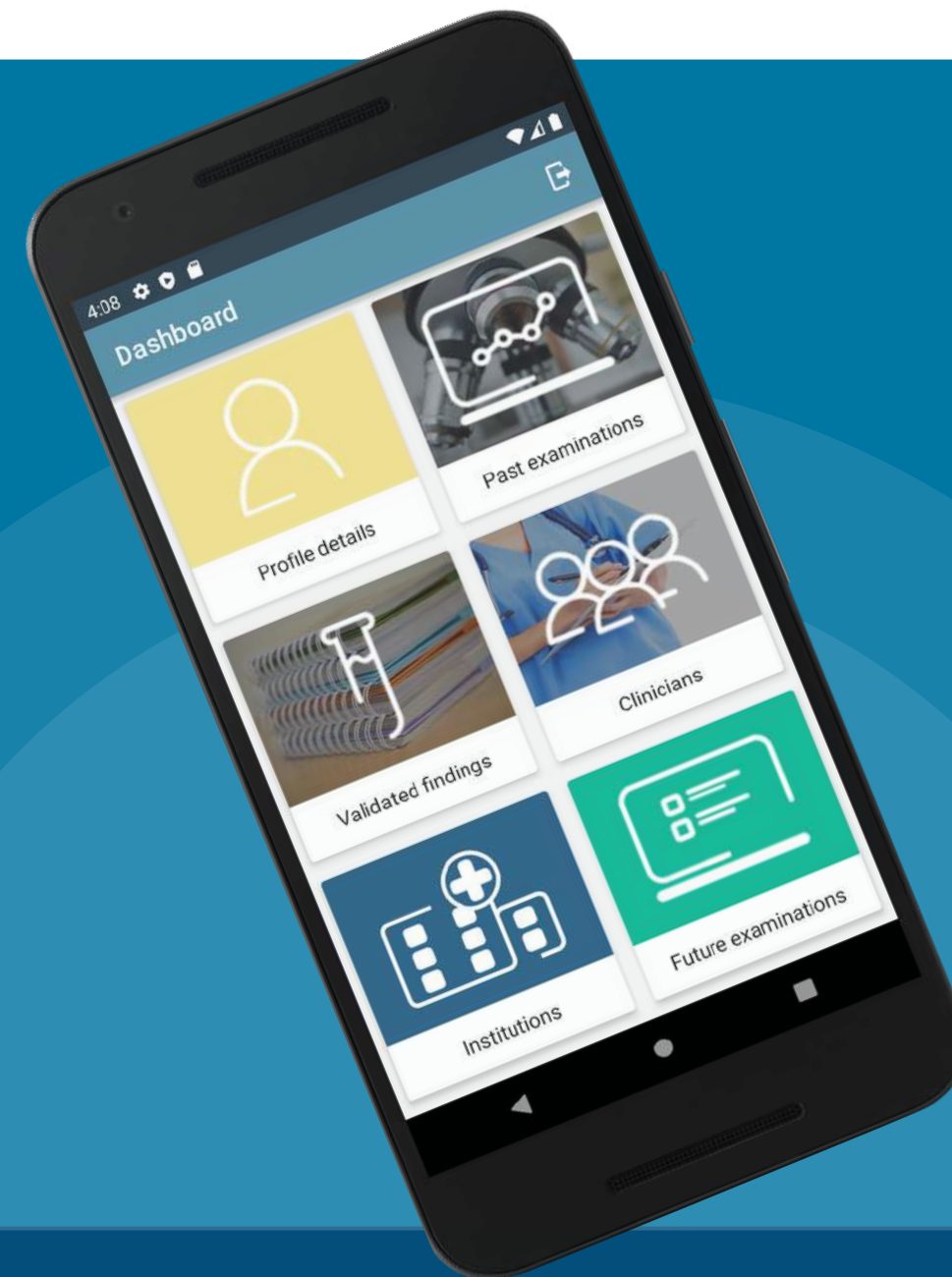


# CTA

## Cancer Treatment Assistant



[www.innovitech.hu](http://www.innovitech.hu)

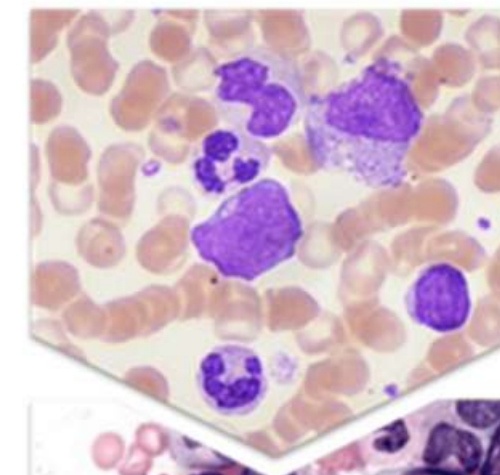
# Objectives

- 01** Personalized, scan tracking of patient's health status.
- 02** Storage of test results
- 03** Tracking of medical treatment
- 04** Efficacy test of therapy
- 05** WEB, Android / iOS

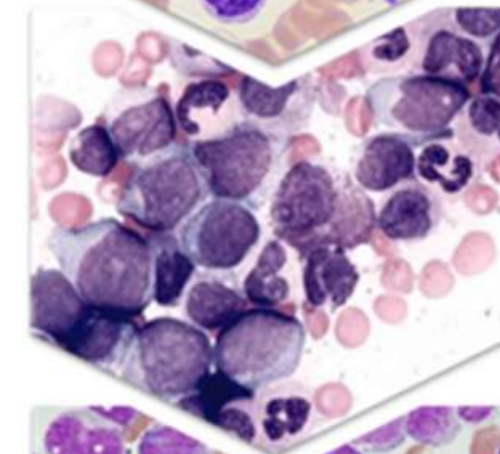
Research partner:  
SOTE I. Department of Pathology and  
Experimental Cancer Research

## CML Chronic Myeloid Leukemia

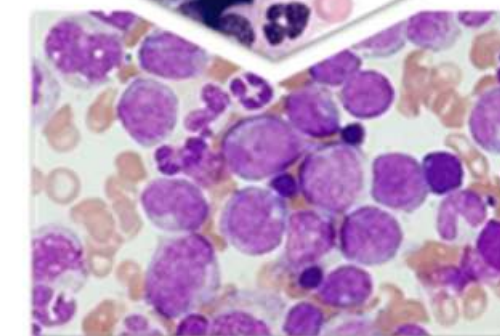
### Phases of CML Development



**Chronic Phase**



**Accelerated Phase**

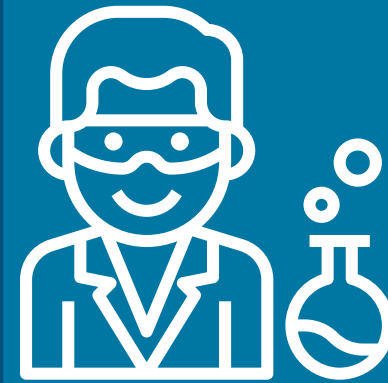


**Blast Crisis**

# User Management



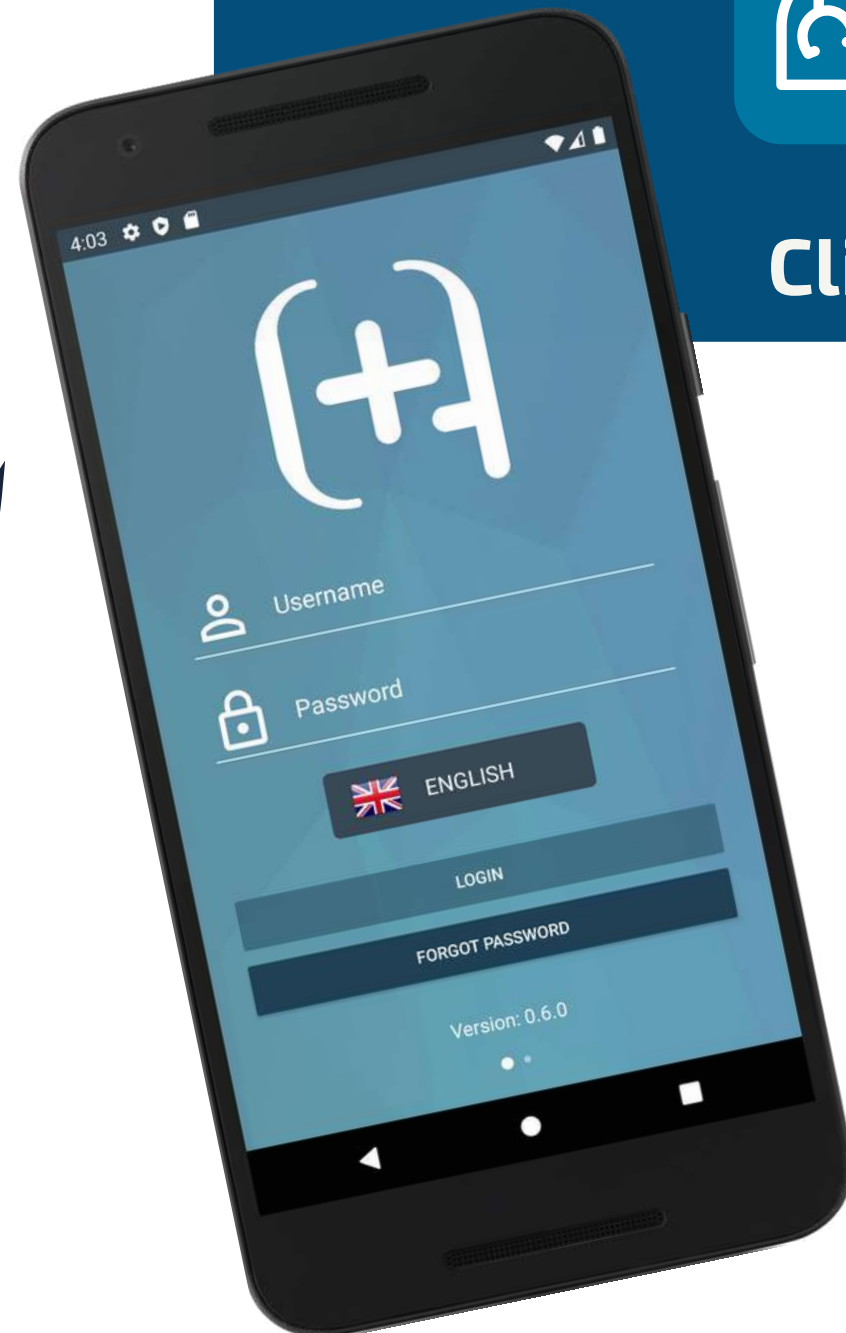
Clinician



Lab Assistant



Patient



- Authentication and authorization
- Clinician and Patient contact management
- Institution management (hospital - lab)



## Diagnostic Management

Master data management of disease types and health condition groups.

Establishing patient diagnosis.

Determination of health status and progress of the disease.



## Therapy Tracking

Tracking of medical treatments of different diseases.

Follow-up of clinical trials and examinations based on classification scheme.

Analysis of efficacy of treatments and therapies.

# Cancer Treatment Assistant

## Data of diagnosed condition

**View diagnosed condition**

|  |  |
|--|--|
| <b>Patient:</b><br>Páciens Péter (202202011) | <b>Clinician:</b><br>Dr. Klinikus Károly (20222/1) |
| <b>Diagnosed condition type:</b><br>Disease  | <b>Diagnosed condition name:</b><br>CML            |
| <b>Valid from:</b><br>10/02/2022             | <b>Valid to:</b><br>-                              |
| <b>Disease type:</b><br>CML                  |  |
| <b>Diagnosed condition description:</b><br>- |  |

[← Back](#) [Edit](#)

## Therapies associated with diagnosed condition

**Connected therapies**

[+ Create therapy](#)

Items per page: 5 | 1 - 3 of 3 | << < > >>

| Name of therapy          | Start of therapy | End of therapy | State of therapy | Actions                                   |
|--------------------------|------------------|----------------|------------------|---|
| In progress TKI Therapy  | 01/01/2022       | -              | In progress      | <a href="#">Show</a> <a href="#">Edit</a> |
| Successful TKI Therapy   | 01/01/2021       | 31/12/2021     | Successful       | <a href="#">Show</a> <a href="#">Edit</a> |
| Unsuccessful TKI Therapy | 01/01/2020       | 31/12/2020     | Unsuccessful     | <a href="#">Show</a> <a href="#">Edit</a> |

Items per page: 5 | 1 - 3 of 3 | << < > >>

# Cancer Treatment Assistant

## Assessment protocol

**Examination rule details**

|   |  |
|---|--|
| <b>Medical examination rule type:</b><br>Treatment efficiency | <b>Examination rule starting period:</b><br>1                    |
| <b>Medical examination type:</b><br>BCR-ABL1 RQ-PCR           | <b>Examination rule ending period:</b><br>3                      |
| <b>Period unit:</b><br>Month                                  | <b>Evaluation mode:</b><br>Evaluation based on examination value |
| <b>Comment:</b><br>-  |  |
| <b>Minimum value:</b><br>0                                    |  |
| <b>Maximum value:</b><br>10                                   |  |
| <b>Result:</b><br>The treatment is optimal                    |  |

[← Back](#) [Edit](#)

## List of assessment protocols

**Examination rule list**

[+ Add examination rule](#)

Items per page 5 1 - 5 of 20 [|<](#) [<](#) [>](#) [>|](#)

| Medical examination rule type | Medical examination type | Minimum value | Maximum value | Actions                                   |
|-------------------------------|--------------------------|---------------|---------------|---|
| Recommended date              | BCR-ABL1 RQ-PCR          | 5             | 10000         | <a href="#">Show</a> <a href="#">Edit</a> |
| Treatment efficiency          | BCR-ABL1 RQ-PCR          | 5             | 10000         | <a href="#">Show</a> <a href="#">Edit</a> |
| Treatment efficiency          | BCR-ABL1 RQ-PCR          | 0             | 10            | <a href="#">Show</a> <a href="#">Edit</a> |
| Treatment efficiency          | BCR-ABL1 RQ-PCR          | 10            | 100           | <a href="#">Show</a> <a href="#">Edit</a> |
| Treatment efficiency          | BCR-ABL1 RQ-PCR          | 100           | 5000          | <a href="#">Show</a> <a href="#">Edit</a> |

Items per page 5 1 - 5 of 20 [|<](#) [<](#) [>](#) [>|](#)

# Management of Clinical Results

- Tracking of gene expression levels.
- Administration of examination appointments and history.
- CTA can be customized to the therapy tracking of other cancerous and chronic diseases.

BCR-ABL1 fusion transcriptum level (Páciens Péter, Social security number: 202202011)



# Cancer Treatment Assistant

Screening of medicine intake

Information sharing of medicine intake

### Medication filter

*i* You must choose a patient to use the listing

Patient \*  Medicine  Interruption type

Name of therapy  Valid from  Valid to

### Medication list

Items per page 5 1 - 2 of 2 |< < > >|

| Medicine  | Dose  | Dose unit | Valid from | Valid to   | Actions   |
|-----------|-------|-----------|------------|------------|---|
| BOSULIF   | 10000 | Piece     | 16/04/2022 | 16/04/2022 | <input type="button" value="Show"/> <input type="button" value="Edit"/> |
| BOSUTINIB | -     | -         | 04/02/2016 | 14/07/2039 | <input type="button" value="Show"/> <input type="button" value="Edit"/> |

Items per page 5 1 - 2 of 2 |< < > >|

### Medication diagram

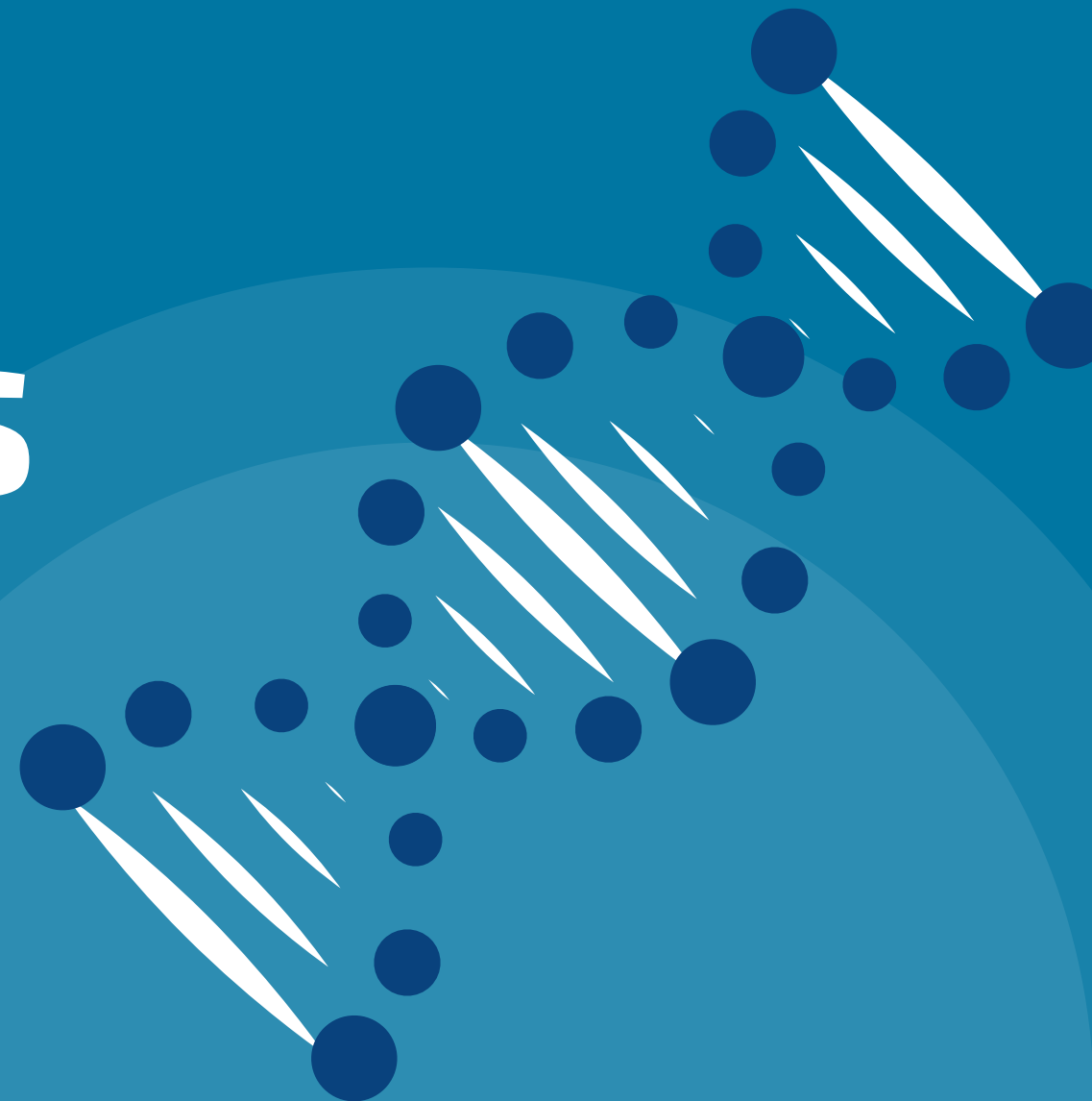
2016.07.01. 2017.07.01. 2018.07.01. 2019.07.01. 2020.07.01. 2022.01.01.

# CTA - Cancer Treatment Assistant

- 01 Follow-up of diseases and diagnoses
- 02 Tracking clinical therapies and medical treatments:
  - Recording medical history
  - Supporting therapy control
- 03 Monitoring and evaluating test results.
- 04 Medical history tracking and sharing with clinician.
- 05 Automatic evaluation of the effectiveness of clinical therapy based on pre-defined assessment rules.
- 06 Automatic selection of next clinical trial date.



# GenomeAtlas



[www.innovitech.hu](http://www.innovitech.hu)

# Objectives

Visualization of the three-dimensional structure of cell type-specific genomes of a given species

- 01 Comprehensive, user-friendly bioinformatics analysis of raw sequencing data
- 02 Data cleaning and quality control
- 03 Sequence alignment to reference genome
- 04 Integration of the most efficient analysis algorithms (HiC-Pro, MiniMDS)
- 05 Interactive graphical display of a predicted 3D structure
- 06 Integration of other NGS data (ChIP-seq, RNA-seq) data

Official partner:  
UD-GenoMed Kft.

## GenomeAtlas



NGS



FASTQ



Normalized  
distance matrix

```
00101011
01101010
101110101
11011000
10100110
```

Coordinate file



# Login

Genome Atlas

## Login

Username \*

Password \*

[Forgot password](#)

HUN / ENG

Login Registration

genome.support@innovitech.hu HUN / ENG 1.0.0

# Project creation

Genome Atlas

Dr. László Laboros

## Project list filter

Project name Analysis type Project state Run date from Run date to

Clear filters Filter

## Project list

Create project

| Project name           | Analysis type | Run date   | Project state | Actions |
|------------------------|---------------|------------|---------------|---------|
| I. FROGS projekt       | Frogs         | 31/01/2022 | Completed run | Show    |
| I. Korrelációs elemzés | Correlation   | 31/01/2022 | Completed run | Show    |
| 3D teszt               | MiniMDS       | 22/11/2021 | Completed run | Show    |

genome.support@innovitech.hu HUN / ENG 1.0.0

# File upload

File upload

File select

Drag file here

File upload Remove

genome.support@innovitech.hu HUN / ENG 1.0.0

# List of uploaded files

File list

| File name            | File size | File upload date | File description | Actions |
|----------------------|-----------|------------------|------------------|---------|
| 03-chimera.fasta     | 469.31 MB | 25/05/2022       |                  |         |
| 01-prepro-vsearch.ts | 144.9 MB  | 25/05/2022       |                  |         |
| 04-filters.excluded  | 33.71 MB  | 25/05/2022       |                  |         |

genome.support@innovitech.hu HUN / ENG 1.0.0

# 3D Illustration

**Filter Conditions** Upload File

File Type:

Filename:

File Description:

Uploader / Creator Name:

Upload date from:

Upload date until:

Filter

| File Name  | File size | Upload date |   |
|--|-----------|-------------|---|
| mm_BMDM_HiChIP_CTR_RNAPII_pS2_m_15000_0_iced_intra_chr1.matrix_p0.01_structure.tsv | 64.21 KB  | 19. 11. 06. | <span>Show 3D</span> <span>Show file</span> <span>Delete</span> |
| myfastq1.fastq   | 9.77 KB   | 19. 11. 06. | <span>Select</span> <span>Delete</span>                         |

Scaling: (1)

Hide grid

Tube segments: (5000)

Radius: (0.4)

Radius segments: (10)

Show tube structure

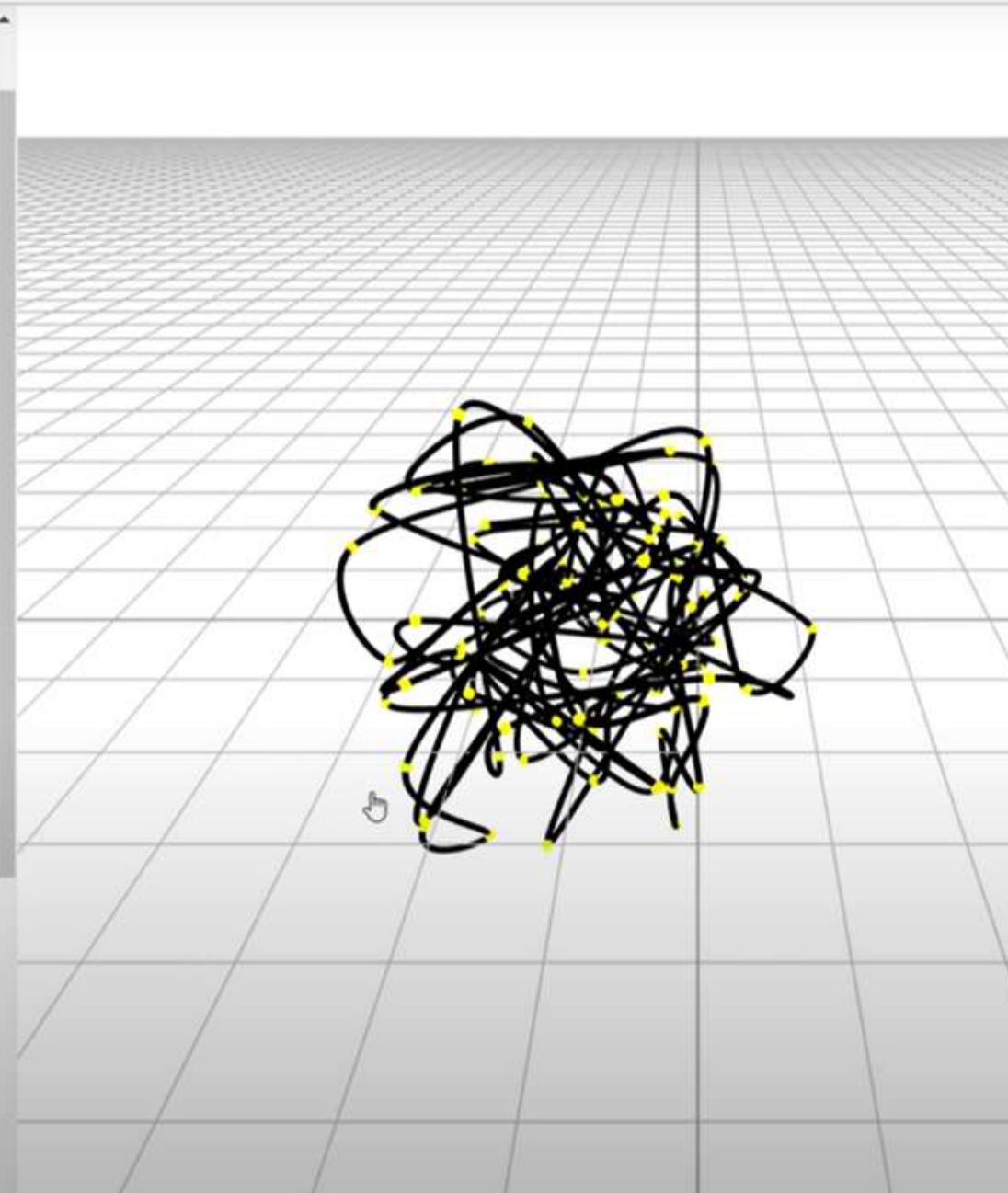
**Select region**

Sum 1281 coordinates

Section begin

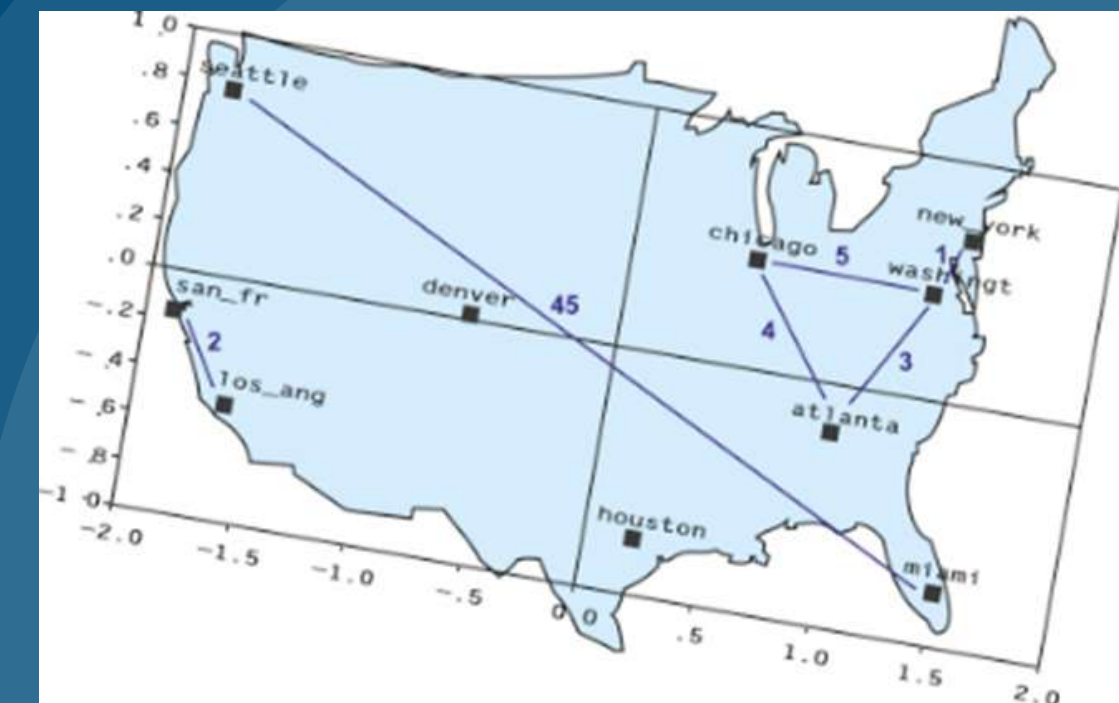
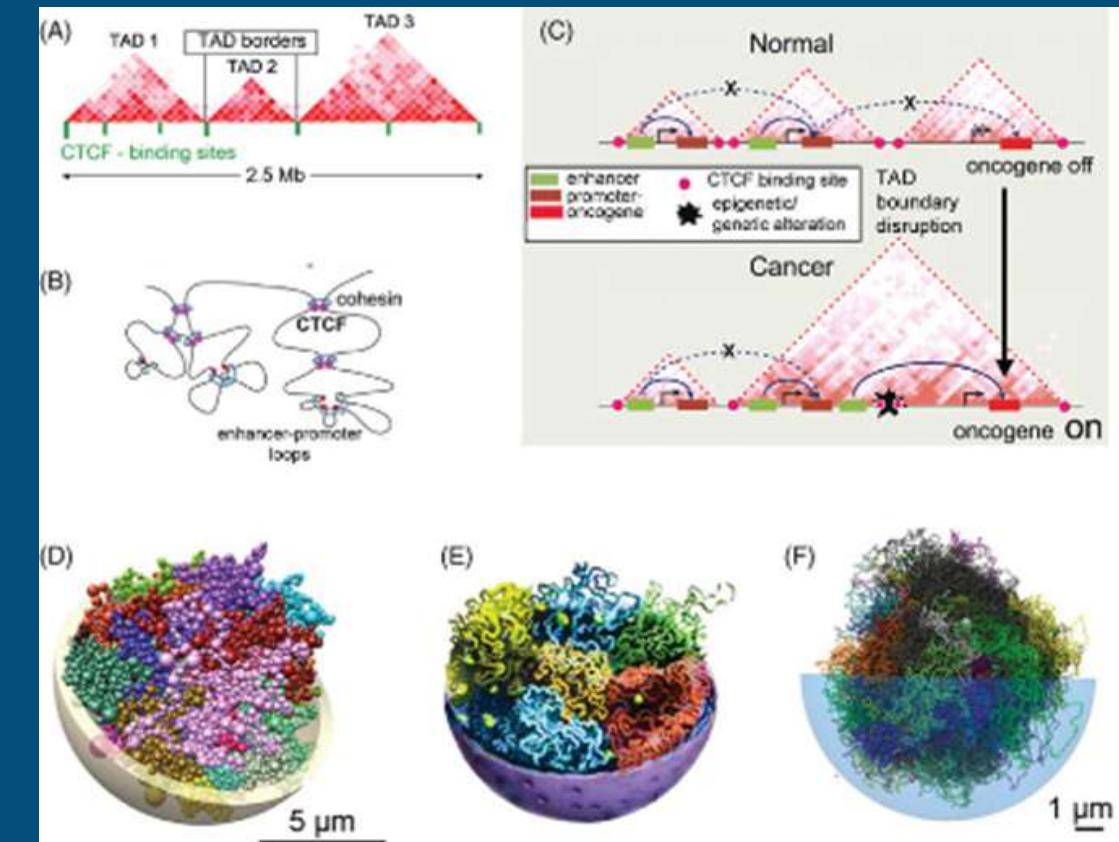
Section end

Draw section



# GenomeAtlas

- Upload and organize raw data generated by a sequenator.
- Generating connection matrices based on a user-friendly session and raw sequencing files.
- Using the discovered artificial intelligence algorithm and connection matrix, prediction of the three-dimensional structure.
- View the generated 3D object and perform interactive transformations.



# Metagenom



# Objectives

Metagenom provides an opportunity for automated analysis of the relationships between the composition of the intestinal flora and various mental illnesses.

Changes in the intestinal microbiome due to chemotherapy and antibiotic treatment



Development of pathophysiological changes:

- Neurodegenerative, mental illness (e.g. Parkinson's disease)
- Mental illnesses:
  - Major depressive disorder (MDD)
  - Attention Deficit Hyperactivity Disorder (ADHD)

Official partners:

UD-GenoMed Kft.

SOTE Psychiatric and Psychotherapy Clinic

Metagenom



Correlation study between mental illness and microbiome composition

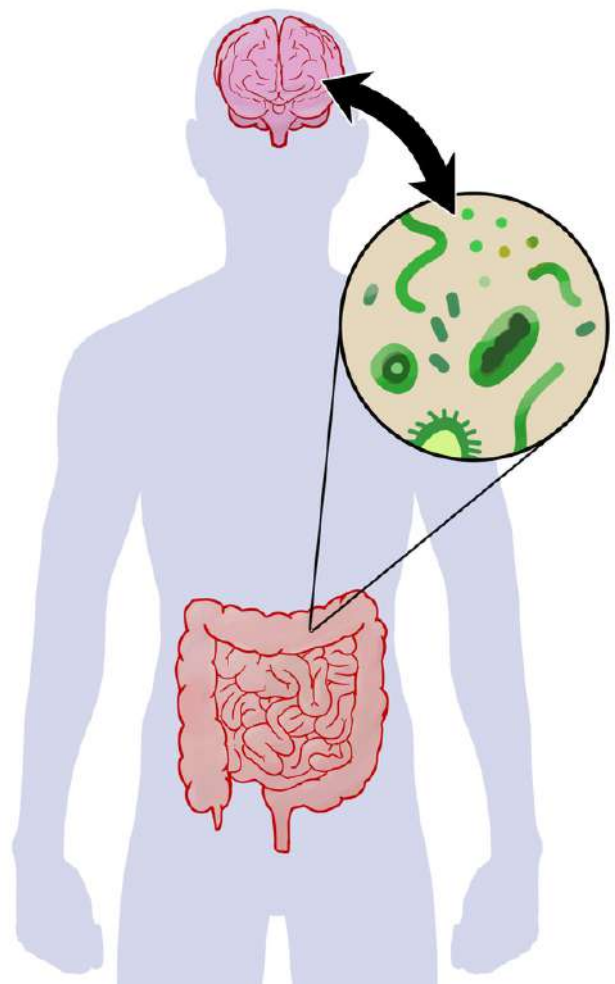


Effect of therapy on microbiome  
(Sampling before and after treatment)



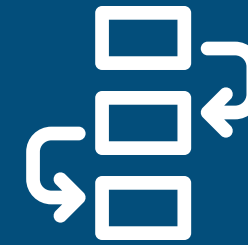
Assessment can be applied to the analysis of other diseases

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# Lab workflow management module

Follow-up of the entire microbiome analysis process of the patient



Metagenom



**Stool sample filter**

Sample name (patient id)    Sample number    Visit number    State    Create date from    Create date to

✕ Clear filters Filter

---

**Stool Sample list**

+ Create new stool sample    Items per page 5    1 - 3 of 3    |< < > >|

| Sample name (patient id) | Sample number | Visit number | State       | Create date | Actions   |
|--------------------------|---------------|--------------|-------------|-------------|---|
| A1B2                     | Eppendorf01   | V1           | Completed   | 04/02/2022  | <span>Show</span> <span>+ Create DNA isolation</span> |
| A1B2                     | Eppendorf01   | V2           | In progress | 31/01/2022  | <span>Show</span> <span>Edit</span>                   |
| A1B2                     | Eppendorf01   | V3           | Empty       | 31/01/2022  | <span>Show</span>                                     |

Items per page 3    46 - 48 of 68    |< < > >|

- 01 Receipt of samples
- 02 Quality control
- 03 Upload documents and images for workflow states
- 04 Establishment of a biobank simultaneously with the recording of sample data
- 05 Flexible workflow declaration, which can be used to configure and parameterize the processing progress in a non-predefined way

Type of illness: psychiatric illness  
Sample type: stool sample



Sample tracking can be extended to treat other diseases and types of samples.

# Genomic profile analysis module

NGS database analysis



Metagenom



**Project handling**

**Reader files pre-processing:**

|  |  |
|--|--|
| <b>Minimum aplicon size:</b><br>44   | <b>Maximum aplicon size:</b><br>550  |
| <b>Mismatch rate:</b><br>0.15  | <b>Number of reads:</b><br>33900   |
| <b>Paired-end sequencing lengths - from Forward primer lengths:</b><br>251 | <b>Paired-end sequencing lengths - from Reverse primer lengths:</b><br>251 |
| <b>Keep unmerged:</b><br>Yes   | <b>Output dereplicated:</b><br>Yes   |

**Sequent clustering:**

|  |  |
|--|--|
| <b>Number of Sequent char maximum difference:</b><br>3 | <b>Sequent cluster noise filtering:</b><br>Yes |
|--|--|

**Sequent filtering:**

|  |                                       |
|--|---------------------------------------|
| <b>Minimum abundance [x] %:</b><br>0.00005 | <b>Minimum example presence:</b><br>3 |
|--|---------------------------------------|

**Annotate:**

**Reference database:**  
SILVA

01 NGS → Bacterial 16S rRNS sequences



02 Sequence quality control  
Data cleaning



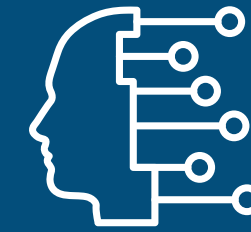
03 Inputting filtered sequences SILVA, GREENGENES to databases  
Taxonomic annotation of taxonomic units



04 Determination of the patient's microbiome



# Expert system module



Big Data analysis of the relationships between microbiome and clinical data

Metagenom



## 1. Apparent Sadness

Representing despondency, gloom and despair, (more than just ordinary transient low spirits) reflected in speech, facial expression, and posture. Rate by depth and inability to brighten up.

- No sadness. (0)
- (1)
- Looks dispirited but does brighten up without difficulty. (2)
- (3)
- Appears sad and unhappy most of the time. (4)
- (5)
- Looks miserable all the time. Extremely despondent. (6)

Field is required

## 2. Reported sadness

Representing reports of depressed mood, regardless of whether it is reflected in appearance or not. Includes low spirits, despondency or the feeling of being beyond help and without hope. Rate according to intensity, duration and the extent to which the mood is reported to be influenced by events.

- Occasional sadness in keeping with the circumstances. (0)
- (1)
- Sad or low but brightens up without difficulty. (2)
- (3)
- Pervasive feelings of sadness or gloominess. The mood is still influenced by external circumstances. (4)
- (5)
- Continuous or unvarying sadness, misery or despondency. (6)

Field is required

## 3. Inner tension

Representing feelings of ill-defined discomfort, edginess, inner turmoil, mental tension mounting to either panic, dread or anguish. Rate according to intensity, frequency, duration and the extent of reassurance called for.

- Placid. Only fleeting inner tension. (0)
- (1)
- Occasional feelings of edginess and ill defined discomfort. (2)
- (3)
- Continuous feelings of inner tension or intermittent panic which the patient can only master with some difficulty. (4)
- (5)
- Unrelenting dread or anguish. Overwhelming panic. (6)

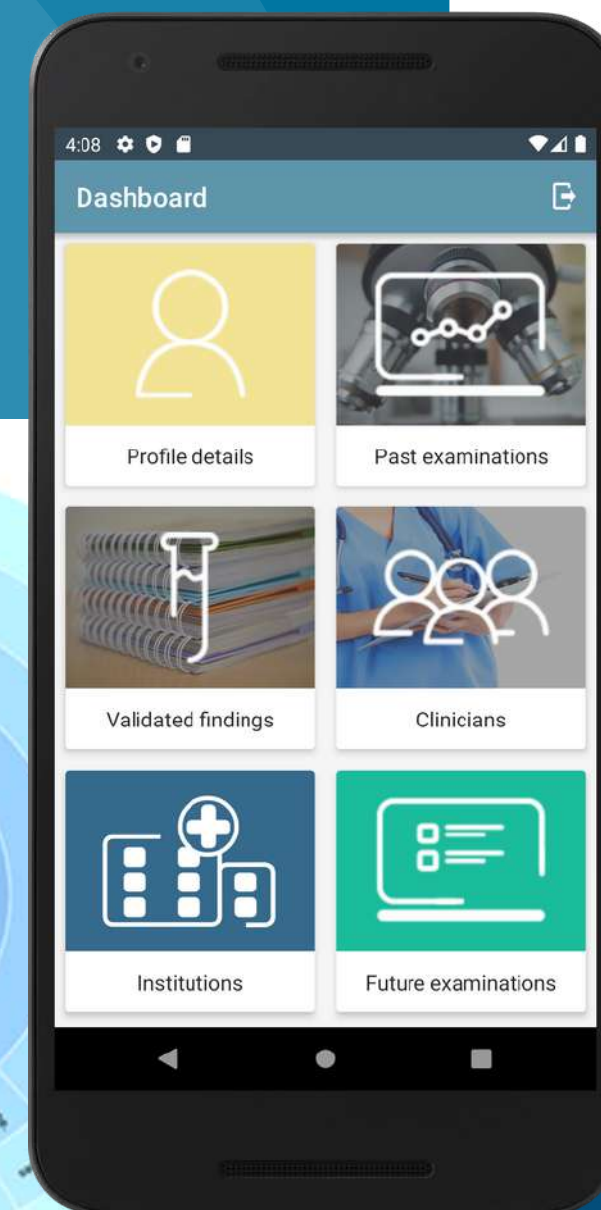
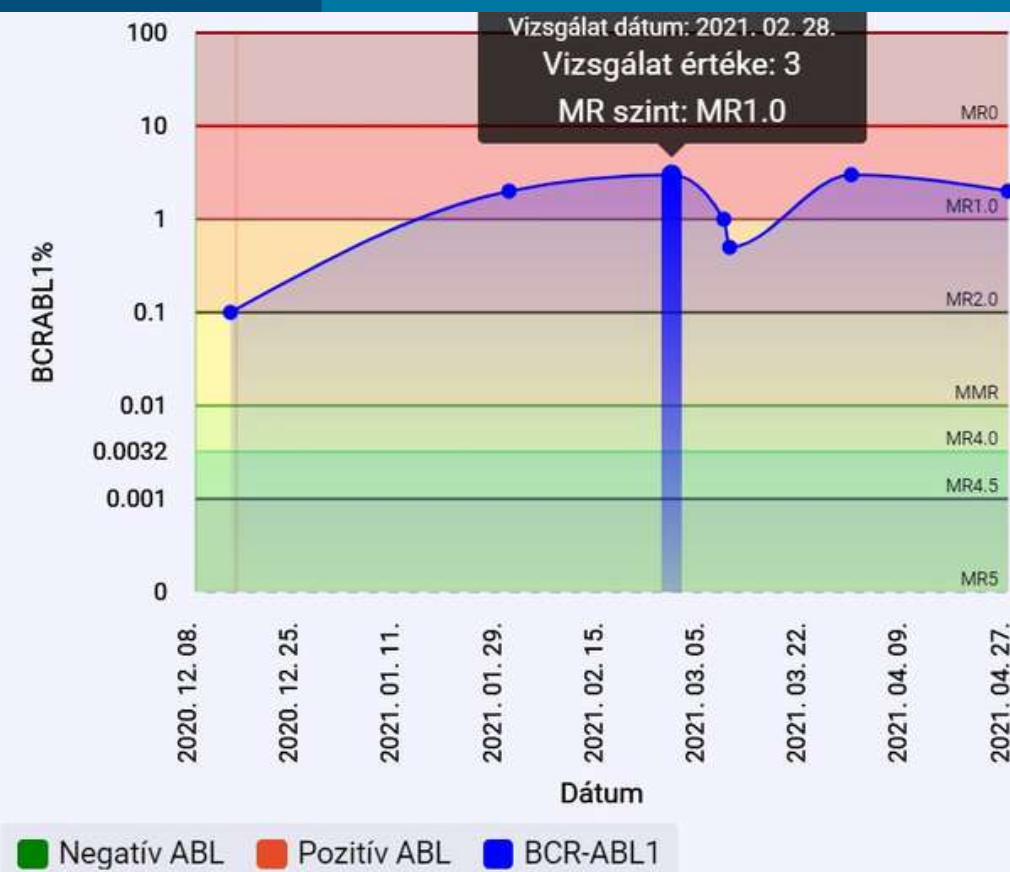
Field is required

- 01 Determining the relationships between the scores of the questionnaire, the psychological state and the composition of the microbiome
- 02 Identification of microbiomic markers for a given disease type
- 03 Increase treatment efficiency
- 04 Supporting research on treatment protocols



# Innovatech

## CTA - GenomeAtlas - Metagenom



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