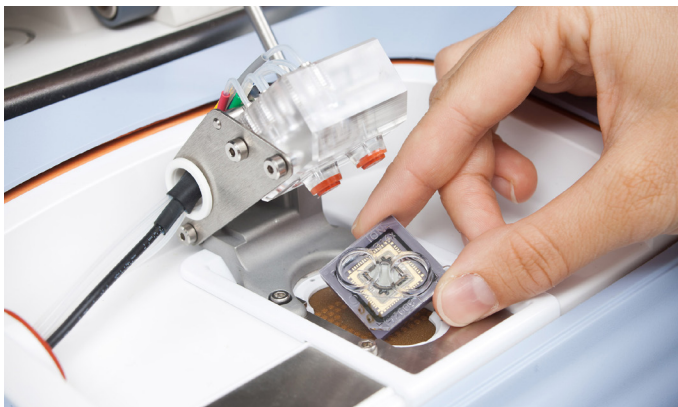


# BIOMARKER AND ASSAY DEVELOPMENT SERVICE AND COMPETENCY OVERVIEW

## INTRODUCTION

We offer innovative high throughput technologies in combination with in house-developed, workflow-based data analysis software tools to support our partners and customers in the ultimate goal of defining biomarkers for personalized medicine and early and fast disease detection.

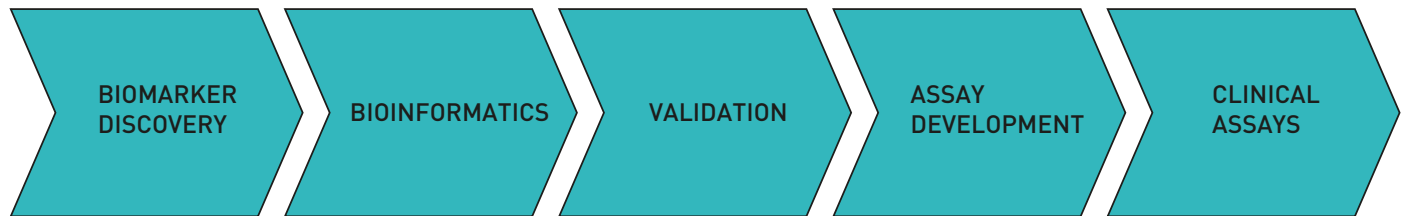


## COMPLEX DISEASE DIAGNOSTICS

Biomarkers are endogenous molecules specific to certain diseases. They can either be found in the diseased organ or in body fluids such as serum, urine and saliva. Complex diseases and cancer are associated with extensive genetic changes causing complex effects on gene regulation, expression and translation. To improve disease diagnostics and management multivariate analyses of different biomolecules are necessary to account for the complexity of the disease. We have long lasting expertise in genome-wide screenings for elucidating changed profiles of RNA (mRNA and smallRNA), DNA (structural changes and mutations), and especially in DNA methylation and serum autoantibody-based analyses. Bioinformatics data analyses from genome-wide discoveries identifies candidate marker sets. Using customized batch-processing software tools, targeted assays are designed and used for marker validation to develop minimal-invasive diagnostics. We assist clinical and industrial partners in project planning and act as technology provider and assay developer. Together we set up appropriate projects to answer diagnostically relevant questions and to meet the challenges of translational research.

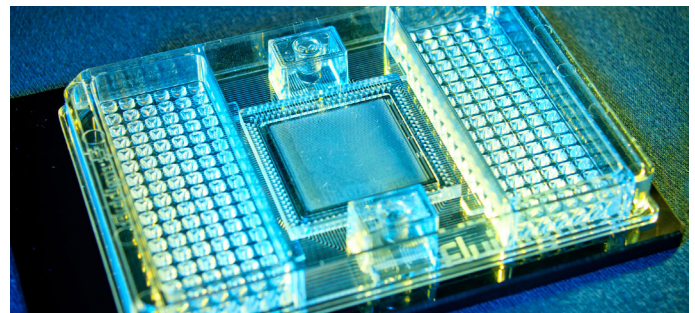


## FROM DISCOVERY TO VALIDATED ASSAYS



### TECHNOLOGY USED

- High-throughput extraction of nucleic acids (DNA, cfDNA, miRNA, mRNA), peptides and proteins from a variety of different types of clinical samples including liquid biopsies (fresh frozen tissue, FFPE, blood, plasma, serum, sputum, saliva, nasopharyngeal aspirates, nasal wash specimen).
- High throughput protein expression and protein purification
- OMICS discovery solutions:
  - EPIGENOMICS: Illumina EPIC BeadArrays (epigenome wide DNA methylation)
  - PROTEOMICS: targeted serum protein marker screen (OLINK 92-plex panels for Cardio, Cancer, Neuro, Inflammation ...)
  - IMMUNOMICS: (auto-)antibody profiling with AIT's customized 16k human protein array; Nimblegen customized high density peptide arrays (two formats available: 1 sample/slide with 6 million spots/sample or 12 samples/slide with 392k spots/sample)
- Various customized assay developments for candidate marker validation:
  - (q)PCR and NGS based validation including assay design and assay qualification
    - Methylation Sensitive Restriction Enzyme based (q)PCR (MSRE-qPCR)
    - High throughput nano-fluidic qPCR for genotyping and MSRE based technologies (up to 96 assays x 96 targets)
    - Methylation Specific PCR (MSP)
    - Targeted Deep Amplicon Bisulfite Sequencing (TDBS)
  - Peptides and Proteins:
    - Targeted protein and peptide microarrays
    - Luminex based multiplexed immunoassays (multiplexing up to 250)
    - (on-chip) multiwell and classical ELISA assays
- Bioinformatics:
  - High throughput design tools for (q)PCR and NGS assays (SNP; MSRE/MSP/TDBS based DNA methylation)
  - Data analysis: Multivariate statistics and bioinformatics analyses
  - customized software solutions



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