
IOCB SERVICE DAYS

Presentation of services by:
Research-Service Groups / Service Groups / Core Facilities

20
23

Next Generation Sequencing Support Core Facility (NGSf)

Ondřej Lukšan

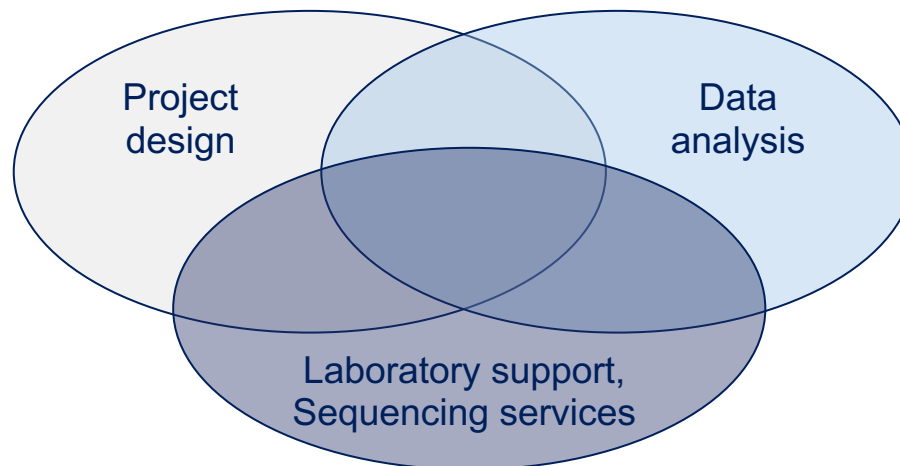


ÚOCHB AV
CR
IOCB PRAGUE



Who we are...

- **Core facility** supporting other IOCB groups with **expertise in high-throughput sequencing**
 - **experimental design** and choice of best fitting sequencing strategy
 - **project processing**
 - bioinformatic **data analysis**
- Operating **without** its **own laboratory**
 - **standard** laboratory workflows - **outsourced** to worldwide external providers
 - **custom** laboratory workflows - **in the user's laboratory** and sequenced by external providers or on in-house IOCB sequencers (*MiniSeq, Minlon*)



Services

1. NGS project design and processing

2. Basic data analysis and preparation of publication ready outputs

3. Additional services

- NGS **project designs**, selection of convenient sequencing strategy and sequencing service provider

- Calculations of **project costs**, up-to date pricelist of all common NGS technologies and suppliers

- *Illumina*
- *Pacific biosciences*
- *Oxford Nanopore*
- *TenX genomics*
- ...

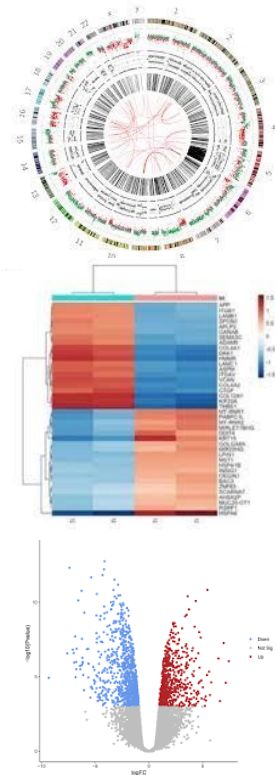


- **On-site co-operation** on custom sample processing and library preparation
- **Project processing** - you provide samples, NGSf takes care about everything else

Services

1. NGS project design and processing
2. **Basic data analysis and preparation of publication ready outputs**
3. Additional services

- Basic data statistics and **quality assessment**, quality **trimming**, **removal of artifacts**, read merging, etc.
- Secondary data analysis using in-house **standardized pipelines** or **workflows** adapted **from literature**
 - *Genome assembly and annotation*
 - *Transcriptome assembly and annotation*
 - *Resequencing, read mapping and variant detection*
 - *Differential gene expression analysis and expression profiling*
 - *Metagenomic analysis*
 - *Phylogenetic analysis*
 - *Analysis of SELEX, Ribosome display or Phague display libraries*
 - *Prediction of therapeutical effects of small molecules*



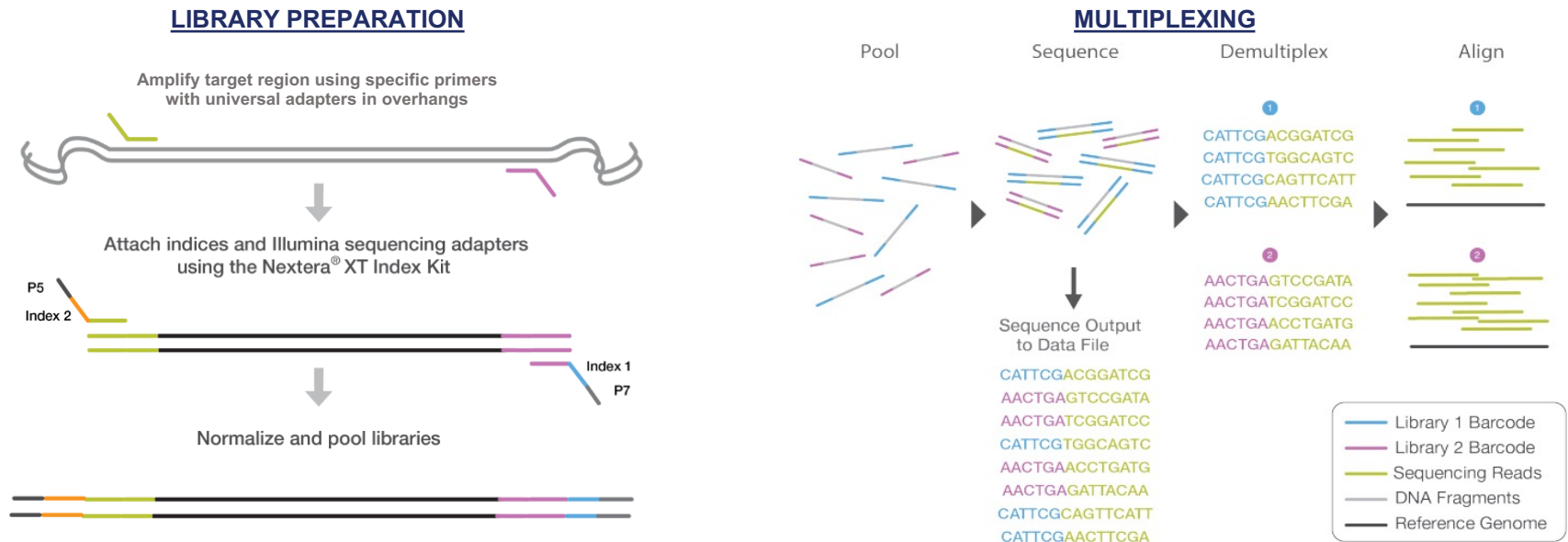
Services

1. NGS project design and processing
2. Basic data analysis and preparation of publication ready outputs
3. **Additional services**
 - **Development of** custom laboratory **workflows**, bioinformatic pipelines, scripts and **tools**
 - *time-consuming, require additional intellectual input => partners and co-authors*
 - Participation on **analysis of** other types of **big data** in unix environment
 - Preparation of **publication ready outputs** in biopython and/or R
 - Organisation of in-house **seminars, trainings** and **workshops** focused on high throughput sequencing and NGS data analysis
 - ongoing courses: Introduction to NGS, 2/20/2023 and 3/9/2023

**We are ready to perform any type of analyzes on demand,
do not hesitate to contact us!**

Particular services - Short amplicon seq

- Fragments sequenced 150 pb from each side
- Ideal for complex templates
- Alternative to HT colony screening - up to millions of colonies at once
- Highly scalable (nr. of samples, coverage)



Depending on demand, NGSf can organize and cover analysis on regular basis using in-house and / or external sequencers

- SELEX**
Systematic Evolution of Ligands by
Exponential Amplification

Phage display

Ribosomal display

NGS

reads

```

15615
13250
1014
956
899
654
456
65
26
2

```

sequence (DNA or Protein)

```

ATGTATATAGTATTTAGGA
ATGTATATAGTATTTAGGA
ATGTATATAGTATTTAGGA
ATGTATATAGTATTTAGGA
ATGTATATAGTATTTAGGA
ATGTATATAGTATTTAGGA
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```

Just about any
ol' thing you
dream up ;)

Motif search

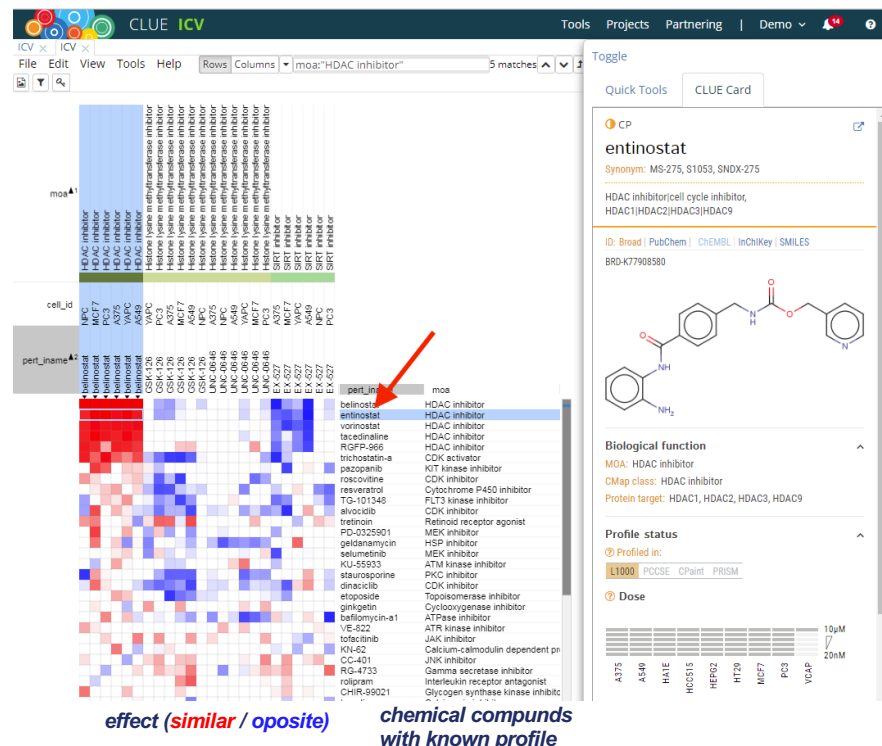
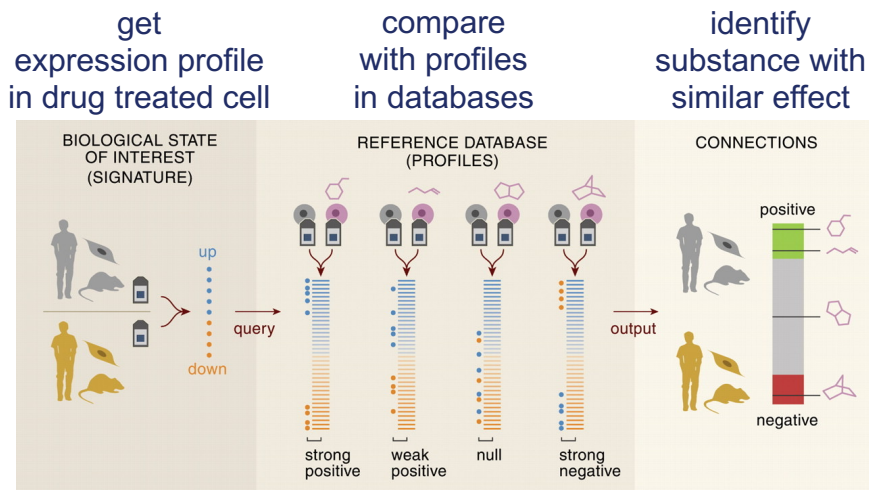
Clustering

Secondary structure

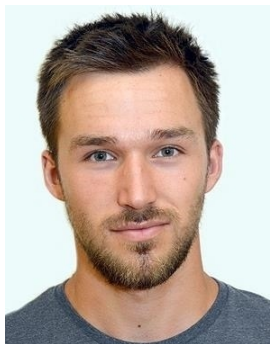
Particular services - Drug effect prediction

- Prediction of therapeutic effect of small molecules based on:
 - gene expression profile in treated cells
 - comparison with profiles of other substances in databases (LINCS, ...)

CMAP analysis



How to reach us...



Signpost Noticeboard Events Management Administration **Science** HR & Payrolls ITS Contacts Misc Documents

/ Úvod / Science / Core Facilities / NGSf

Core Facilities

Analytical
Laboratories

Biochemical
Pharmacology

MS

NMR

Microscopy

NGSf

Courses

Radiochemistry

Virology

High Performance
Computing



Next generation sequencing support facility (NGSf) was established to support other IOCB groups with expertise in next generation sequencing from experimental setup to downstream data analysis. The group provides consultations and practical help in sample preparations and experimental design, choice of best fitting sequencing strategy, project processing and bioinformatic data analysis including development of custom pipelines and publication quality outputs. Due to close cooperation with the IOCB High performance computing service group and MetaCentrum, the facility profits from access to high-performance grid infrastructure allowing to process large scale projects with requirements of high computational power.

Requests

For requests please fill the request [form](#)



Contacts

In case of any questions do not hesitate to contact us on ngsf.iocb@gmail.com

- Ondřej LUKŠAN, ☎: 320, ondrej.luksan@uochb.cas.cz
- Jaroslav KURFÜRST, ☎: 472, jaroslav.kurfurst@uochb.cas.cz

Thank you for your attention.



**WE WANT YOU TO
USE OUR SERVICES!**

ngsf@uochb.cas.cz
