



Leids Universitair  
Medisch Centrum

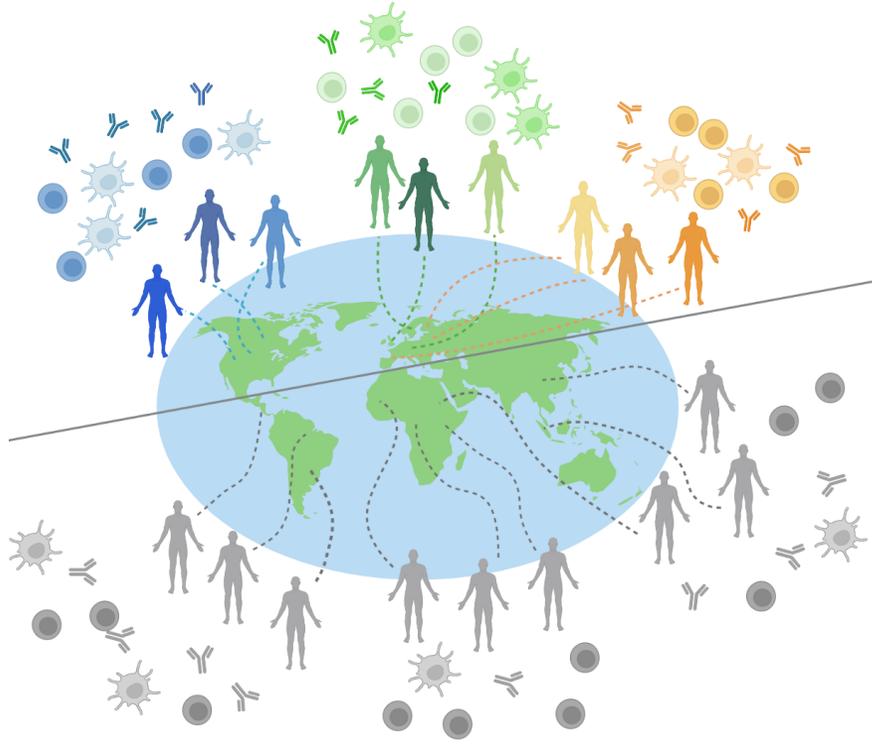
# Molecular insights in “real-life” immunology

## *Vaccine hyporesponsiveness*

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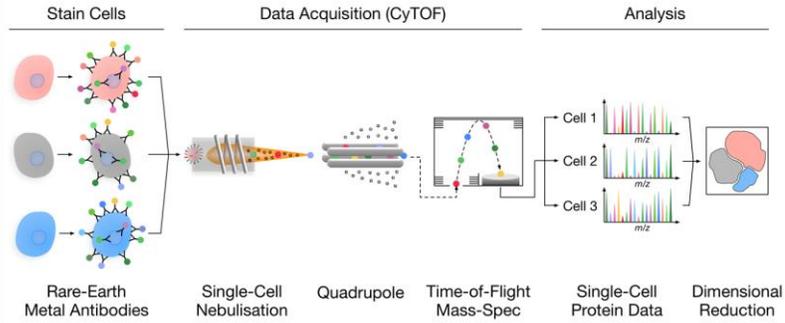
# Geographical / Socioeconomic difference in response to vaccines



Our knowledge of the human immune system is based on populations of affluent regions of the world: Europe or North America

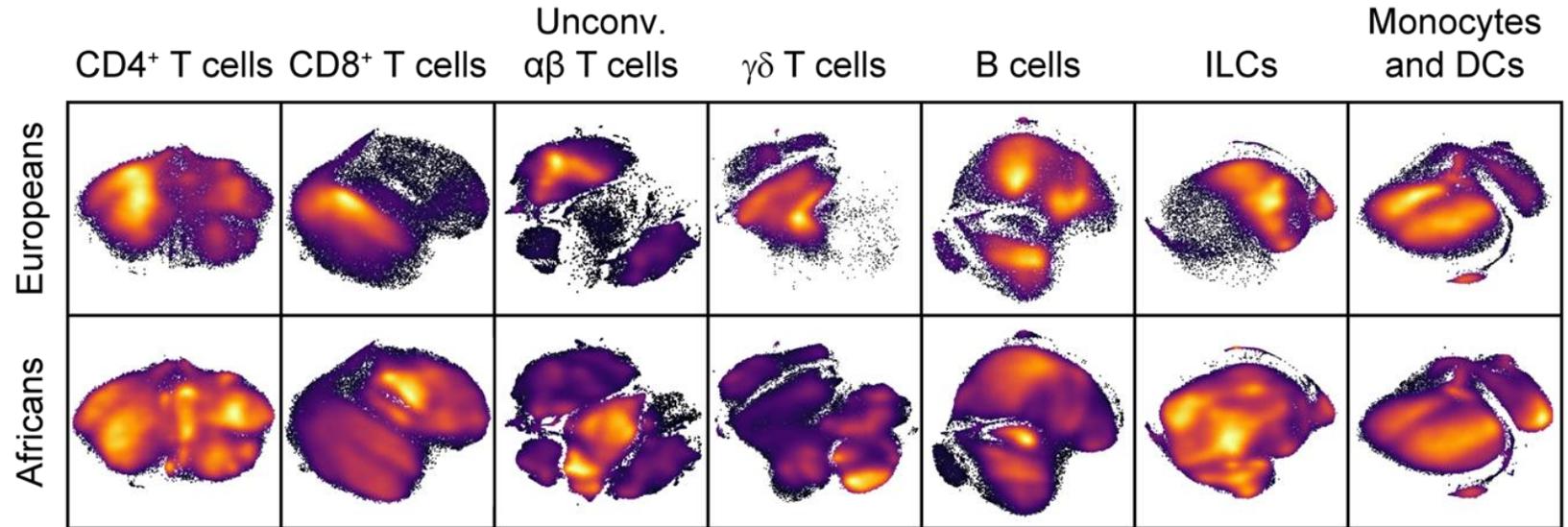
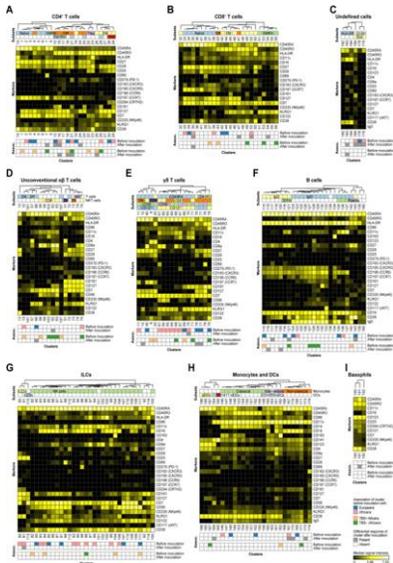
*We know little about the rest*

# High-dimensional immune cell profiling



<http://tape-lab.com/technology/>

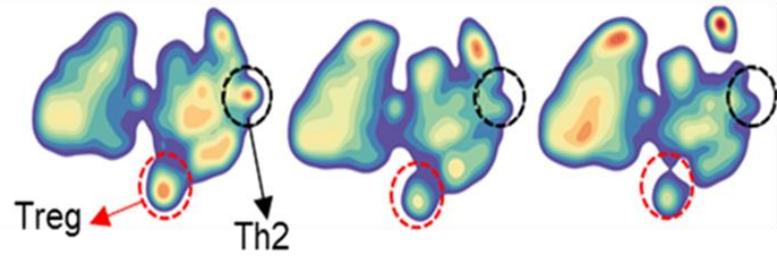
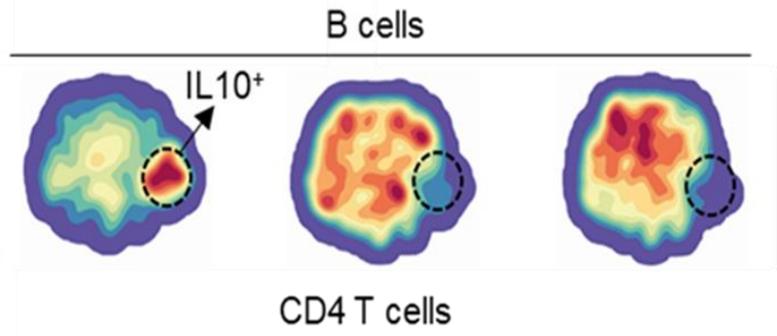
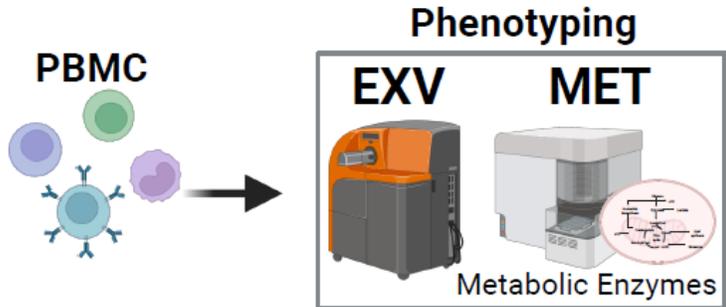
PBMC



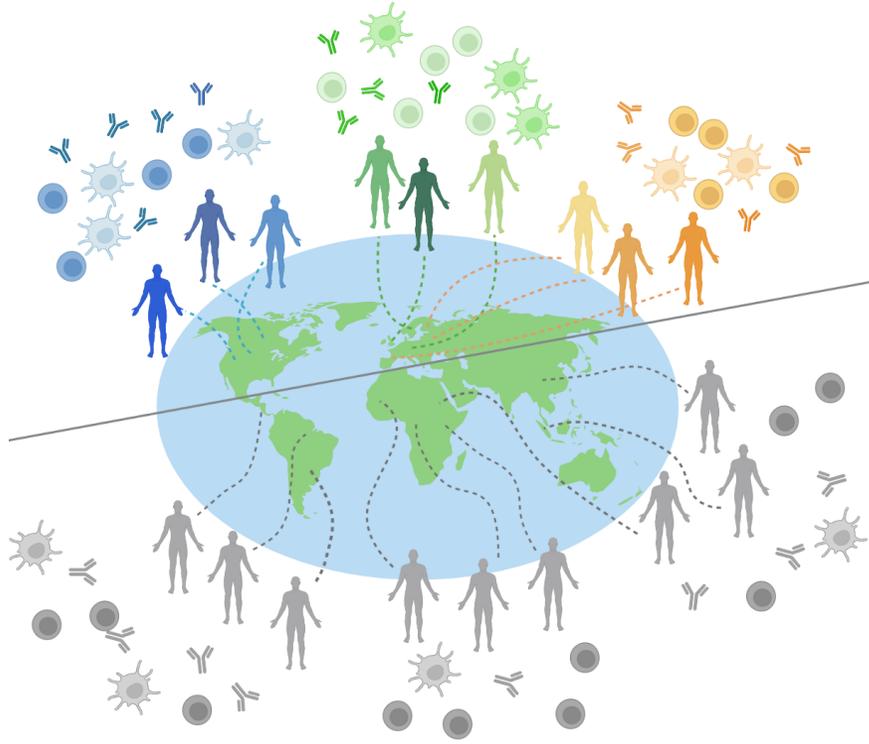
# Large environmental diversity seen even within one country



# Rural Urban differences within Indonesians using mass cytometry



# Geographical / Socioeconomic difference in response to vaccines



Our knowledge of the human immune system is based on populations of affluent regions of the world: Europe or North America

*We know little about the rest*

Vaccines are tailored around immune system of affluent regions

*They perform less in less affluent regions*



# Importance of Vaccines

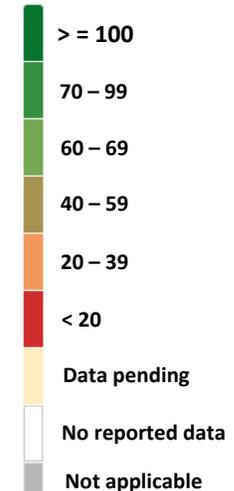
- Vaccines are the cornerstone of public health interventions
- Every year 4 million deaths worldwide are prevented by childhood immunizations (WHO)
- Vaccines = critical in the control of infectious disease epidemics and pandemics
- COVID-19 pandemic = lessons in the importance of vaccines / vaccination



**WHO: Total Number of COVID-19 doses administered worldwide**

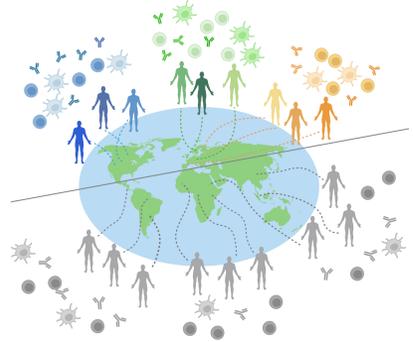


**Vaccination – Total doses administered per 100 population**

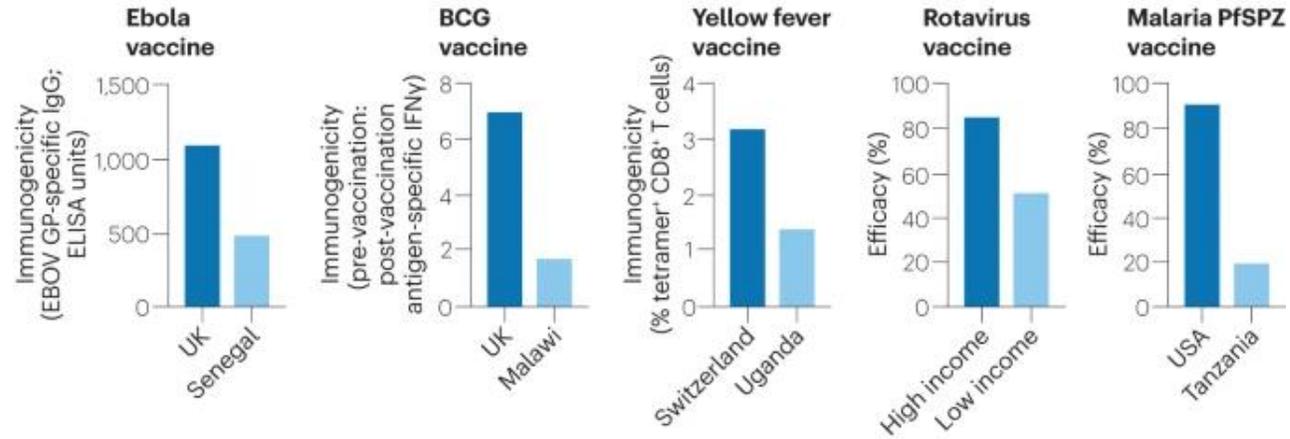


**August 2023: 13.5 billion COVID-19 vaccine doses administered (WHO)**

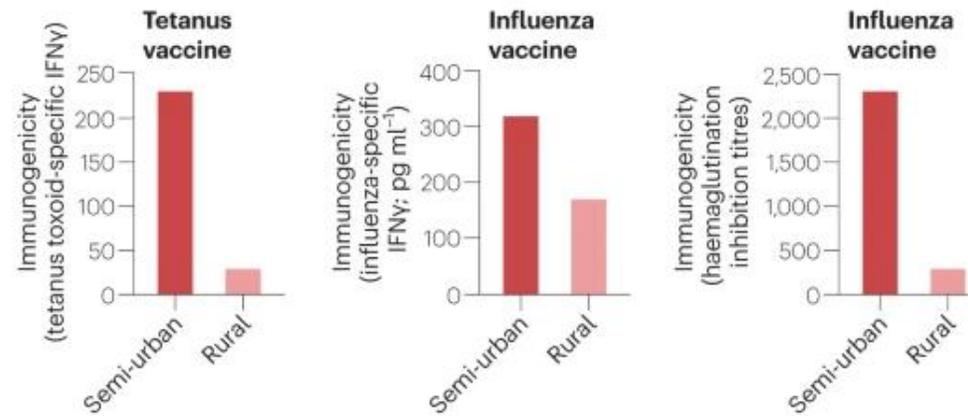
# Geographical / Socioeconomic difference in response to vaccines



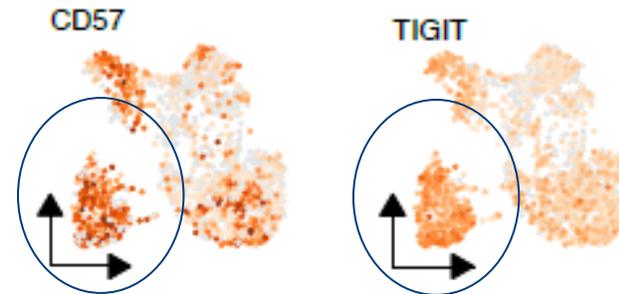
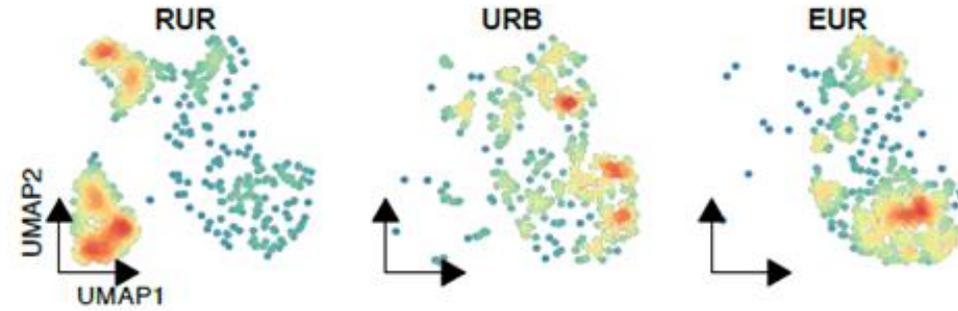
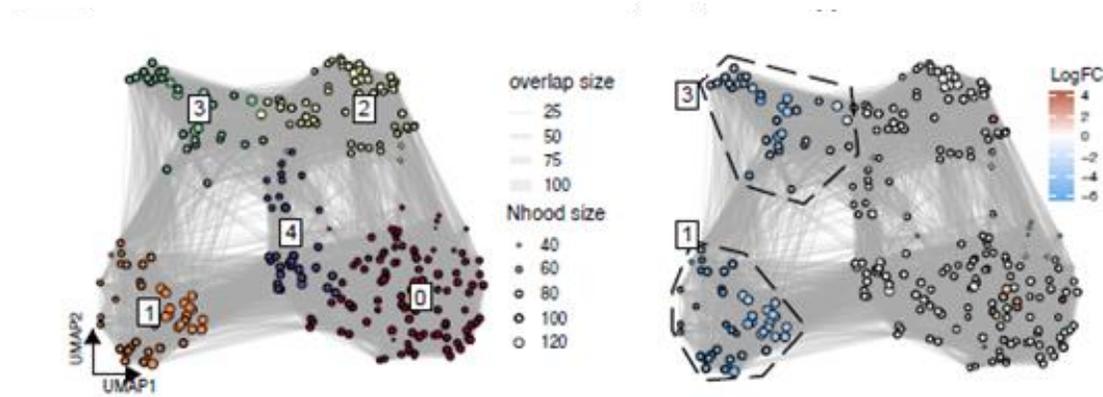
## a Between countries



## b Between semi-urban and rural



# Example: NK cells in a rural to urban gradient



The differentially expressed NK cells:  
rich in CD57 and TIGIT



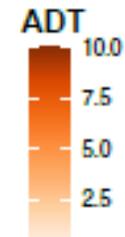
BRIEF DEFINITIVE REPORT

**Reduced Ebola vaccine responses in CMV<sup>+</sup> young adults is associated with expansion of CD57<sup>+</sup>KLRG1<sup>+</sup> T cells**

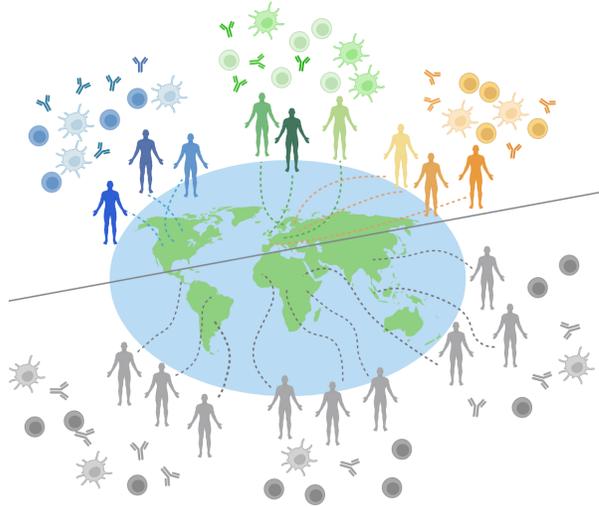
Georgina Bowyer<sup>1</sup>, Hannah Sharpe<sup>1</sup>, Navin Venkatraman<sup>1</sup>, Pierre Braham Ndaye<sup>1</sup>, Djibril Wade<sup>1</sup>, Nicole Brenner<sup>1</sup>, Alex Mentzer<sup>1</sup>, Catherine Mair<sup>1</sup>, Tim Waterboer<sup>1</sup>, Teresa Lambé<sup>1</sup>, Tandakha Dieye<sup>1</sup>, Souleymane Mboup<sup>1</sup>, Adrian V.S. Hill<sup>1</sup>, and Katie J. Ever<sup>1</sup>

**TIGIT expression levels on human NK cells correlate with functional heterogeneity among healthy individuals**

Feng Wang, Hongyan Hou, Shiji Wu, Qing Tang, Weiyong Liu, Min Huang, Botao Yin, Jing Huang, Lie Mao, Yanfang Lu and Ziyong Sun



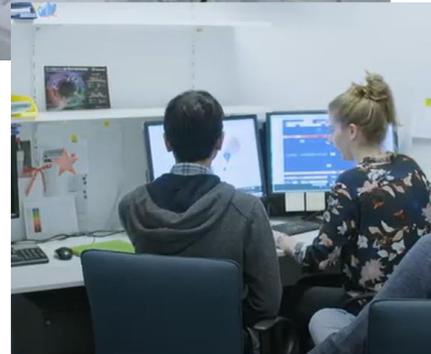
# Summary



- Including different populations in immunological profiling, will provide us with a more complete picture of the immune system
- New pathways can be identified that can help improve vaccine hypo-responsiveness in low- and middle-income regions of the world

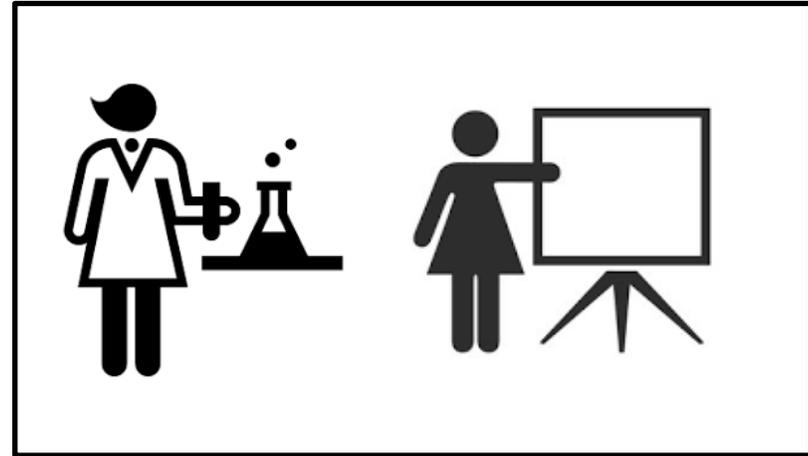
# HYPOVAX GLOBAL

Tackling Vaccine Hyporesponsiveness



# Specific Objectives

To support and champion women researchers



- To engage with partners from industry, policy-makers, funders and technology transfer experts ;
- To build a global network of researchers focused on understanding variations in vaccine
- To provide a robust platform that allows researchers to share their experiments, expertise, methodologies and data

