

AIRR Community Meeting VI

Paul Stys – PhD student

i³ lab – UMRS 959

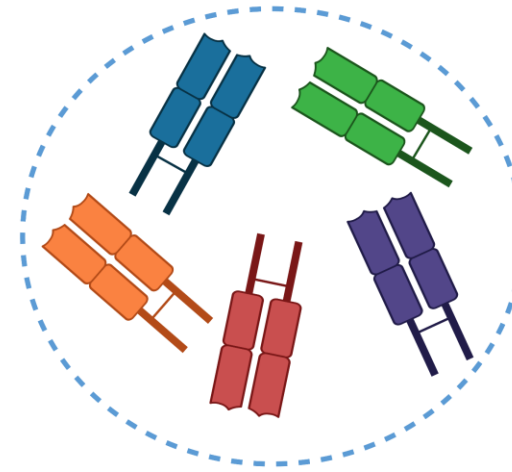
Thesis supervisors: Pr. David Klatzmann & Assoc. Prof. Encarnita Mariotti-Ferrandiz

TCR repertoire as biomarkers of immune diseases : applications to autoimmune diseases and Covid-19

19 May 2022

Background & Aims

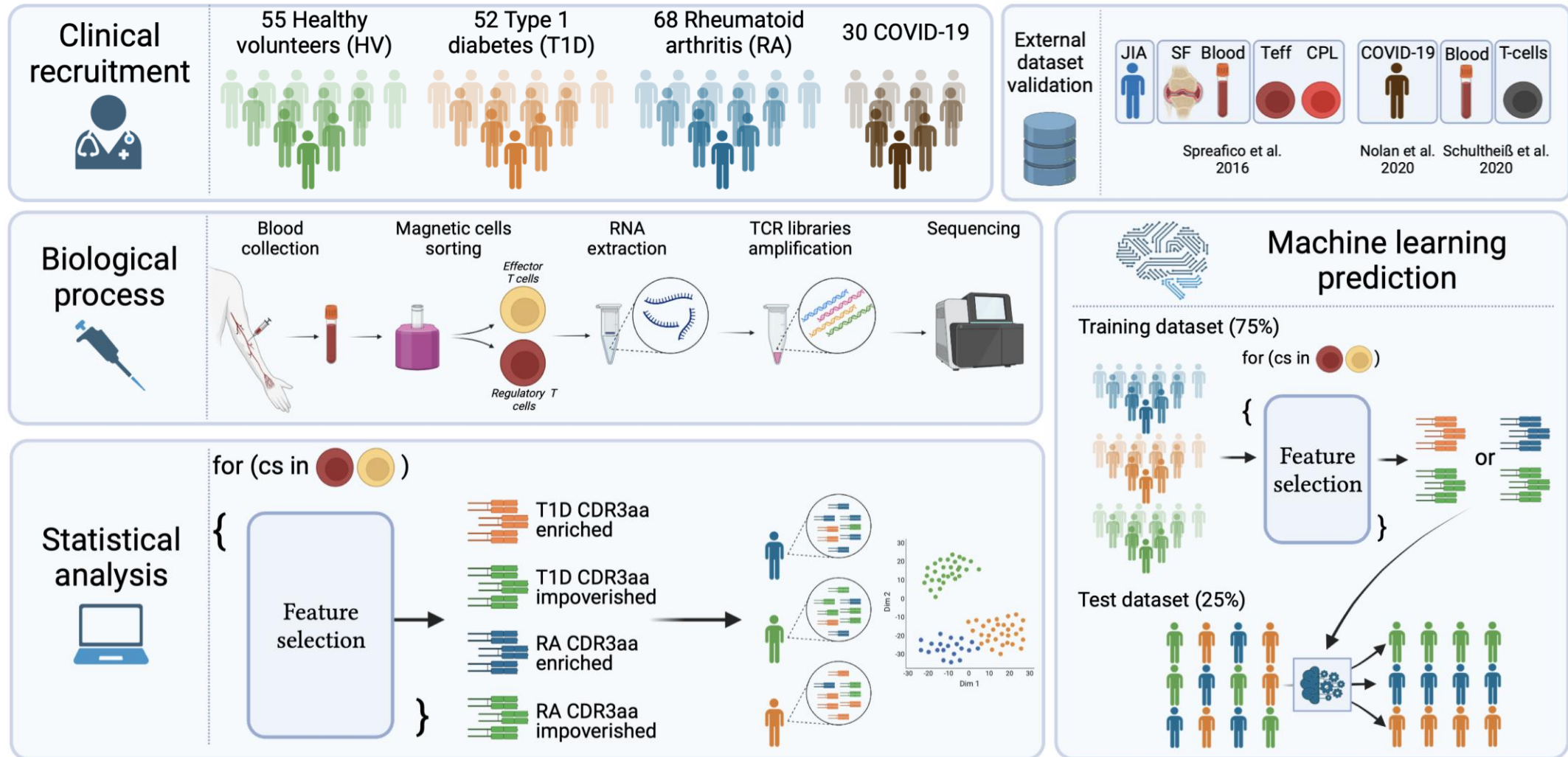
- Adaptative T-cell repertoire diversity



- **Aims**

- **Identify disease-specific TCRs** from the repertoire of sorted T cells
- Use these sequences to **classify and predict** patient outcome
- Determine the **specificity and biological roles** of these TCRs to better understand the diseases

Methods



Signatures

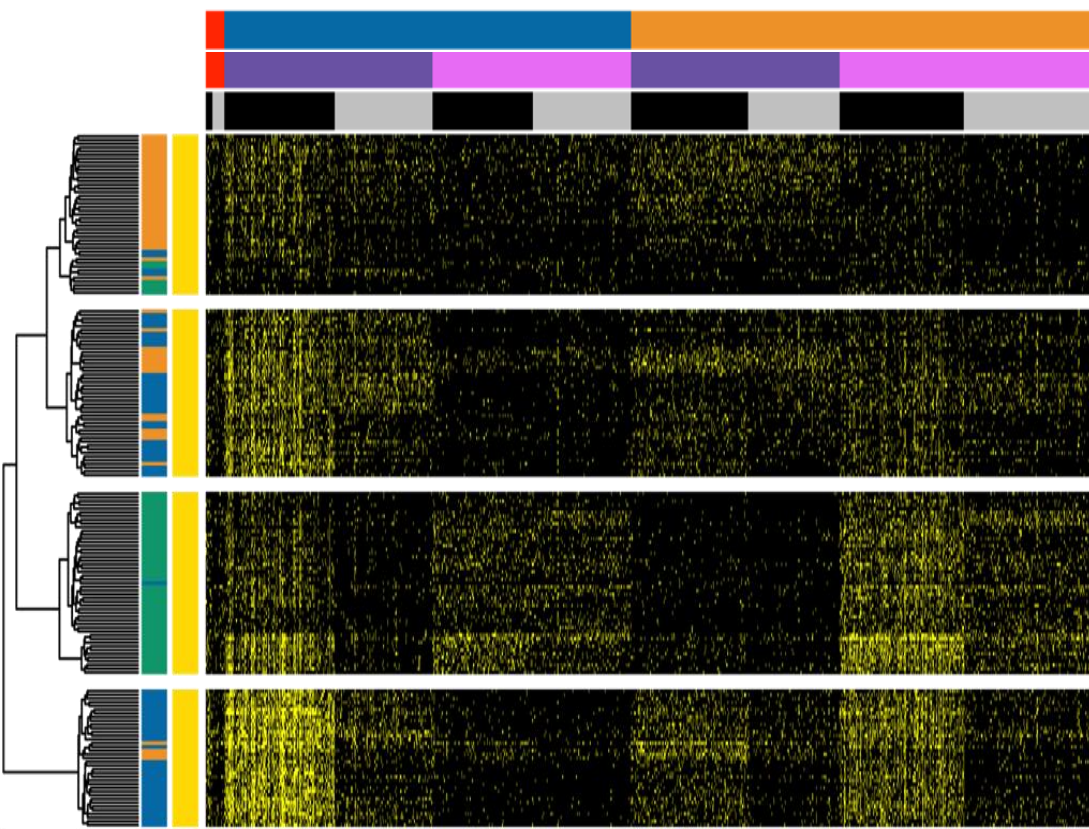
Transimmunom

SirocCo

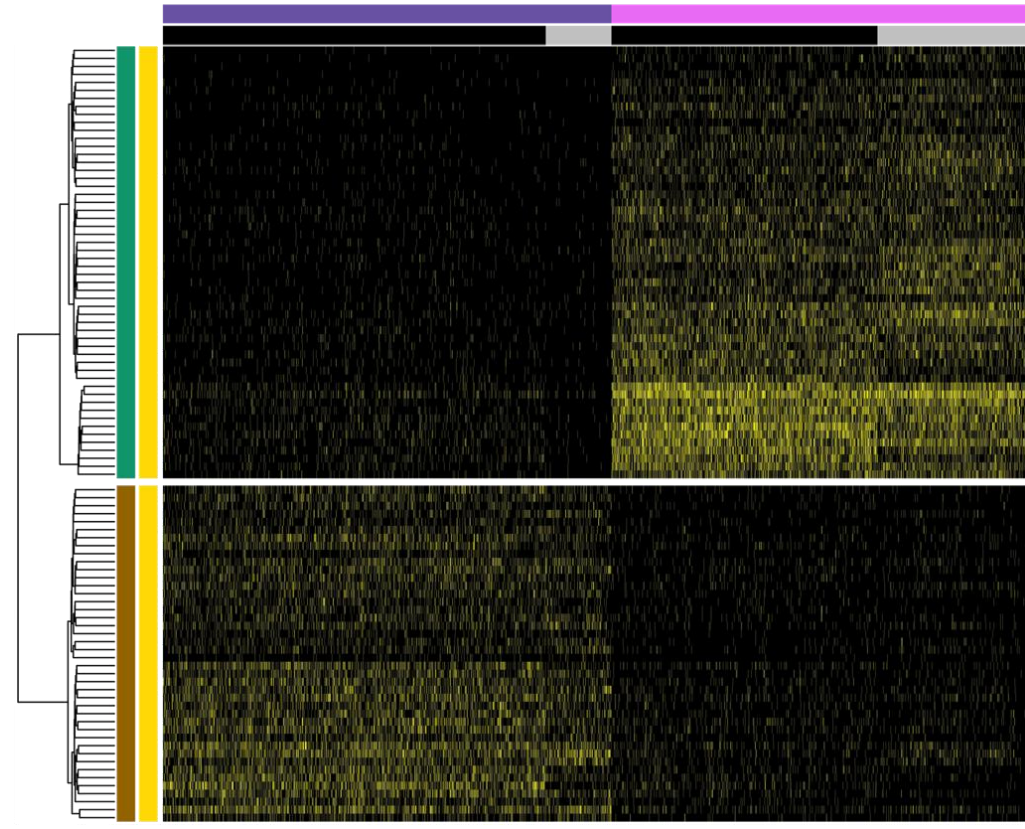
Value
CDR3aa binary expression
 Absence
 Presence

y-axis
Patients disease
 T1D
 HV
 RA
 COVID-19
Cell subset
 CD4 Teff

x-axis
Analysed disease
 Shared
 RA
 T1D
 COVID-19
Signatures type
 Shared
 Enriched
 Impoverished
Chain
 TRA
 TRB



Cluster purity : 0.83

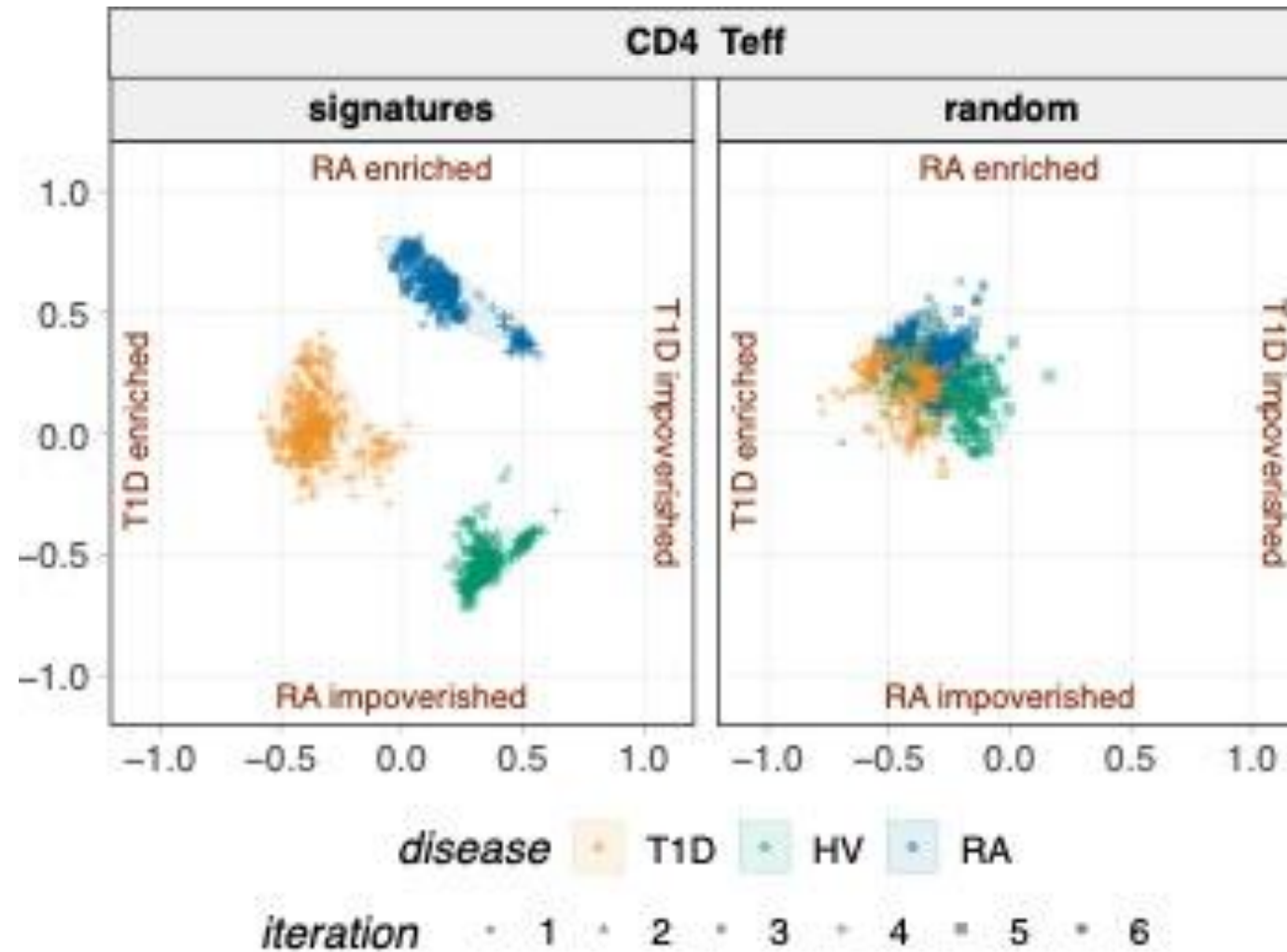


Cluster purity : 1

- The selection of CDR3aa from peripheral blood **works well on a viral disease** like COVID-19 since the clustering shows a **perfect separation** of patients from HV.
- The **strategy also separates AIDs** patients from HV **but to a lesser extent**.

Signature validation $\frac{1}{4}$: Random

Transimmunom



➤ The strategy is reproducible, little impacted by sampling, and that the results are not due to chance.

Signature validation : ...

- See you on my poster 202 or on Whova
- Poster features : ML classification, prediction of disease outcome, ...



Acknowledgements

i³ Laboratory

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TCR Team

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- Adrien Six
- **Pierre Barennes**
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- Helene Vantomme
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- Leslie Adda

Human immunology Team

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- Caroline Aheng
- Roberta Lorenzon
- Claire Ribet
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- Julien Derop
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- Raphael Boutry
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Collaborators

- Francis Berenbaum
- Jérémie Sellam

TI consortium