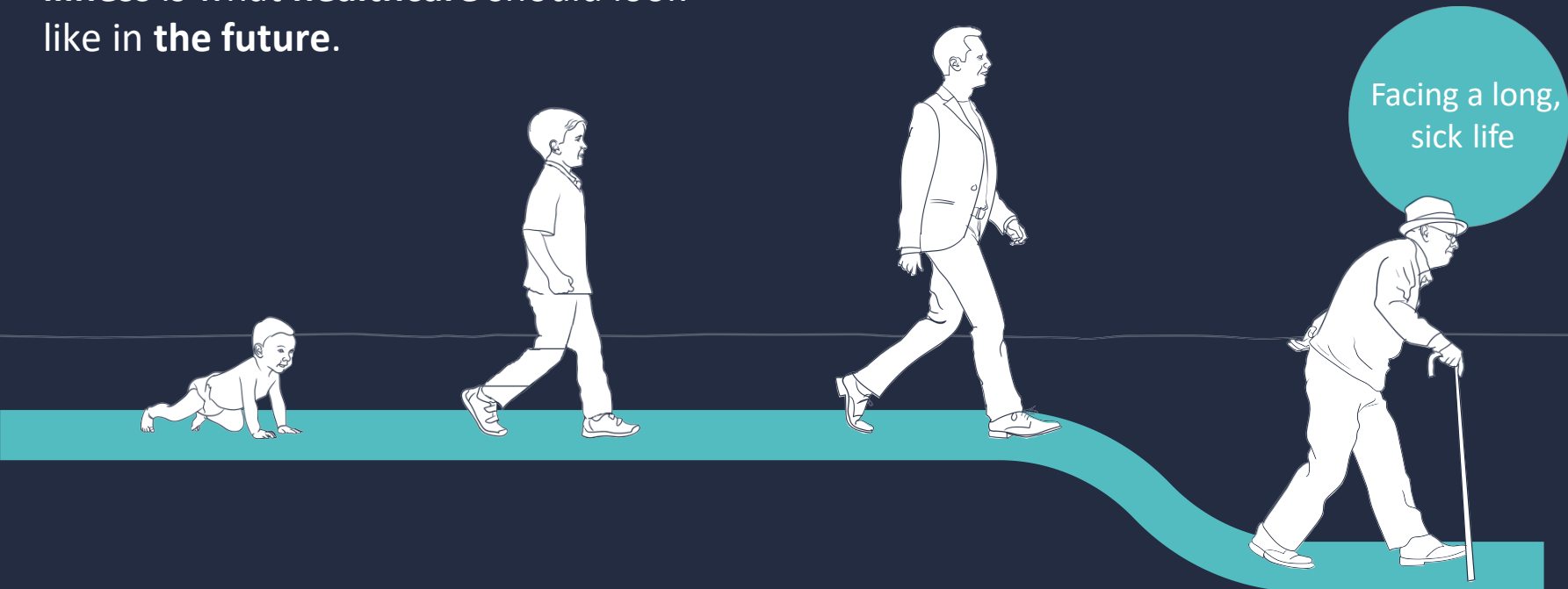
Healthy Life

Precision
Agriculture & Food



Precision
Health & Nutrition

Managing health instead of managing illness is what healthcare should look like in the future.



Nutritional behavior



Primary care



Hospitals



Medication



Surgery



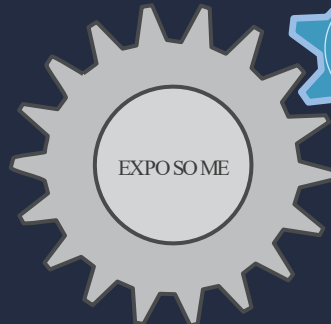
Specialized care



Long-term care



Emergency care



Treatment of
an unhealthy
lifestyle



Nutritional behavior



Primary care



Hospitals



Medication



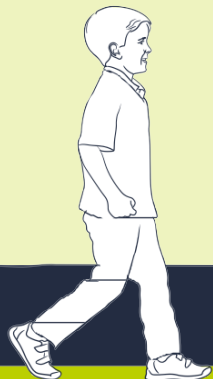
Long-term care



Emergency care

This means **prevent, predict** and **intercept** the onset of disease.

Enjoying a
long and
healthy
life



Nutritional behavior



Primary care



Lifestyle



APPS



Smart Devices



Your
Digital Twin



Lifestyle

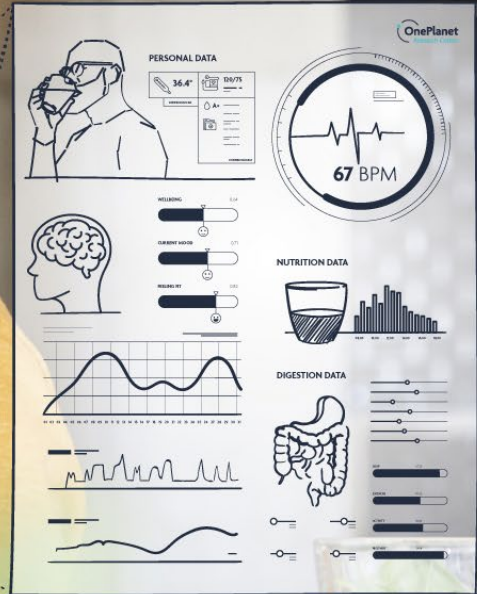


Personalized
Nutrition





Good choice this juice!
You've reached your
vegetables goal for today.



Nutrition

Health

Gut health

pH	°C
6.8	30
7	36,5
7.9	37,2
7.3	36,7
8.2	37,1



Gut Health

- 25% of population suffer from digestive complaints or disorders (IBD / FGID ..)
- We are all different...
- ...therapeutic response is multifactorial...with a lot of unknowns
- Biomarkers for early flare up detection, therapeutic intervention monitoring outside the clinic are lacking



Gut Health

Current methods are expensive,
cumbersome and often not
representative of real life

Need for advanced tools to
measure gut health biomarkers in
daily life along gastro-intestinal
tract...

Current diagnostic methods



Endoscopy/ colonoscopy

Capsule endoscopy

Point data — ex vivo parameters



Sensor validation in Simulator of Human Intestinal Microbial Ecosystem



Disruptive technology for gut-health research

Ingestible Sensor Platform

- Non-invasive, easy, repeatable
- Continuous measurements along gastro-intestinal tract
 - pH
 - Temperature
 - ORP
- Information on transit times
 - Gastric emptying
 - Small intestinal transit times
 - Colonic transit times

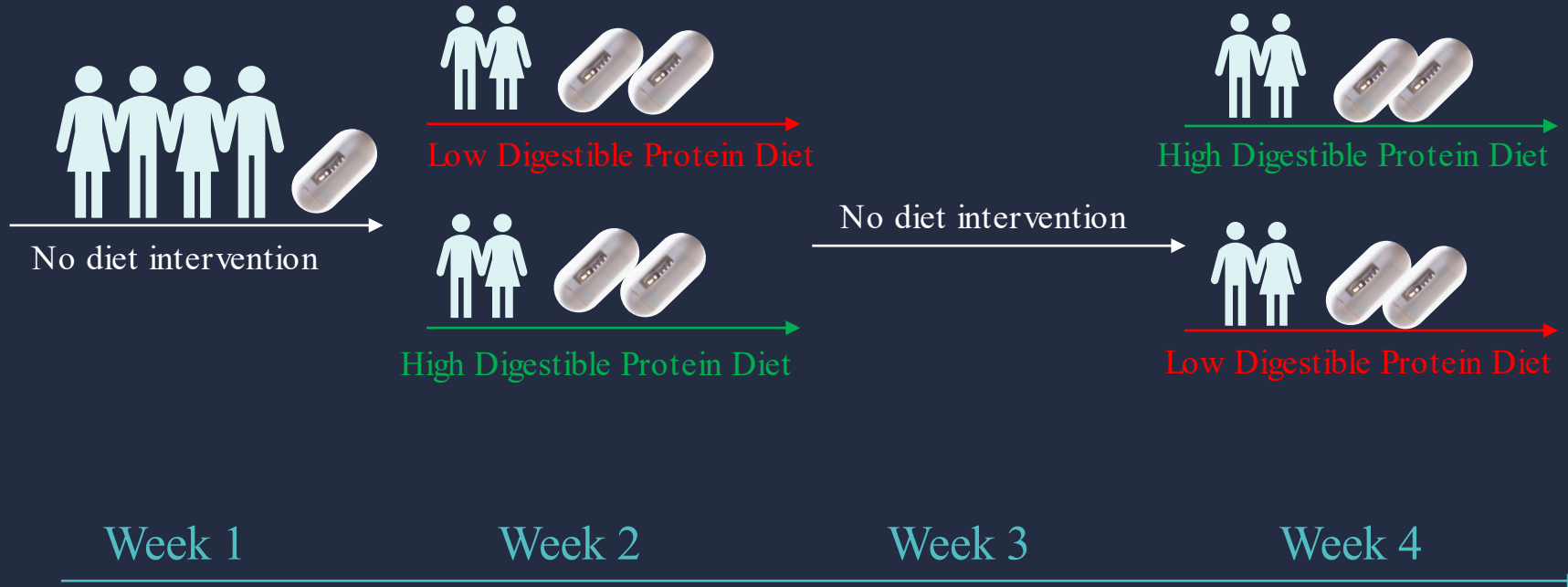


Data transmitted wirelessly to external
wearable base device



21.6 x 7.64 mm (pill size 0)

Human Study – Gut Health including digital pill



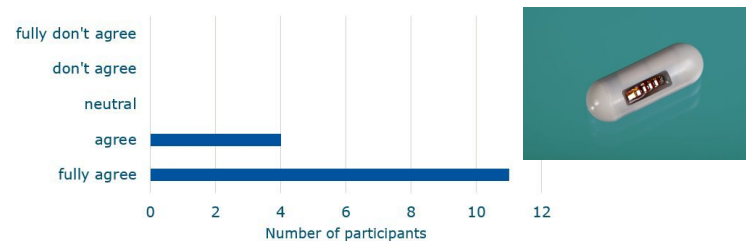
Controlled dietary intervention



Gut Health Platform - status

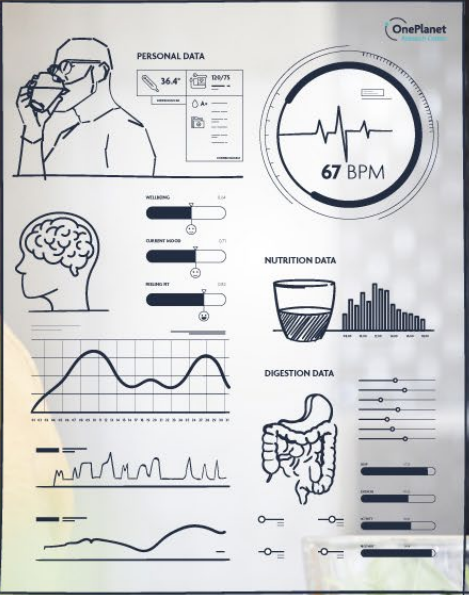
- Successful validation in healthy volunteers
- Gut Health Platform for data processing available
- Investigational Device status
→ Medical Device certification next

Participant willingness to swallow another capsule





Good choice this juice!
You've reached your
vegetables goal for today.

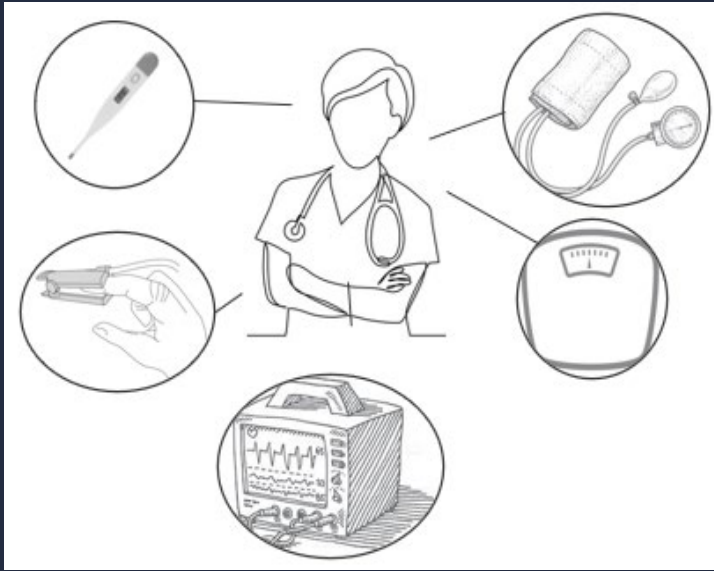


Monitoring health, treatment at home ...

Continuous – unobtrusive monitoring biomarkers at home



Measurement of vital signs



Measurement of urine biomarkers

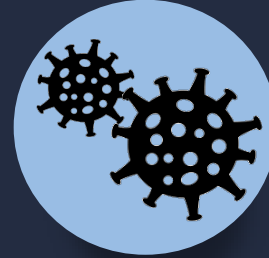
Lab prototype



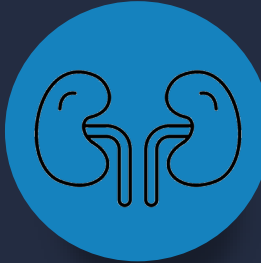
HYDRATATION



URINARY TRACT
INFECTIONS



CHRONIC KIDNEY
DISEASE

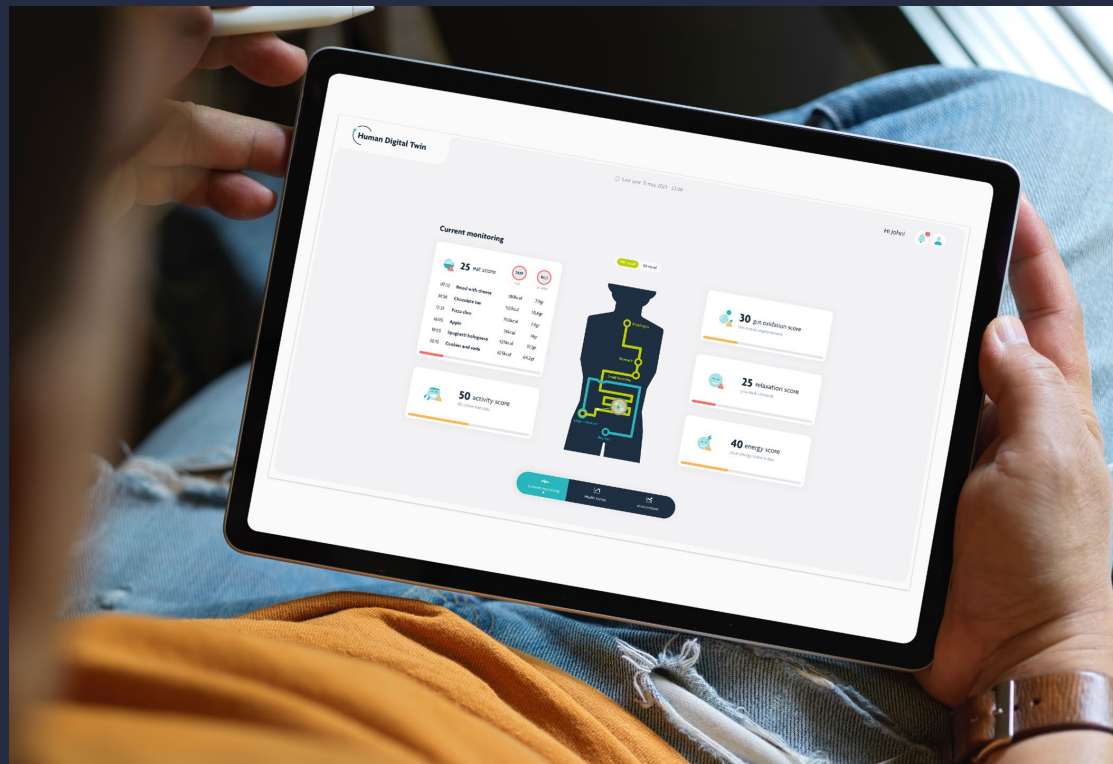


CARDIOVASCULAR
DISEASE



Human Digital Twin

Monitoring & Understanding
Support & Prevent





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