

A 3D anatomical model of a male torso, rendered in a dark, semi-transparent style. The prostate gland is highlighted in a bright orange-yellow color, glowing from within. The model shows the internal organs, including the bladder, ureters, and vas deferens, as well as the skeletal structure of the pelvis and spine. The background is a gradient from dark to light grey.

Digitalisering i prostatakreftdiagnose?  
May-Britt Tessem  
ISB, NTNU



**Incidence in Norway 2015**

•5061 menn

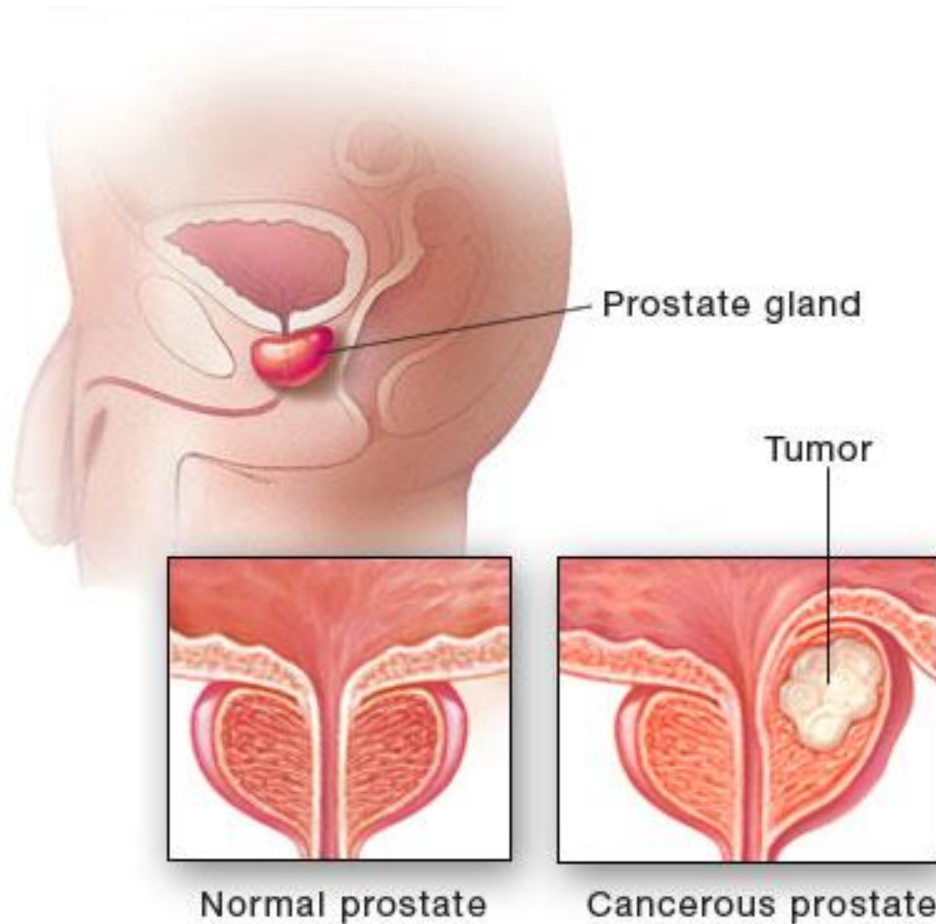
**Deaths in Norway 2015**

•1045 menn

**2.9%** lifetime risk of **dying** from prostate cancer

(Ries et al. SEER Cancer statistics 1975-2004)

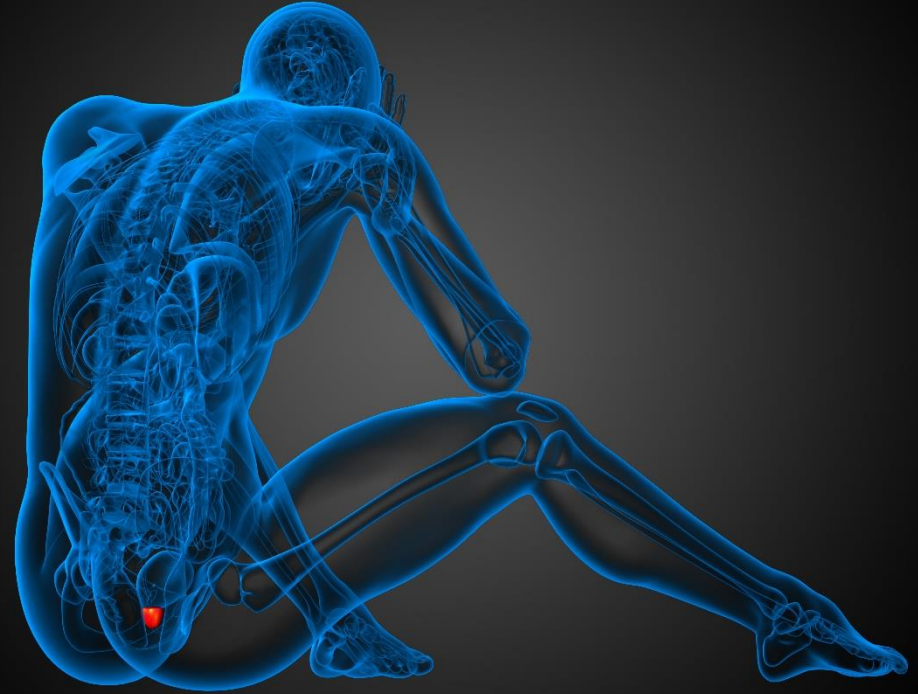
# The prostate cancer challenge



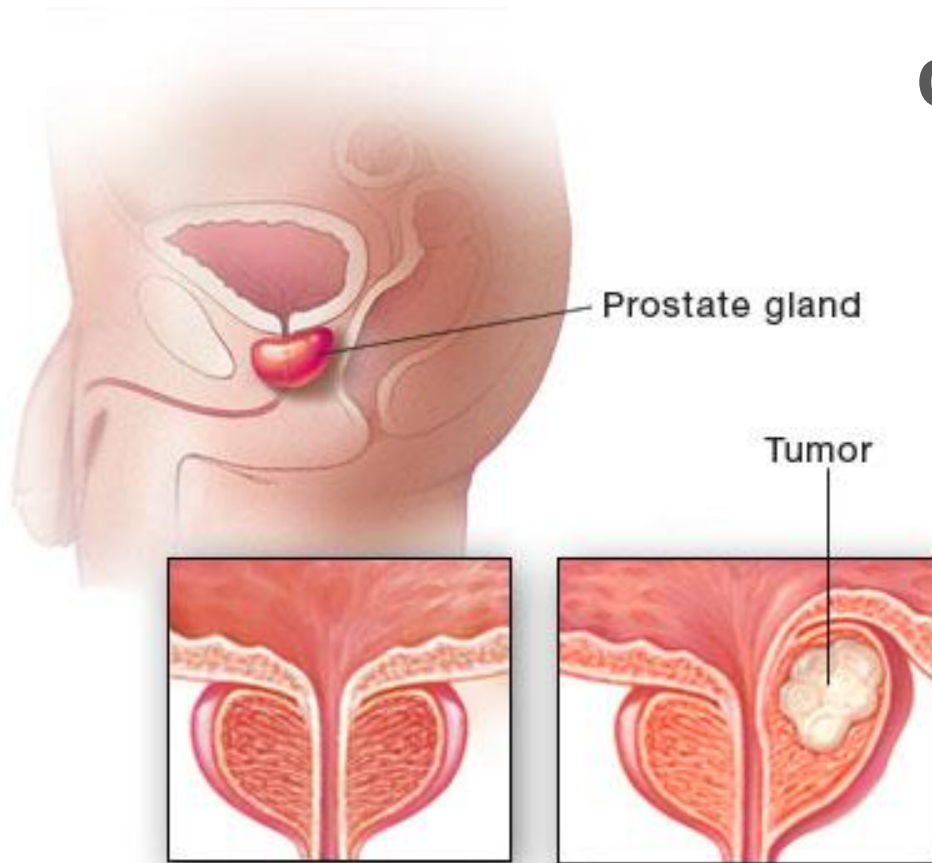
Diagnosis is challenging  
– good clinical tools are limited

Underdiagnosis  
**Overdiagnosis**  
Treatment side-effects

**Life threatening?**



# The prostate cancer challenge



Normal prostate

Cancerous prostate

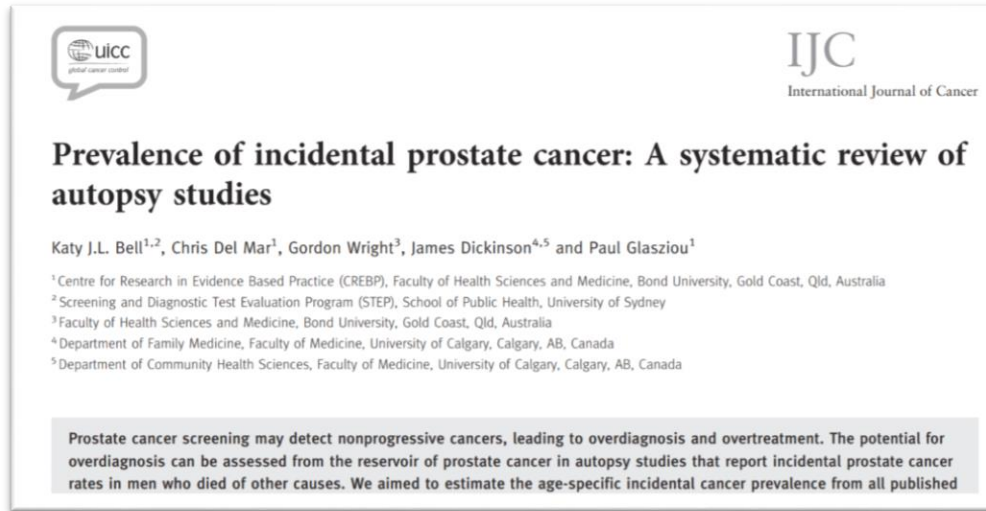
Life threatening?

Diagnosis is challenging  
– good clinical tools are limited

Underdiagnosis  
**Overdiagnosis**  
Treatment side-effects

**Identify the life threatening prostate cancers**

# Systematic review of 29 autopsy studies (2015)



30 years old > 4%

50 years old > 30%

60 years old > 40%

80 years old > 60%

90 years old > 90%







PSA Test



ERC starting grant



# ProstOmics

**‘Tissue is the issue’:**  
a multi-omics approach to improve  
prostate cancer diagnosis

## PI: May-Britt Tessem

Associate Professor/Research Scientist  
*Department of Circulation and Medical Imaging*  
*NTNU, Trondheim*



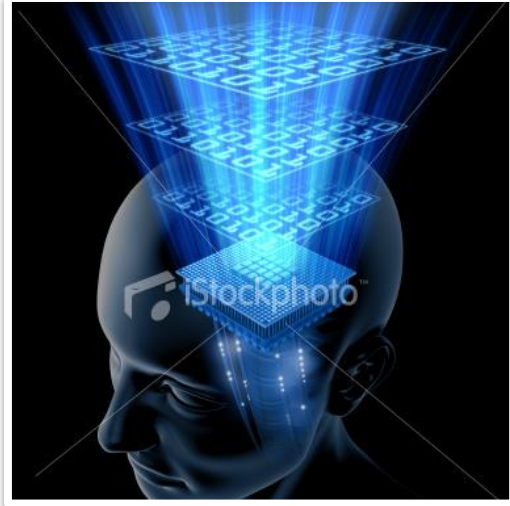
**European Research Council**

Established by the European Commission



“This project has received funding from the European Research Council (ERC) under the European Union’s Horizon 2020 research and innovation programme (grant agreement No 758306)”

# How to obtain the correct diagnosis?



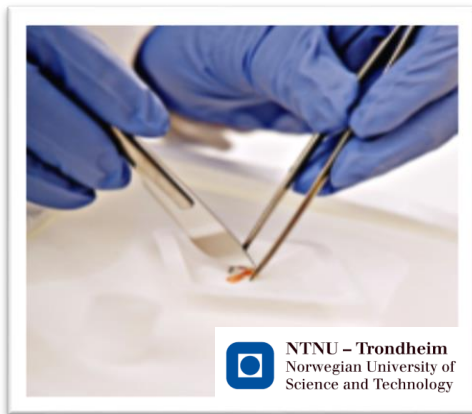
multi-level information on molecular signatures of each cancer patient

Key idea:  
**multi-omics technology and histopathology on the same prostate tissue sample**

Unique resources:  
**High quality large-scale tissue biobanks**

# Human tissue biobanks

available for ERC project



1: Prostatectomy biopsies  
N=1000



2: Prostatectomy tissue slices  
N~1000



3: MR guided biopsies  
N=100

All material approved by the Regional Ethics Committee and collected after informed consent

# MULTIOMICS

PHENOMICS

GENOMICS

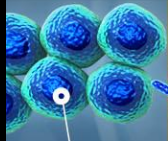
EPIGENOMICS

TRANSCRIPTOMICS

REPEATOMICS

PROTEOMICS

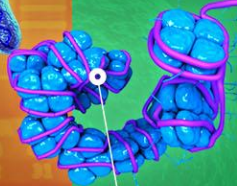
METABOLOMICS



CELL GROWTH



SINGLE NUCLEOTIDE VARIATIONS



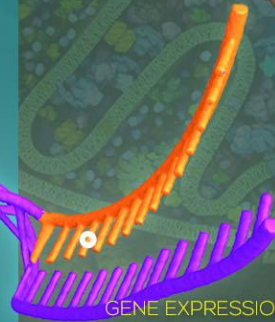
CHROMATIN REMODELING



ALTERNATIVE SPLICING



TRANSPOSONS



GENE EXPRESSION



PROTEIN-PROTEIN INTERACTIONS



METAGENOMICS

HETEROGENEOUS DATA INTEGRATION CHALLENGE...



# Key methodology and collaborations



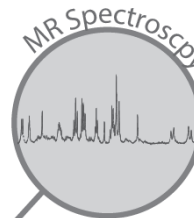
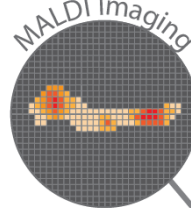
## Matrix-Assisted Laser Desorption Ionization

Prof. Ron Heeren

Maastricht MultiModal  
Molecular Imaging  
institute (M4I)



Maastricht University



**NTNU – Trondheim**  
Norwegian University of  
Science and Technology

## Laser Ablation Inductively Coupled Plasma Mass Spectrometry imaging

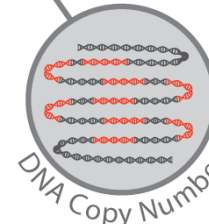
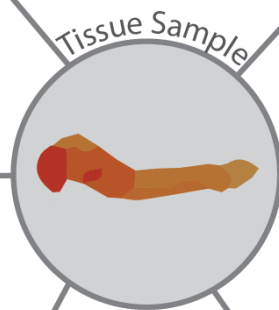
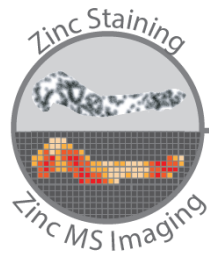


Prof. Dr. Uwe Karst

University of Muenster  
Institute of Inorganic and  
Analytical Chemistry,  
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WWU  
MÜNSTER



**NTNU – Trondheim**  
Norwegian University of  
Science and Technology

**Genomics Core  
Facility**

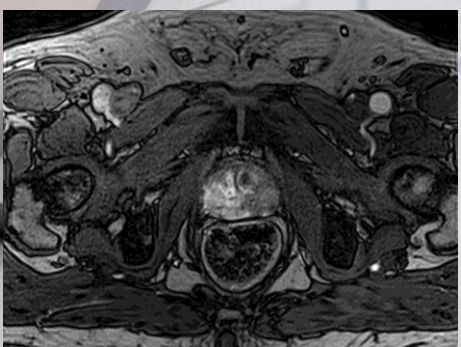
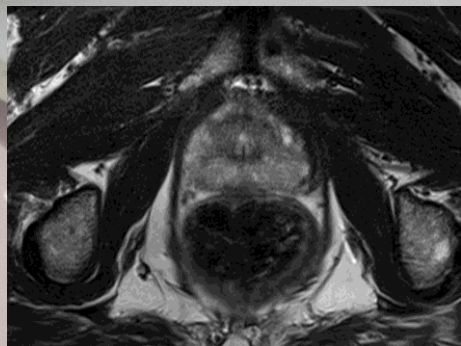
**NTNU – Trondheim**  
Norwegian University of  
Science and Technology

**Cellular and Molecular Imaging  
Core Facility (CMIC)**

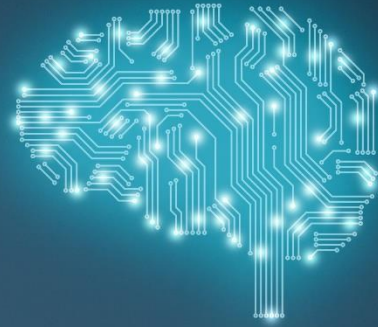


Pathologist/Assoc. Professor  
Elin Richardsen  
Department of Medical Biology, Tromsø

**UiT** / THE ARCTIC UNIVERSITY  
OF NORWAY









PROSTATE  
CANCER



