

DNA and RNA Analyses: Microarray and NGS Services

Biomarker and assay development

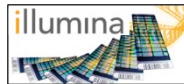
Find out more



- Multi-omics, microarray & sequencing (NGS)
- Genomics, epigenomics, RNA, miRNA
- Candidate marker validation (qPCR/dPCR/targeted NGS)
- Targeted assay data analysis pipelines

Illumina microarray services

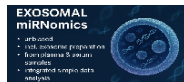
Find out more



- Illumina Human EPIC v2.0 ¹⁾
- Illumina Mouse EPIC ²⁾
- Illumina Human GSA - Infinium global screening³⁾
- Inquire for other Illumina microarrays

EVmiRNomics

Find out more



- Extracellular vesicle (EV) isolation
- EV small RNA SEQ from 200+ μ l plasma/serum
- Unbiased miRNA detection
- Analysis pipeline for miRNAs & other small RNAs

Liquid Biopsy testing

Find out more



- Assay development (cfDNA, cfRNA)
- Design, analytical & clinical study support
- Sample testing & data analysis
- Bioinformatic workflows and patient data inclusion in bioinformatic analysis

Bioinformatics for NGS and array data

Find out more



- Data integration
- Broad expertise across different platforms (NGS, qPCR, microarray)
- Biostatistics
- Molecular and clinical interpretation

Assays with Biological Readouts, Development of Custom Applications

Assay development

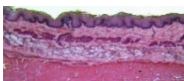
Find out more



- Database management, design tools and experimental evaluation
- Assay development and performance analysis detection platforms and principles
- Human and animal diagnostics expertise
- Various platforms and options available

Biological barriers

Find out more



- Transport and toxicity studies (drugs, toxins, chemicals)
- (Novel) disease models and therapeutic strategies
- Cell-cell communication studies
- High-throughput qPCR barrier chip

DNA Nanotechnology

Find out more



- Nanotechnology, a novel key enabling technology, applicable in manifold applications
- Design & analytical qualification
- Functional testing

Protein and Immunological Assays and Services: Proteomics, Immunomics, Metabolomics

Biomarker and assay development

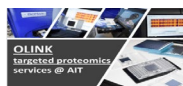
Find out more



- Assay development for protein analytics
- Assay design, analytical & clinical study support
- Sample testing & data analysis
- Bioinformatics workflows and processing of patient records

Olink Proteomics

Find out more



- All Olink formats available: 48plex – 96plex – 5400plex
- Including data analysis support
- ISO certified with long-standing expertise
- AIT Molecular Diagnostics is a qualified service provider

Immunomics

Find out more



- Discover (auto)antibody profiles on AIT's 16k protein-array representing a total of 8200 human transcripts⁴⁾
- AIT's 260 human pathogen array – serum/plasma-antibody profiling associated with bacterial infections⁵⁾
- Inquire for alternatives & custom protein- and peptide microarray and bead array services

INFINITY BIO – Proteome Wide Autoantibody Discovery and Profiling

Find out more



- MIPSA technology delivers high-resolution antibody profiling for deeper immune insights. Comprehensive panels enable broad detection of antibodies against viruses, self-proteins, and allergens⁶⁾

CDI - Proteome Wide Autoantibody Discovery and Profiling

Find out more



- HuProt™ Human Proteome Microarray with >21,000 full-length, folded 3D proteins for conformational binding⁷⁾
- HuScan™ and MouseScan™ for epitope-level whole proteome profiling using Phage ImmunoPrecipitation Sequencing (PhIP-Seq) High-throughput Focused/Custom microarrays available for biomarker validation experiments

Metabolomic & lipoprotein profiling - lifespın

Find out more



- For serum/plasma samples
 - LipoPRO - Lipoprotein profiling with 150+ targets
 - BloodScanner - Small metabolite quantification of up to 100 parameters
 - MetaboPro - Metabolic status assessment
- Divers other biofluids (urine, CSF, faeces, saliva, non-human biofluids) and metabolomic questions project based upon request

Technical Specifications and Sample Requirements

1) Illumina Human EPIC v2.0 array - the reference platform for human epigenetics:

- >935k methylation sites at single CpG resolution (incl. non-CpG (CHH) methylated sites identified in human stem cells)
 - 500 ng DNA input (Qubit or Picogreen measurements)
 - Multiples of 8 samples (deviations possible upon request)
 - Various sample types possible (blood, tissue, FFPE, cell culture, ...)
 - CpG methylation & hydroxy methylation testing possible (2 arrays per sample)
 - Backwards compatibility with MethylationEPIC v1
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 - (2) Ilijazi D.; Pulverer W.; Ertl I.E.; Lemberger U.; Kimura S.; Abufaraj M.; D'Andrea D.; Pradere B.; Bruchbacher A.; Graf A.; Soria F.; Susani M.; Haitel A.; Molinaro L.; Pycha A.; Comploj E.; Pabinger S.; Weinhäusel A.; Egger G.; Shariat S.F.; Hassler M.R. Discovery of Molecular DNA Methylation-Based Biomarkers through Genome-Wide Analysis of Response Patterns to BCG for Bladder Cancer. *Cells*, **2020**, 5;9(8), 1839. doi: 10.3390/cells9081839.
 - (3) Noehammer C.; Pulverer W.; Hassler M.R.; Hofner M.; Wielscher M.; Vierlinger K.; Liloglou T.; McCarthy D.; Jensen T.J.; Nygren A.; Gohlke H.; Trooskens G.; Braspenning M.; Van Criekinge W.; Egger G.; Weinhaeusel A. Strategies for validation and testing of DNA methylation biomarkers. *Epigenomics*, **2014**, 6(6), doi: 10.2217/epi.14.43.
 - (4) Dillinger T.; Sheibani-Tezerji R.; Pulverer W.; Stelzer I.; Hassler M.R.; Scheibelreiter J.; Pérez Malla C.U.; Kuroll M.; Domazet S.; Redl E.; Ely S.; Brezina S.; Tiefenbacher A.; Rebhan K.; Hübner N.; Grubmüller B.; Mitterhauser M.; Hacker M.; Weinhaeusel A.; Simon J.; Zeitlinger M.; Gsur A.; Kramer G.; Shariat SF.; Kenner L.; Egger G. Identification of tumor tissue-derived DNA methylation biomarkers for the detection and therapy response evaluation of metastatic castration resistant prostate cancer in liquid biopsies. *Mol Cancer*, **2022** 3;21(1):7, doi: 10.1186/s12943-021-01445-0.
 - (5) Hassler M.R.; Pulverer W.; Lakshminarasimhan R.; Redl E.; Hacker J.; Garland G.D.; Merkel O.; Schiefer A.I.; Simonitsch-Klupp I.; Kenner L.; Weisenberger D.J.; Weinhaeusel A.; Turner S.D.; Egger G. Insights into the Pathogenesis of Anaplastic Large-Cell Lymphoma through Genome-wide DNA Methylation Profiling. *Cell Rep* **2016**, 4;17(2):596-608, doi: 10.1016/j.celrep.2016.09.018.

2) Illumina Mouse EPIC array:

- Illumina Infinium Mouse Methylation BeadChip
- Comprehensive coverage (>285k methylation sites)
- Sample input (500 ng DNA recommended)
- Multiples of 12 samples
- Various sample types possible (blood, tissue, FFPE, Xenografts, ...)

3) Infinium Global Screening Array (Human GSA)

- >654k SNPs (add-on capacity for customized array: up to 100k)
- 200 ng DNA input
- Multiples of 24 samples (deviations possible upon request)
- Various sample types possible (blood, buccal swabs, FFPE, saliva, ...)
- Economical next-generation genotyping array for a variety of research fields

4) 16k proteinarray

- Sample volume required: 10 µL serum or plasma
- Provides an additional OMICS layer for your multi-omics research
- Printed Protein microarray using human proteins produced from E. coli UNIPEX expression library
- Represents 15286 human cDNA expression clones, fully annotated and sequences available
- Best suited for human serum and plasma studies for IgG, E, M, A antibody profiles
- Applications – disease versus control, successfully applied for autoimmunity, inflammation, neurology, oncology, as well as for therapy response and treatment monitoring, etc.
- Customised targeted protein microarray production, e.g. for confirmation or pathway specific analysis
- See PubMed links:

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- (7) Brezina, S.; Soldo, R.; Kreuzhuber, R.; Hofer, P.; Gsur, A.; Weinhaeusel, A. Immune-Signatures for Lung Cancer Diagnostics: Evaluation of Protein Microarray Data Normalization Strategies. *Microarrays (Basel)* **2015**, *4* (2), 162–187. <https://doi.org/10.3390/microarrays4020162>.

5) AIT's 260-plex human pathogen protein-array

- Detect serum/plasma-antibody profiles associated with infections
- Protein microarray printed using lysates of clinical isolates isolated from sepsis patients
- Covers 124 bacterial species/260 strains ,
- Fully annotated and sequences available for most isolates
- Best suited for human serum and plasma studies for IgG, E, M, A antibody profiles
- Applications – disease versus control, combine e.g. with microbiome studies in different human settings, - similar to antibody profiling on proteinarrays (see above)

6) Infinity Bio

- MIPS Technology
 - HuSIGHT (contains 16,516 unique full-length proteins, 353,034 unique and overlapping peptides, each ~87 amino acid long)
 - MuSIGHT (contains 273,786 unique and overlapping peptides, each ~87 amino acids long)
 - VirSIGHT (Human virome antibody reactome; covers 94,9699 unique taxonomic IDs; 285,669 unique peptides, each ~60 amino acids long).
 - EnviroSIGHT (contains 242,884 unique peptides, covering 31,133 unique protein sequences)

7) HuProt™ Human Proteome Microarray from CDI

- The most comprehensive collection of human proteins available
- >21,000 full-length, folded 3D proteins (more than 80% of the human proteome)
- Proteins manufactured in a yeast eukaryotic environment which is conducive to correct protein folding and stability
- Requires only 20 µl of human serum or plasma (please request for other sample types)
- Detects IgG, IgA and IgM antibodies
- Focused microarrays available for high throughput validation studies
- Autoantibody seromics applications include biomarker discovery, biomarker validation, patient stratification, diagnostic development, vaccine development and safety
- Target ID applications include antibody specificity/validation testing, protein-protein interactions, protein-nucleic acid interactions, target discovery, post translational modification specificity testing, and studies of chemically induced proximity (PROTACs)
- Epitope-level analysis of binding across the entire Human and Mouse proteomes can be achieved using HuScan™ and MouseScan™ which use Phage ImmunoPrecipitation Sequencing (PhIP-Seq) technology.
 - Requires 20 µl of serum or plasma and samples accepted in multiples of 12 up to 48 samples (any number can be processed after 48)
- Please visit: <https://www.cdilabs.com/resources/publications> to search for application specific peer reviewed publications

8) lifespın® - Metabolomic and lipoprotein profiling platform:

- Metabolomic and lipoprotein profiling
- Most comprehensive panel for low budget (95 small metabolites and 150+ lipoprotein parameters, subclasses and sizes)
- Possible for different sample types, optimized for serum and plasma
- Low/no sample consumption (500 µL needed – usable after analysis, only aqueous diluted, for divers' further assays)
- Wide dynamic range (~1 µM – 100 mM)
- Metabolic Status Assessment in blood: broad range of clinically and biologically relevant panels integrated and evaluated
- Customised panels, biofluids or experimental set-ups upon request
- Data analysis services, also in the context of the lifespın database; project-based and based on separate offers
- Applications/use cases: Sample/biobanking/study quality control: unbiased, hypothesis-free; Patient stratification, risk mitigation and monitoring of studies, Treatment response studies and monitoring, multi-omics – ideal & simple supplement in combination with other omics-studies, Aging and longevity, Drug discovery and development, Nutrition and life-style monitoring and research