Genomic Applications 2021

De novo sequencing

Assembly
- WGS Illumina
- WGS MGI
- WGS PacBio CLR
- WGS PacBio Hifi
- WGS ONT
- WGS stLFR MGI ⏳

Scaffolding
- Intra chromosomic interactions
  - HiC Illumina
  - OmniC Illumina
  - PoreC Nanopore ⏳
- Optical mapping
  - Bionano Saphyr

Polymorphism study

Whole genome screening
- WGS Illumina
- WGS MGI
- WGS PacBio CLR
- WGS PacBio Hifi
- WGS ONT

Reduced genome screening
- Gene targeting
  - Exome Sequencing
    - WES Illumina
    - WES Illumina on FFPE
  - RNAseq
    - RNAseq Illumina
    - RNA Seq PacBio
- Target on selected fragments
  - Amplicon Seq
    - Capture Seq
      - Capture Agilent Mybaits Illumina
    - AmpliSeq
      - Thermo AmpliSeq (Ion Torrent)
      - Thermo AgriSeq (Ion Torrent)
      - AmpliSeq Illumina
    - Other GBS kit
      - Allegro SPET TECAN Illumina
      - NEBNext direct Illumina
    - Amplicon Seq Custom
      - Fluidigm Access Array 48.48 Illumina
      - PCR custom pool Illumina
      - PCR custom pool PacBio
  - Allelic disequilibrium RNA Seq
    - RNAseq Illumina
- RE (restriction) - GBS
  - ddRADSeq
  - RADSeq
- Sparse Sequencing
  - WGS Illumina
  - WGS Riptide Illumina ⏳

SNP
- Known SNPs genotyping
  - Arrays
    - Affymetrix Axiom
    - Illumina Infinium
  - Mass Spectro
    - iPLeX Agena Bioscience
  - qPCR
    - HD (Microfluidic)
      - Biomark 96 x 96
    - Standard
      - Roche LC480
      - QuantStudio ThermoFisher (KASP ...)
    - digital PCR
      - ddPCR

SSR
- Size analysis (SSR)
  - Capillary sequencer ABI
- Sequence analysis
  - SSR Illumina
  - SSR PacBio Hifi
  - SSR ONT ⏳

Structural variants
- Whole genome screening
  - WGS
    - WGS Illumina
    - WGS PacBio CLR
    - WGS PacBio Hifi
    - WGS ONT
  - Optical mapping
    - Bionano Saphyr
- Targeted screening on enriched region
  - WGS PacBio Hifi after Cas9/12
  - CODe-Seq
  - WGS ONT after Cas9/12 ⏳
- CNV genotyping (Copy number variation)
  - PacBio CNV
  - ddPCR
- Insertion / Transposon study
  - TnSeq / INSseq

Transcripts study

Tissue Expression
- On array
  - Agilent chip
  - Affymetrix chip
- By sequencing
  - Transcript study
    - RNAseq Illumina
    - RNAseq Illumina low input
    - RNAseq Illumina on FFPE sample
    - RNAseq after Illumina Ribodepletion
    - RNA Seq Ion Torrent
    - RNA Seq ONT (cDNA)
    - RNA Seq ONT (RNA direct)
    - RNA Seq MGI
    - RNA Seq ONT (oriented cDNA) ⏳
  - Isoform study
    - Iso-Seq PacBio
    - Iso Seq PacBio after mRNA capture
    - Isoform study ONT
  - Long Non Coding
    - lnc RNAseq after Illumina Ribodepletion
    - lnc RNAseq low input after Illumina Ribodepletion
    - lnc RNAseq after Nanopore Ribodepletion
  - Short Non Coding
    - miRNA Illumina
  - Nascent RNA
    - SLAM-Seq Ilumina
  - Ribosome Profiling
    - Ribosome Profiling Illumina ⏳
  - mRNA + miRNA
    - Duoseq Illumina ⏳
- With HD qPCR
  - qPCR HD Takara Smartchip

Single Cell Expression
- Short Reads
  - Transcripts
    - Abundants
      - with SC machine
        - 10x SC 3'mRNA Illumina
        - 10x SC 5'mRNA Illumina
        - 10x SC NucSeq Illumina
        - 10x SC 3'mRNA Cellplex Illumina ⏳
        - Takara SC RNA-seq Full length ⏳
      - Without SC machine
        - SC RNAseq : SplitSeq + Illumina ⏳
    - Low Input full length
      - 10x SC SMARTSeq3 Illumina
  - Transcripts & Proteins
    - 10x SC 3' RNA & Protein detection (Cite Seq / Cell Hashing)
    - 10x SC 5' RNA VDJ/Cite Seq Illumina
- Expression on microdissected area
  - DEP Array Excilone
  - Microdissection on FFPE sample
- Long Reads
  - Isoform Study SC
    - ScNaUmi-seq 10x ONT ⏳
    - MAS-ISO-seq 10x PacBio ⏳

Geolocated Single Cell Expression on Tissue Sections
- By sequencing
  - Spatial Transcriptomics
    - Visium + Illumina
    - Visium Illumina on FFPE samples
- By hybridization
  - Vizgen Merscope ⏳

Regulation of expression

DNA-Proteins interactions
- ChIP Seq Illumina
- CLIP-Seq

3D Conformation
- Spatially close regions in the nucleus
  - HiC Illumina
  - OmniC Illumina
  - Pore C ONT ⏳

Chromatin accessibility
- Tissue
  - ATAC Seq Illumina
  - Cut & Run Illumina
  - MNAse
- Single Cell
  - 10x SC ATAC Seq Illumina
  - 10x SC MultiSeq (NucSeq & ATACSeq) Illumina
  - 10X SC ACME ⏳

Methylation
- DNA
  - Whole genome
    - Methylation dependant modification
      - Bisulfite Seq Illumina (C->T)
      - EMSeq Illumina (C->T)
      - TAPS Illumina (5mC & 5hmC -> T) ⏳
      - TAPS beta Illumina (5mC -> T) ⏳
      - CAPS Illumina (5hmc -> T) ⏳
    - Native DNA sequencing
      - ONT
      - PacBio Hifi
  - Reduced Genome
    - RRBS Illumina
    - ONT sequencing after enrichment Cas9
  - Methylated regions
    - MeDIP Seq
  - Methylation study on targeted region
    - Agilent Capture on Illumina
    - Bisulfite + Hybridation Chips
      - EPIC Chip Illumina
      - EPIC Chip Illumina (paraffin sample)
    - Agena Bioscience Mass Array Epityper ⏳
- RNA
  - ONT

Metagenomics

Complete metagenome
- Illumina
- Shallow Sequencing Illumina
- SC 10 x WGS Illumina
- MGI
- PacBio Hifi
- Nanopore ⏳
- SC CellenOne WGS Illumina ⏳

Barcoding
- 16S Illumina
- ITS & co Illumina
- 16S PacBio Hifi
- 16S-23 S PacBio Hifi
- 16S ONT
- ITS & co MGI ⏳

Metatranscriptomic
- Illumina
- MGI
- Nanopore
- SC CellenOne RNA Illumina ⏳

Bacteria or viruses detection
- Illumina
- Nanopore

Caption
- Under development ⏳