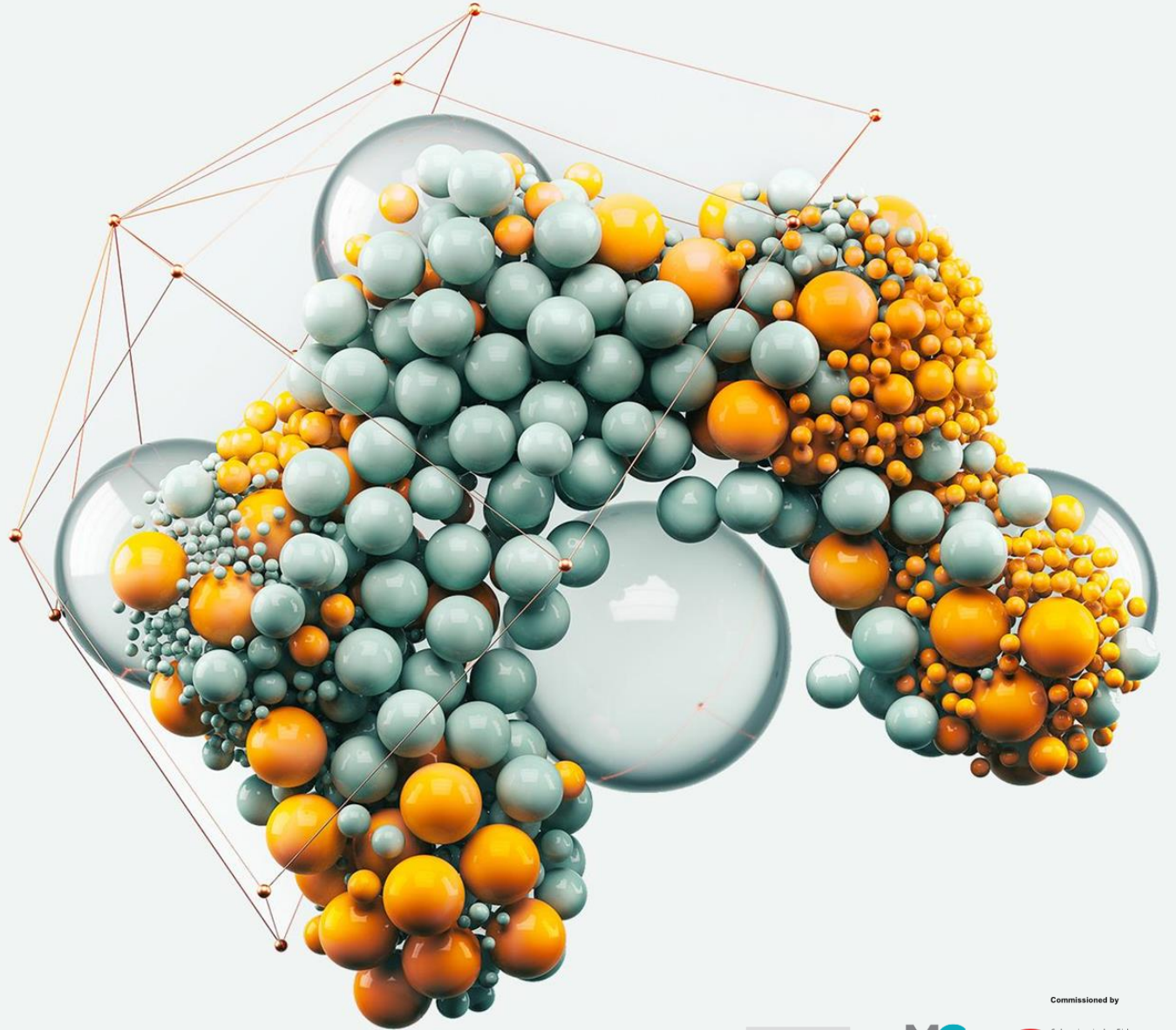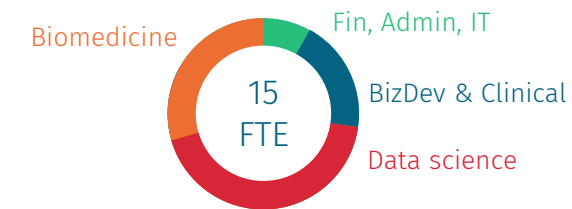# Disease-related **biomarker** discovery from **single-cel**l data

October 2020

Multi-disciplinary and Talented Team

15 FTE

- Biomedicine
- Fin, Admin, IT
- BizDev & Clinical
- Data science

Biomedicine

Dr. Peter Nestorov
Founder & CEO

EBERHARD KARLS UNIVERSITÄT TÜBINGEN · FMI Friedrich Miescher Institute for Biomedical Research

Data Science

Dr. Dennis Göhlsdorf
Founder &
Machine Learning Expert

Google · ETHzürich

Data Science

Prof. Dr. Manfred Claassen
Founder &
Chief Scientific Advisor

EBERHARD KARLS UNIVERSITÄT TÜBINGEN · ETHzürich

Regulatory

Dr. Samidha Kushwaha
QA/RA Manager

HEMEX Healthcare Management Experts · Swiss TPH

Data Science

Dr. Sarah Carl
Director Data Science

UNIVERSITY OF CAMBRIDGE · FMI Friedrich Miescher Institute for Biomedical Research

Biomedicine

Dr. Philip Knuckles
Director Biomarker Discovery

MAX PLANCK GESELLSCHAFT · Lilly · FMI Friedrich Miescher Institute for Biomedical Research

BizDev

Dr. Andrius Serva
Director Business Development

dkfz. GERMAN CANCER RESEARCH CENTER IN THE HELMHOLTZ ASSOCIATION · FLUIDIGM

Finance & Admin

Anna Dimitrova, ACCA
Director Finance & Operations

pwc · KPMG

Advisors and Board of Directors

Biomedicine

Dr. Vijay Tiwari
Executive Advisor

JOHNS HOPKINS UNIVERSITY · Karolinska Institutet

Clinician

Prof. Dr. Michael Mueller, MD
Clinical Advisor Endometriosis

INSELSPITAL
UNIVERSITÄTSSPITAL BERN
HÔPITAL UNIVERSITAIRE DE BERNE

Clinician

Prof. Dr. Petter Brodin, MD
Clinical Advisor Immunology
& Single-Cell Technologies

Karolinska Institutet · SciLifeLab

Clinician

Prof. Dr. Emmanuella Guenova, MD
Clinical Advisor CTCL & Immunology

CHUV · USZ Universitäts Spital Zürich

Data Science

Dr. Michael Stadler
Scientific Advisor Bioinformatics

FMI
Friedrich Miescher Institute
for Biomedical Research · SIB

Biomedicine

Prof. Dr. Tomas Kalina, MD
Scientific Advisor Flow Cytometry
& Immuno assays

CHARLES UNIVERSITY

Regulatory

Pascal Winnen
CEO Hemex AG &
Scailyte Board of Directors
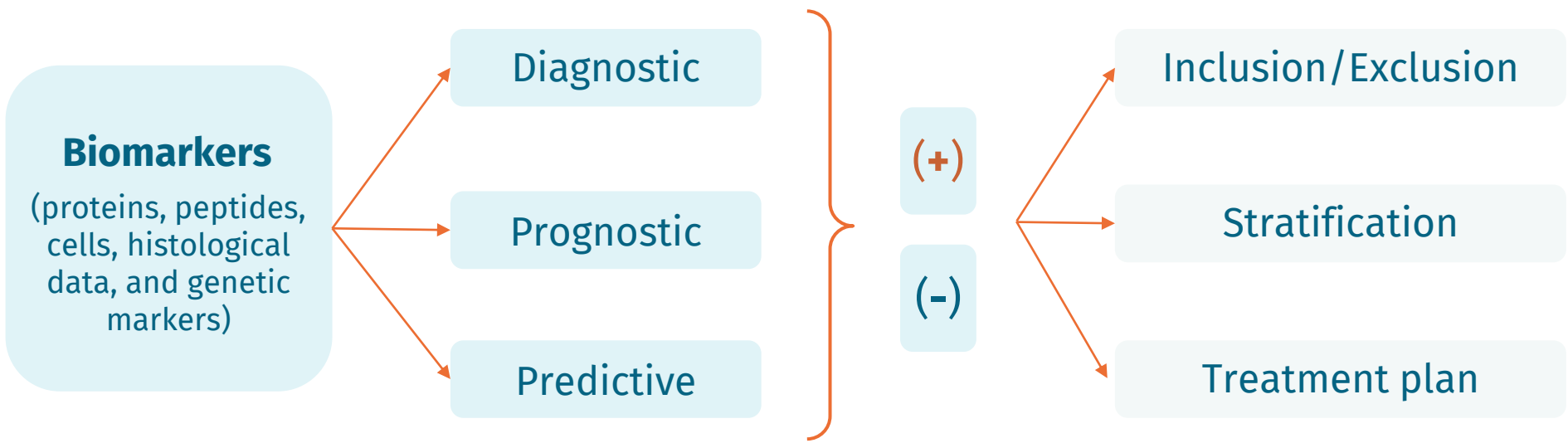
HEMEX
Healthcare Management Experts

Finance

Dominique Mégret
Head of Swisscom Ventures &
Scailyte Board of Directors

swisscom

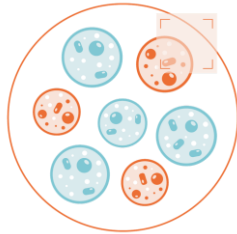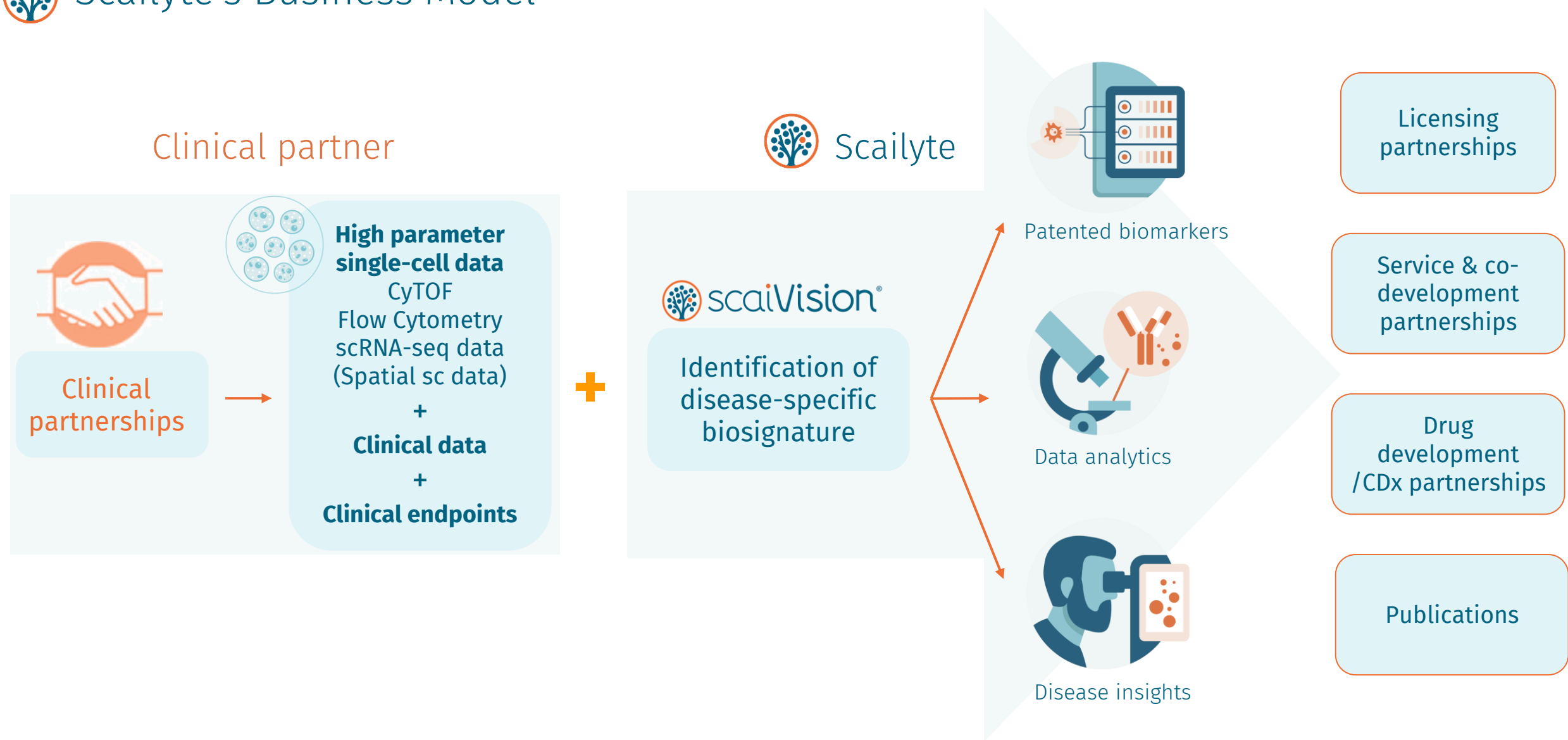# Scailyte develops next-generation diagnostics from single-cell analysis

Biomarkers
(proteins, peptides, cells, histological data, and genetic markers)

- Diagnostic
- Prognostic
- Predictive

(+)

(-)

- Inclusion/Exclusion
- Stratification
- Treatment plan
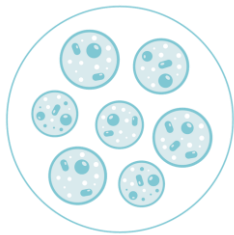
Single-**C**ell data

Artificial **I**ntelligence

Disease-related biomarker

Scailyte's Business Model

Clinical partner

Scailyte

Clinical partnerships →

High parameter single-cell data
CyTOF
Flow Cytometry
scRNA-seq data
(Spatial sc data)
+
Clinical data
+
Clinical endpoints

scaiVision

Identification of disease-specific biosignature

Patented biomarkers

Data analytics

Disease insights

Licensing partnerships

Service & co-development partnerships

Drug development /CDx partnerships

Publications

Contributions and Offering

Phase I: PILOT DISCOVERY

Contribution Clinical partner
The clinical partner will provide single-cell measurements, clinical data & endpoints

Contribution Scailyte AG
Scailyte will analyze the data from Phase I using ScaiVision

Outcome:
Shared **IP** rights between the clinical partner and Scailyte
Joint scientific **publication**
Support with **fundraising**
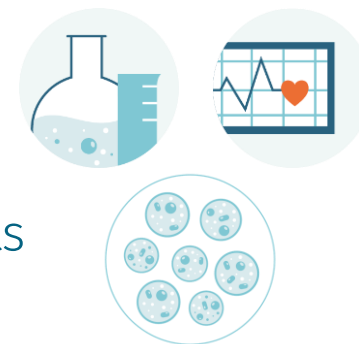
Phase II: EXPANSION AND VALIDATION

Main goal: validate signature from Phase I and expand patient cohort
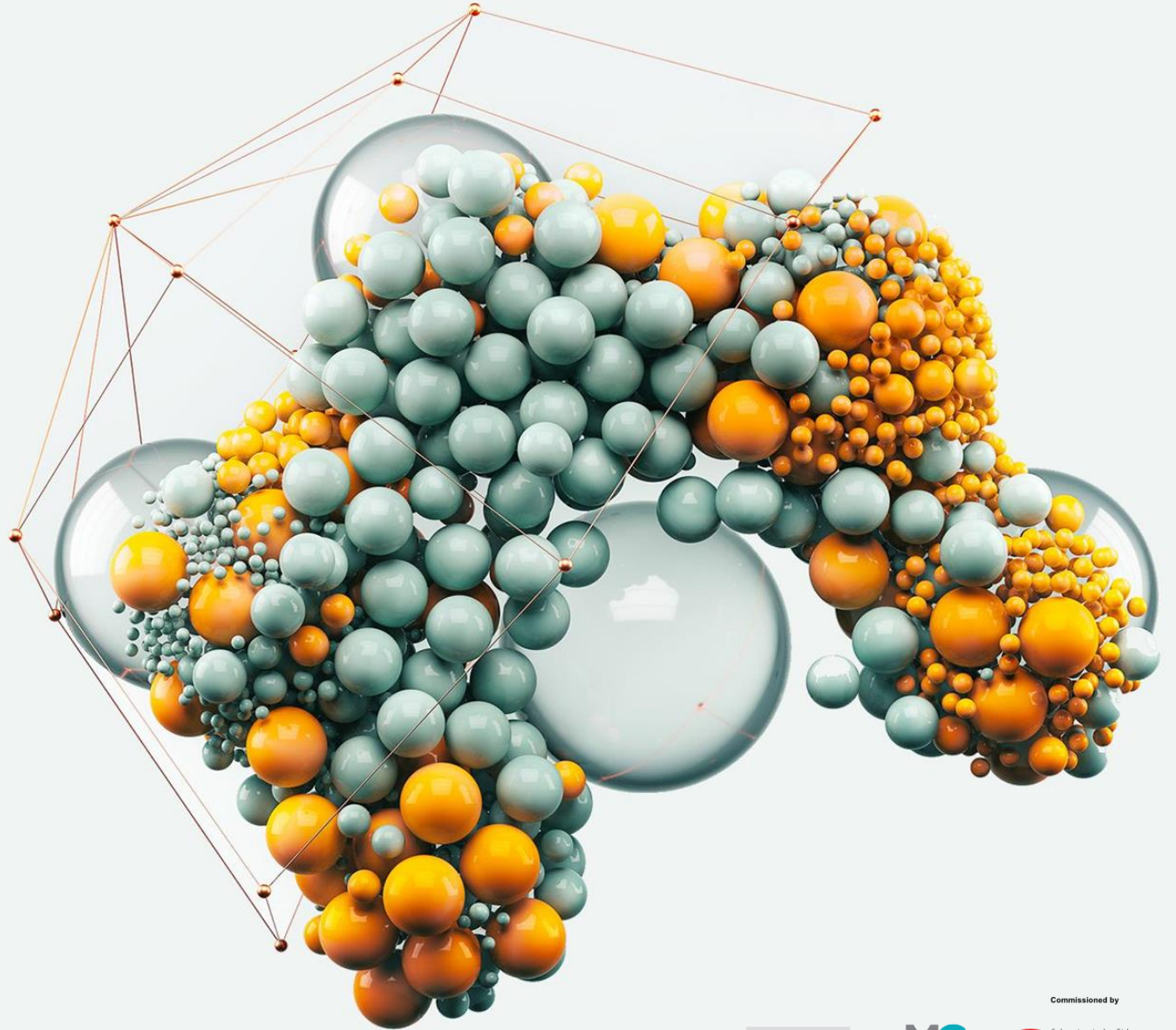Upon successful completion of Phase I we could sponsor a second phase

Clinical Projects

Indication	Clinical partner	Biomarker Discovery		IVD Development	
		Discovery	Patent filed	IVD Prototype	Regulatory Approval
Skin T-cell lymphoma	USZ Universitäts Spital Zürich	*Patent pending (EP19219889)*			
Covid-19 / ARDS	CHU Rennes	*Patent pending (EP20305642)*			
Endometriosis	INSELSPITAL UNIVERSITÄTSSPITAL BERN HÔPITAL UNIVERSITAIRE DE BERNE				
Radiotoxicity in cancer	INSELSPITAL UNIVERSITÄTSSPITAL BERN HÔPITAL UNIVERSITAIRE DE BERNE				
Oncology & Immunology					

Flow cytometry antibody panel

PCR/NGS-assays for RNA expression

FACS-based assay and AI for precise CTCL diagnosis

| Initial discovery & AI training | Validation of signature/AI model | Prototyping of IVD assay | IVD clinical validation |

AD/Healthy vs **CTCL**

N=60

36 protein markers

protein 01, protein 02, protein 03, protein 04, protein 05 ... protein 32, protein 33, protein 34, protein 35, protein 36

AD/Healthy vs **CTCL**
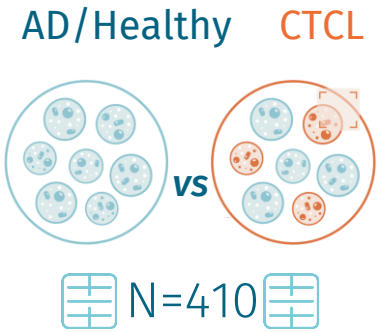
N=33

AUC = 0.98

Sensitivity vs Specificity
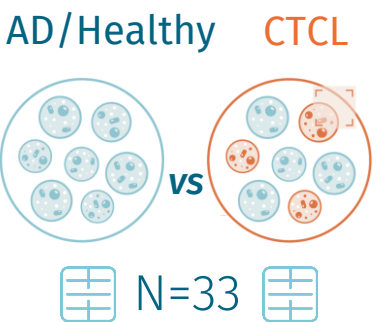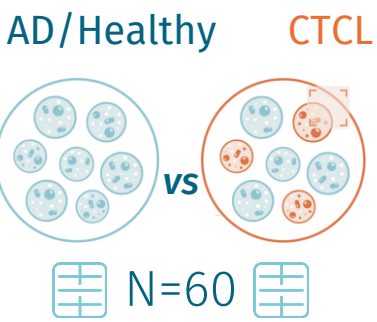
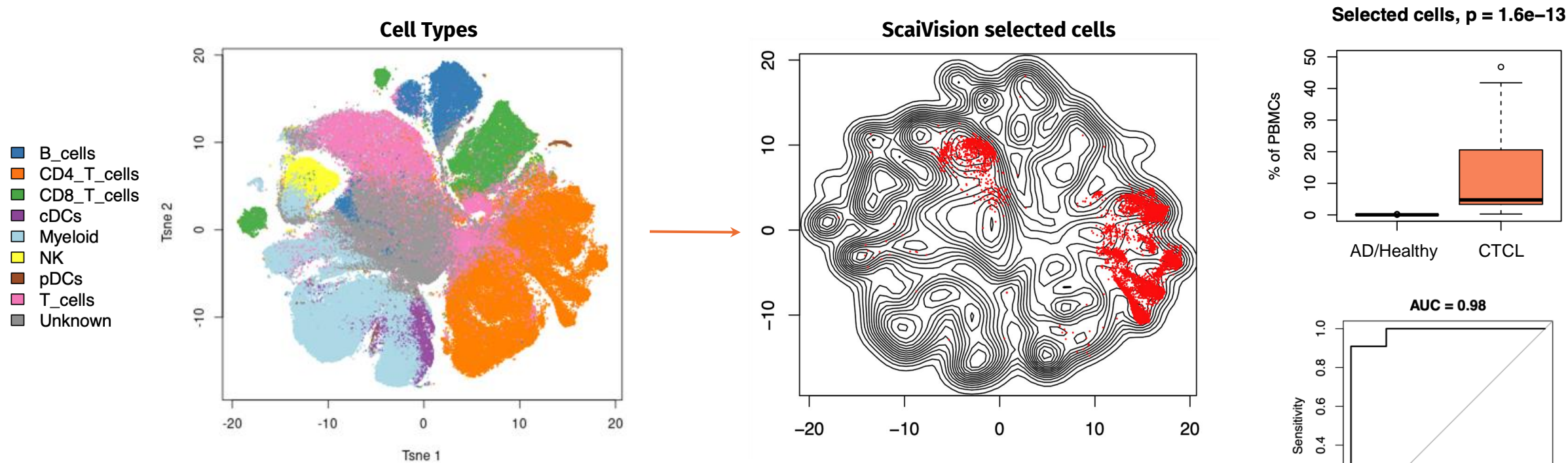Optimized CTCL-specific FACS panel for only 9 cell-surface markers

sensitivity

% CD4+ CD7-, CD4/CD8 ratio, % CD4+ CD26-, TCR clone

scaiVision

Clinical Validation with Prof. Guenova UZH, more clinical partners and business partner

AD/Healthy vs **CTCL**

N=410

ScaiVision predicts CTCL-specific biomarker

Cell Types

Legend:
- B_cells
- CD4_T_cells
- CD8_T_cells
- cDCs
- Myeloid
- NK
- pDCs
- T_cells
- Unknown

ScaiVision selected cells

Selected cells, p = 1.6e−13

AUC = 0.98

- ScaiVision discovered a **unique signature** in CyTOF data corresponding to a specific subset of CD4+ T-cells

- The cells represent **tumor-defining cells** and are only present in patients with CTCL

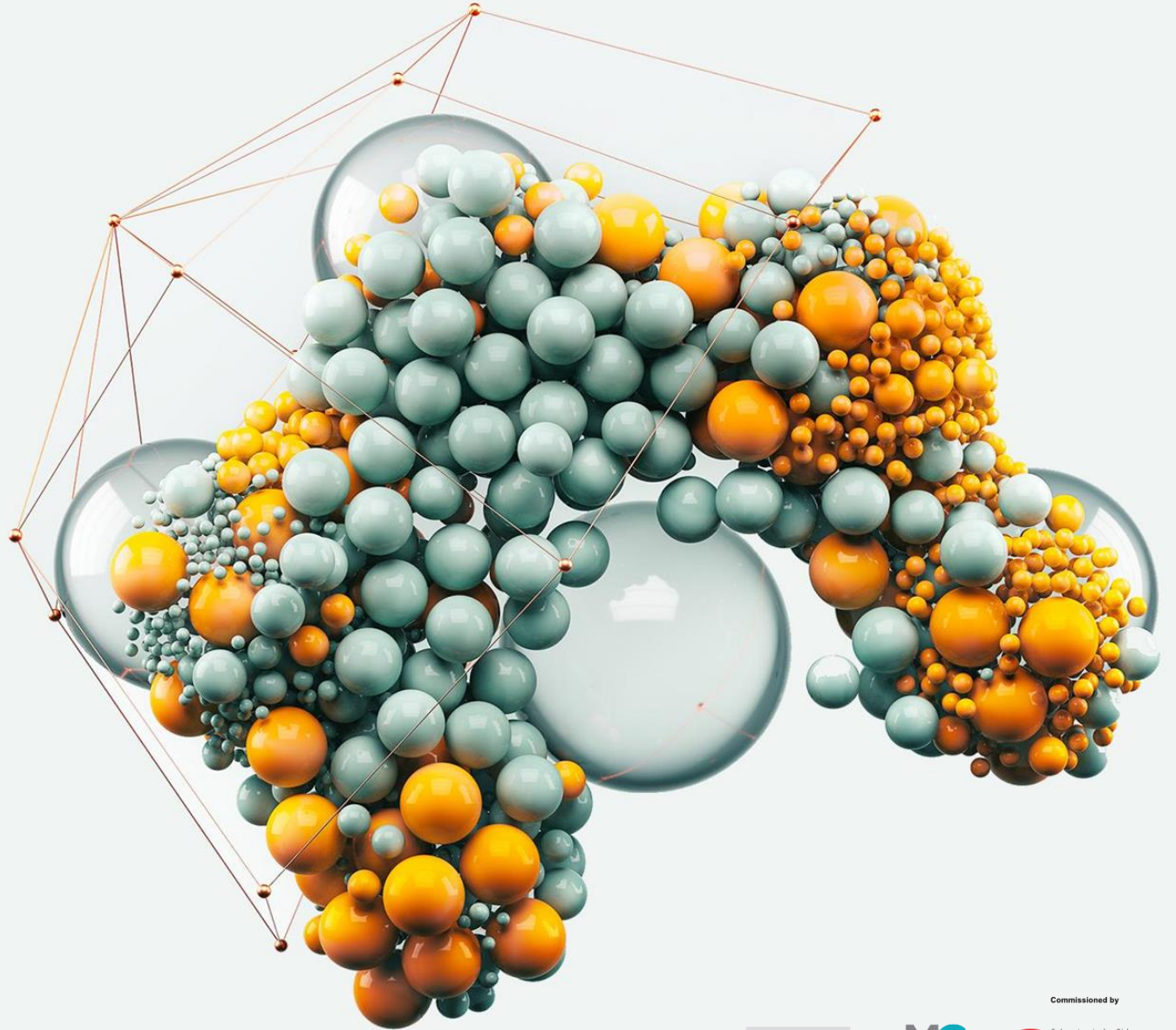- Our trained model could predict CTCL with **97% accuracy** (AUC = 0.98).
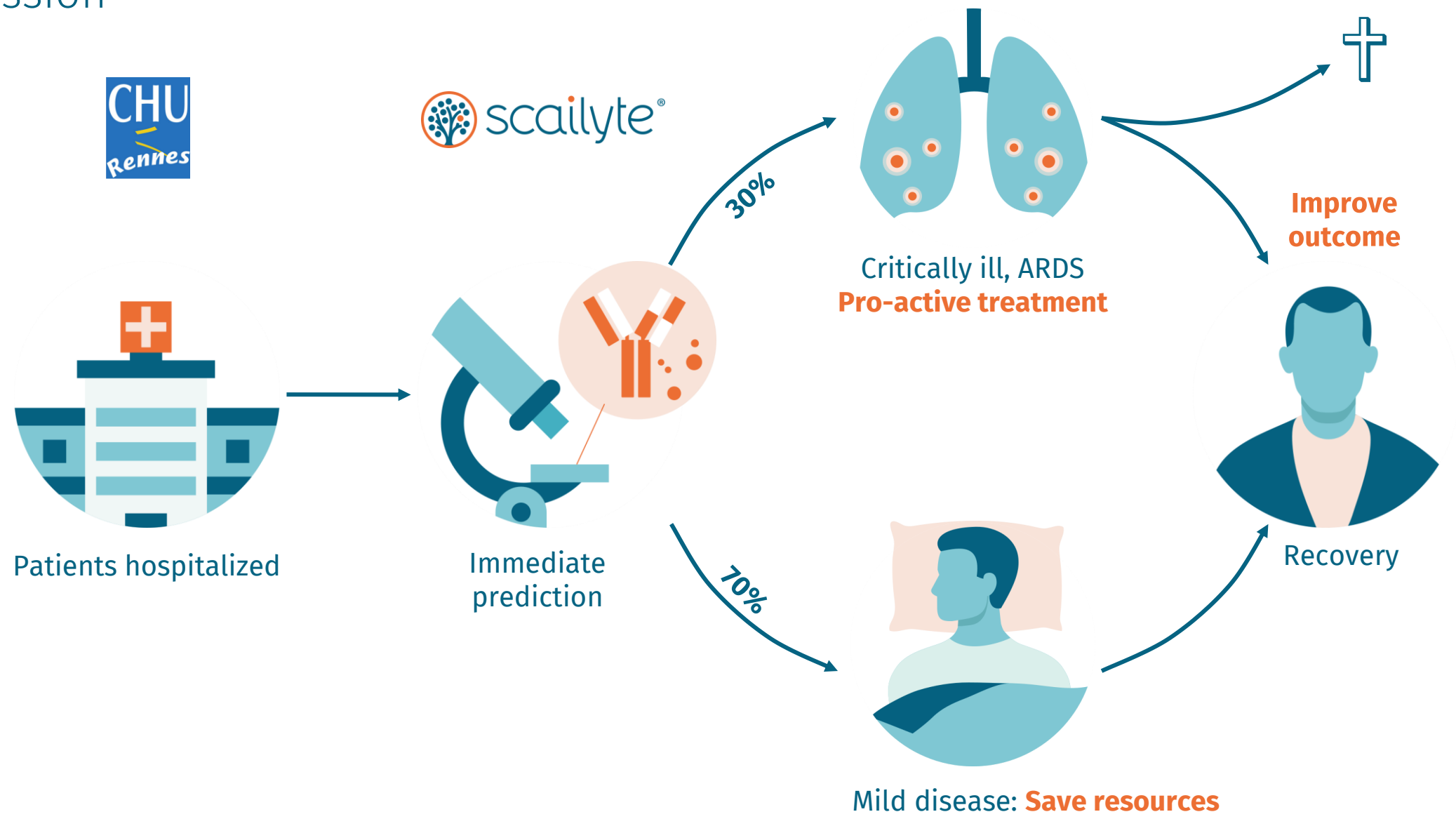
Manuscript submitted

Acute Respiratory Distress Syndrome (ARDS) prediction of COVID-19 patients at admission

CHU Rennes

scailyte®

Patients hospitalized

Immediate prediction

30%

Critically ill, ARDS
Pro-active treatment

Improve outcome

70%

Mild disease: **Save resources**

Recovery

FACS-based assay and AI for ARDS prediction

Initial discovery & AI training	Validation of signature/AI model	Prototyping of IVD assay	IVD clinical validation

Initial discovery & AI training

ARDS - vs **ARDS + (COVID-19 + and COVID-19 -)**

N=37

73 protein markers

protein 01 protein 02 protein 03 protein 04 protein 05 ... protein 32 protein 33 protein 34 protein 35 protein 36

Validation of signature/AI model

ARDS - vs **ARDS + (COVID-19 + and COVID-19 -)**

N=17

AUC = 0.95

Sensitivity / Specificity

Prototyping of IVD assay

Optimized FACS panel for cell-surface markers

- Expansion with more COVID-19 patients
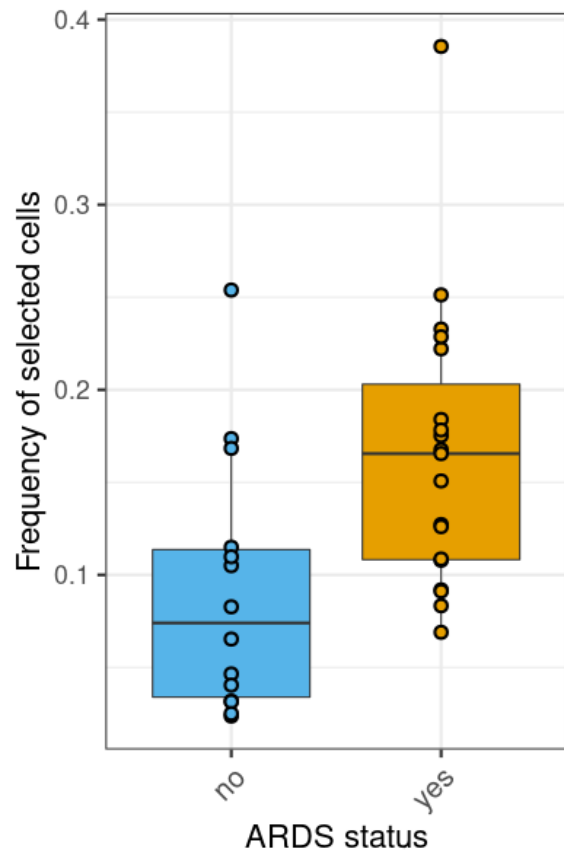- Expansion with pneumonia-driven ARDS cohort

Clinical and Single-cell data combined with AI outperforms classical biomarkers
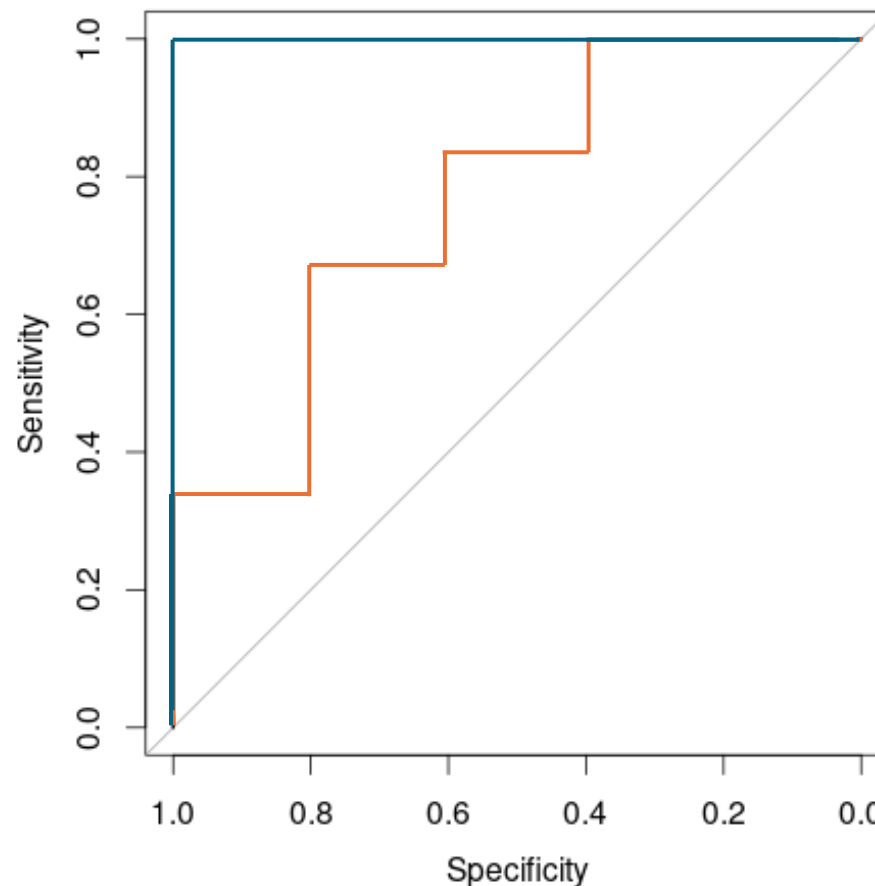
Enriched cell population
discovered in ARDS:
p = 0.0024

AUC = 0.77
AUC = 1.00

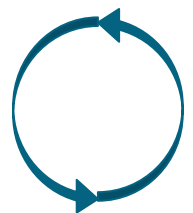**IL-6 alone** (standard of care)

ScaiVision AI model (single-cell and clinical data)

Patient cohort used for training and validation of AI:

- 22 ARDS +
- 15 ARDS −

Why should you work with Scailyte?

Full workflow network
from discovery to commercial prototype

Multidisciplinary & International team

Support & Benefits
fundraising,
project management,
regulatory affairs,
patent filing, publications

Successful clinical projects
CTCL, ARDS

Integrate multi-omics data and clinical data

scailyte®

Contact Name, Contact position
email@scailyte.com
Contact phone number