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# Opposing roles for sMAdCAM and IL-15 in COVID-19 associated cellular immune pathology [Get access >]

Amit Kumar Singh, Nandini Kasarpalkar, Shilpa Bhowmick, Gaurav Paradkar, Mayur Talreja, Karan Shah, Abhishek Tiwari, Harsha Palav, Snehal Kaginkar, Rajiv Kulkarni, Ashwini Patil, Varsha Kalsurkar, Sachee Agrawal, Jayanthi Shastri, Rajesh Dere, Ramesh Bharmal, Smita D Mahale, Vikrant M Bhor ✉, Vainav Patel ✉
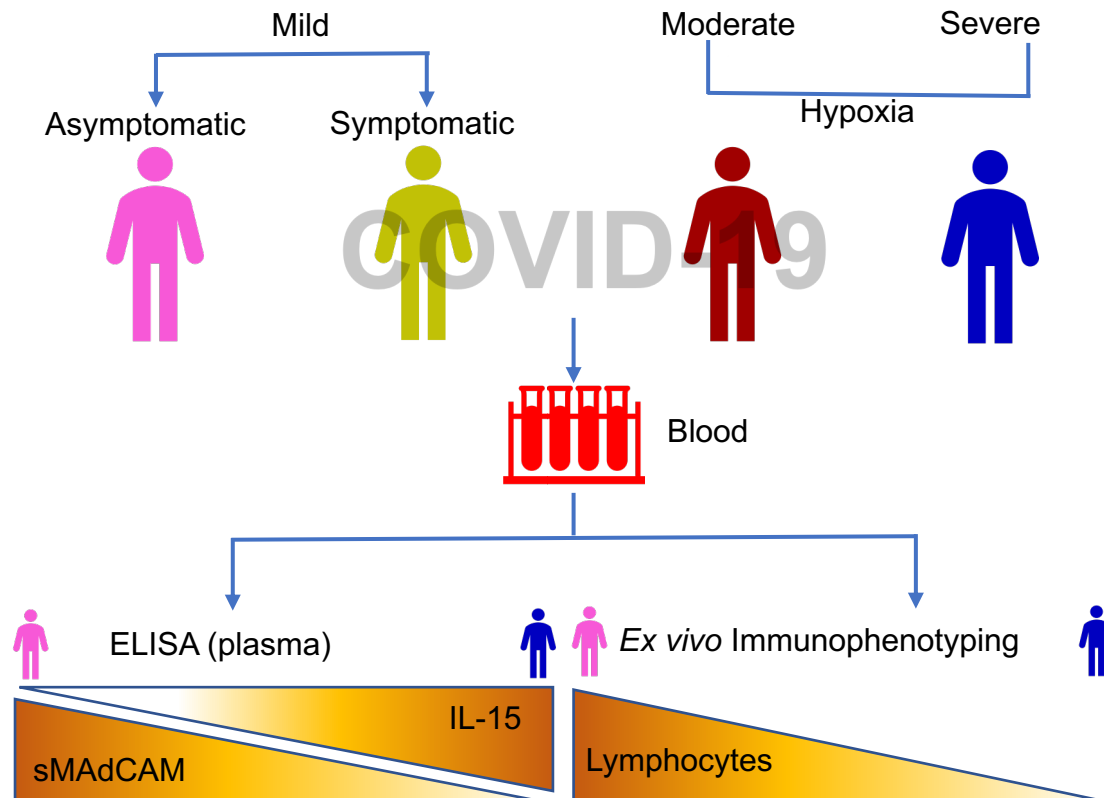
- Lymphopenia negatively correlated with sMAdCAM and positively with IL-15
- Elevated intermediate monocyte frequency (pan disease signature)
- Sparing of Treg and CD8 Effector Memory subsets
- Lower IL-15 corresponds to shorter hospitalization

Integrated viral and immune monitoring in a prospective COVID-19 cohort from India
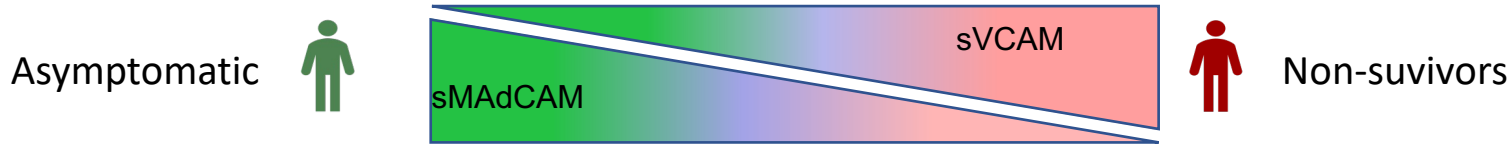
Mild Asymptomatic

Mild Symptomatic

COVID-19

Hypoxic Survivors

Hypoxic non-suvivors

Hospitalization → Follow up at home
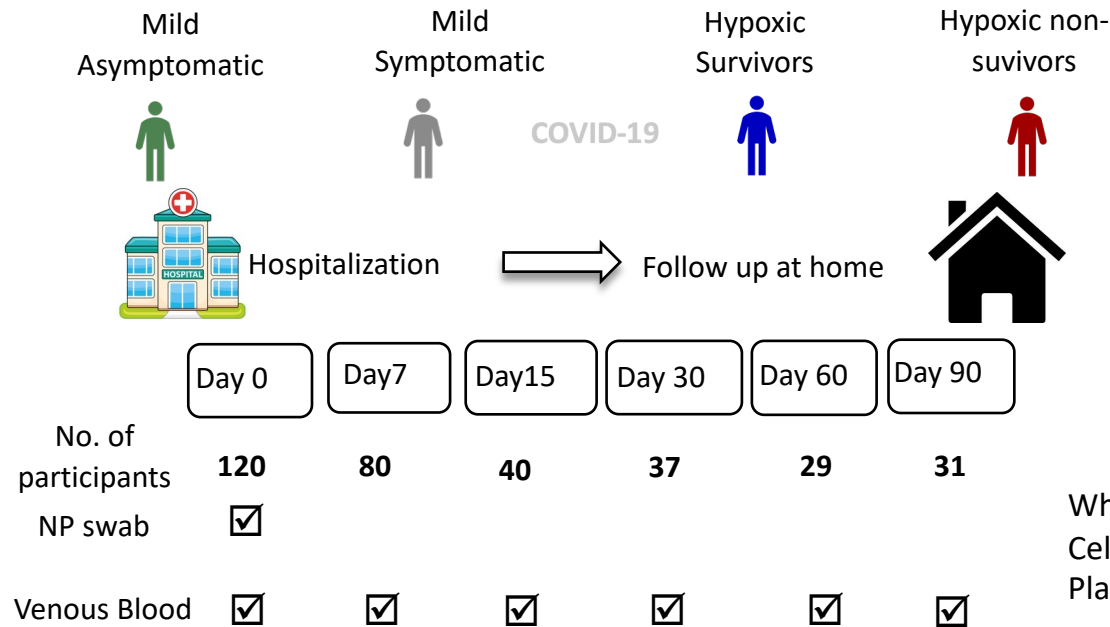
Agrawal, Kasarpalkar, et al.
https://doi.org/10.1093/jleuko/qiae187

|	Day 0	Day7	Day15	Day 30	Day 60	Day 90
No. of participants	120	80	40	37	29	31
NP swab	☑					
Venous Blood	☑	☑	☑	☑	☑	☑

Whole blood *ex vivo* immunophenotyping: Cellular subsets.
Plasma: CLIA, ELISA neutralization assay.

Findings

- 51 participants received at least one indigenous vaccine dose (Covishield/Covaxin)

- Non-survivors did not restore circulating B and NK cells and were largely unvaccinated

- Delta variants of SARS-CoV-2 clearly demonstrated increased pathogenicity

Asymptomatic

sVCAM

sMAdCAM

Non-suvivors
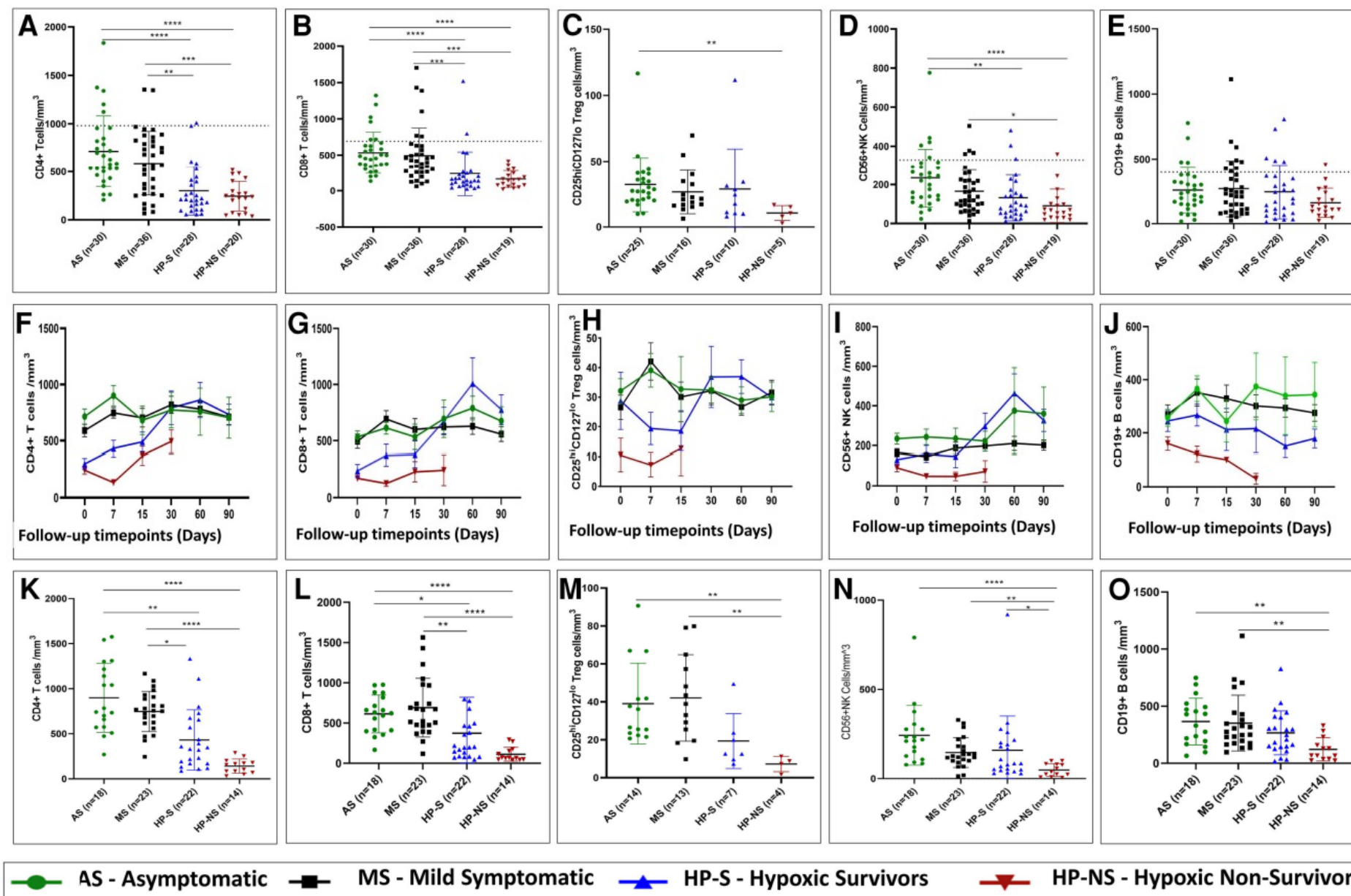
Fig 3 : **Distribution of absolute counts of different immune cell subsets among study participants**: (A–E) variation across asymptomatic (AS), mild symptomatic (MS), HP-S, and HP-NS individuals at day 0 (D0); (F–J) longitudinal follow-up of immune subsets from D0 to D90 at specified timepoints. Timepoints in HP-NS individuals were curtailed due to mortality in this group by D15. (K–O) Variation across AS,MS, HP-S, and HP-NS individuals at D7 when highest apparent divergence and maximum availability of follow-up data across groups were available. Statistical significance was calculated by nonparametric1-way analysis of variance (Kruskal–Wallis test) followed by post hoc Dunn's test.*P < 0.05; **P < 0.01,***P < 0.001; ****P < 0.001.
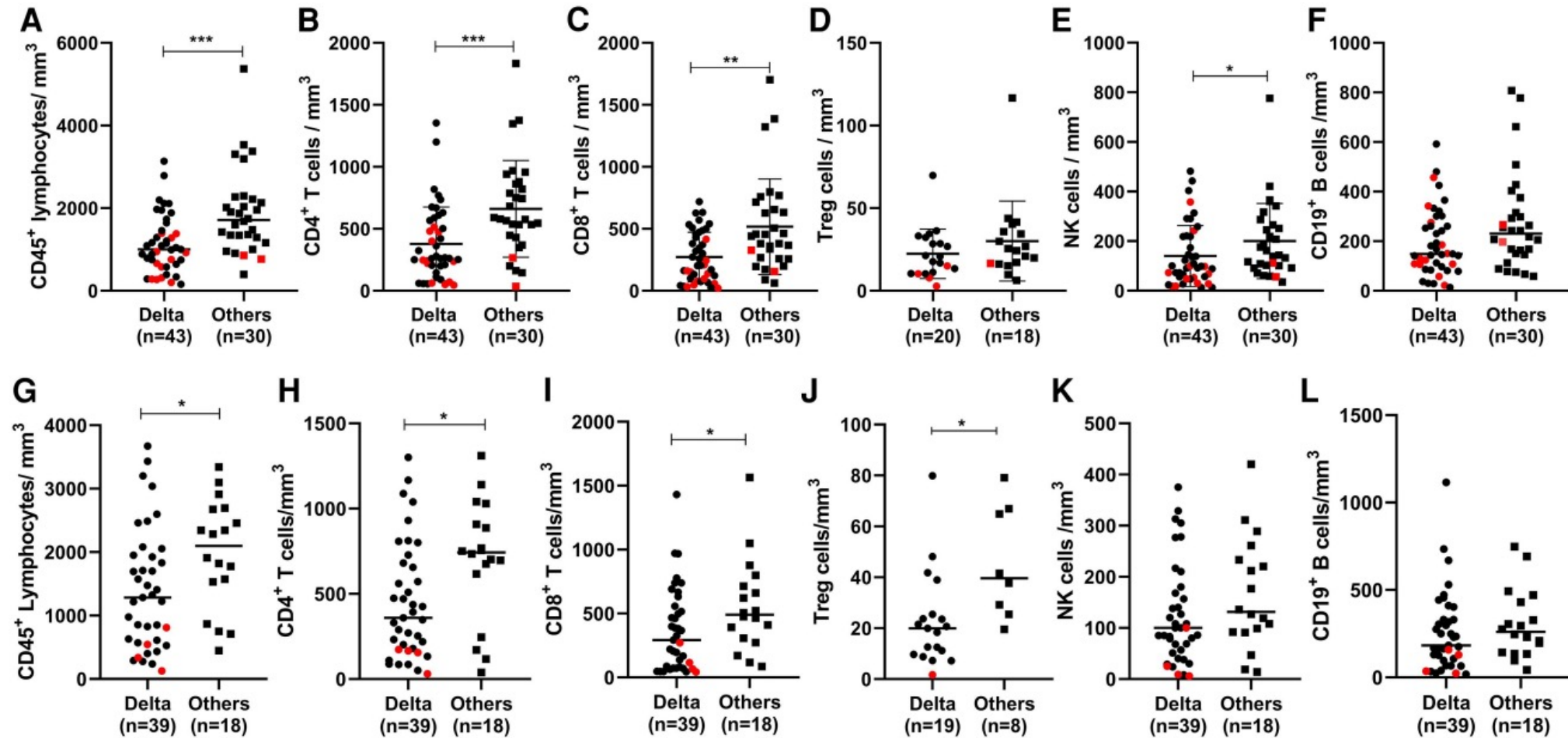
Fig 5: **Comparative analysis of absolute no. of different immune cell subsets between groups infected by Delta vs non-Delta subtypes:** (A–F) Variation of mentioned immune subsets at day 0. (G–L) Variation of mentioned immune subsets at day 7. Black datapoints indicate survivors and red datapoints indicate non survivors. Statistical significance was calculated by Mann-Whitney U test.*P < 0.05; **P < 0.01; ***P < 0.001.

RESPONSE to NIPAH 2023 outbreak

15th September, 2023 (Morning): Request from Dr. Nivedita Gupta, Chief, ECD, ICMR and Dr. Pragya Yadav, Group Leader, Maximum Containment Laboratory, ICMR- NIV, Pune regarding need to understand the viral pathology and associated immune signatures

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Decision taken to conduct immune monitoring studies on samples from Nipah exposed/infected individuals **at ICMR-NIV (MCC), Pune BSL-4 Facility** by Dr. Vainav Patel and team (**Ms. Harsha Palav** (Ph.D. Scholar); **Mr. Nandan Mohite** (Ph.D. Scholar); **Mr. Pranay Gurav** (Research Assistant); **Ms. Denna Sarah** (FACS Operator) in collaboration with Dr. Pragya Yadav and team

⬇

17th September, 2023: The team from ICMR-NIRRCH left from Mumbai to ICMR-NIV, Pune. Protocol for sample collection, safe transport, sample processing and storage created and finalized including **PAPR** training with all protective apparel was conducted**.**

⬇

18th September, 2023: Commencement of Immune monitoring:
Panels used: **Absolute count panel (T, B, NK, Mono, Grans)**
       T-cell Activation & Treg panel
       Plasma blast & homing panel

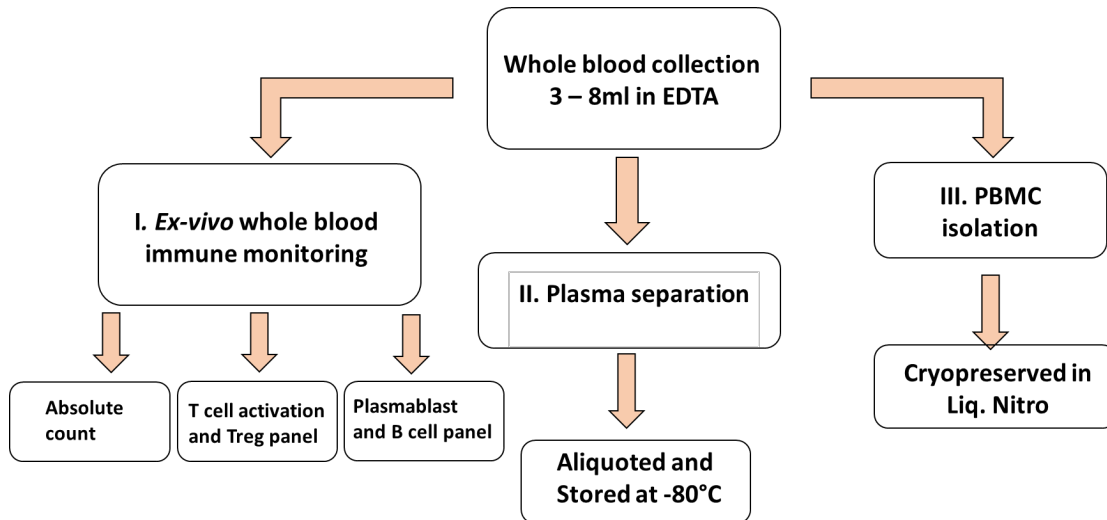PAPR: Powered Air Purifying Respirator training

ICMR- NIRRCH NIPAH TEAM

19th September 2023: Blood samples from 2 infected individuals were received and processed in BLS-4 facility and successfully subjected to ex-vivo immunophenotyping; PBMC and plasma was stored for further analysis.

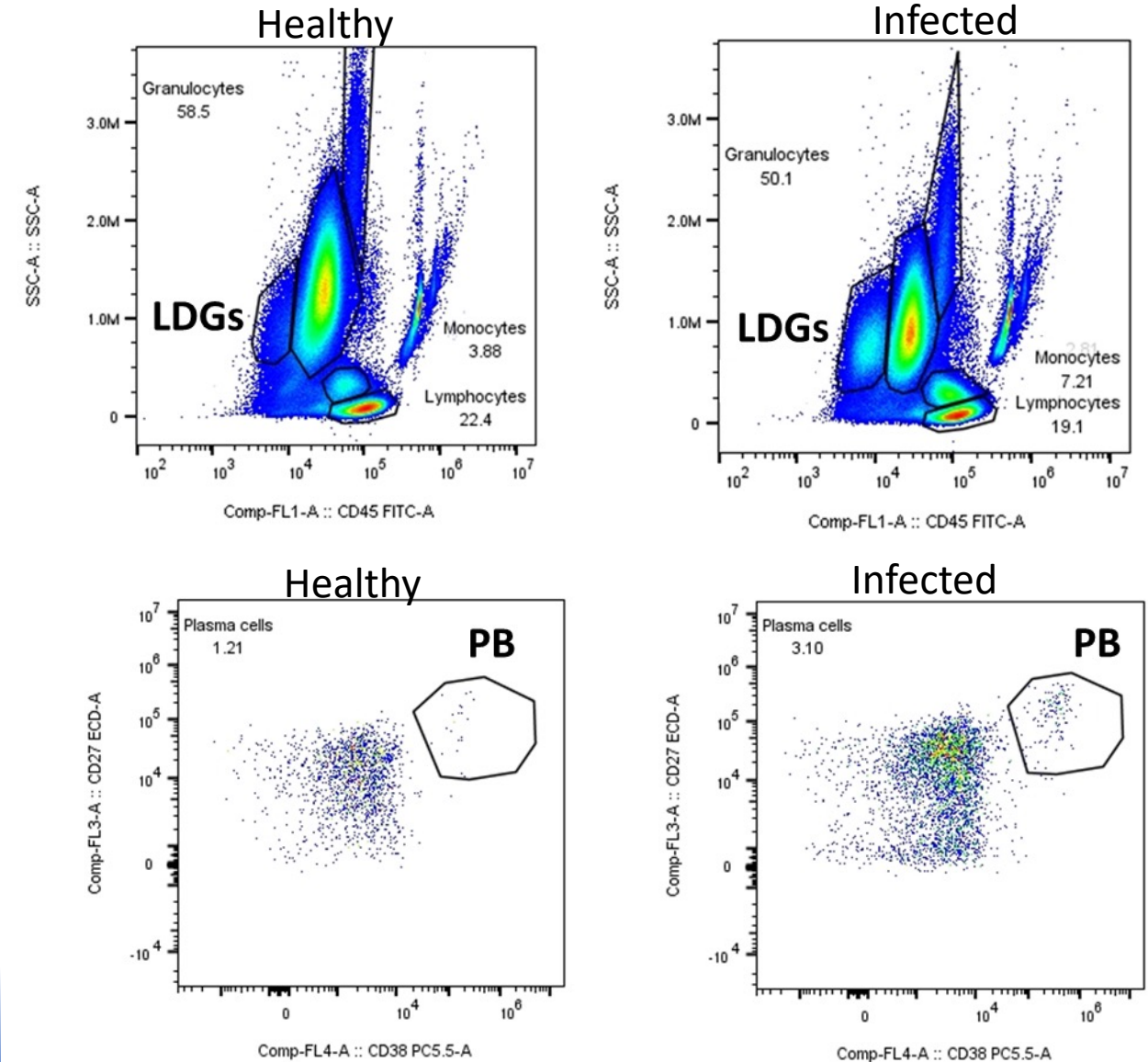**21st September 2023:** A sample from a 3rd exposed individual was received and processed alongside a healthy sample.

27th September 2023 & 13th October 2023: Follow-up samples received and processed along with healthy samples

Work flow

Whole blood collection 3 – 8ml in EDTA

I. *Ex-vivo* whole blood immune monitoring

Absolute count

T cell activation and Treg panel

Plasmablast and B cell panel

II. Plasma separation

Aliquoted and Stored at -80°C

III. PBMC isolation

Cryopreserved in Liq. Nitro

Preliminary results

Increased Low Density Granulocytes (LDGs) & Plasmablasts (PB) observed in patients

Healthy

Granulocytes 58.5

LDGs

Monocytes 3.88

Lymphocytes 22.4

Infected

Granulocytes 50.1

LDGs

Monocytes 7.21

Lymphocytes 19.1

Healthy

Plasma cells 1.21

PB
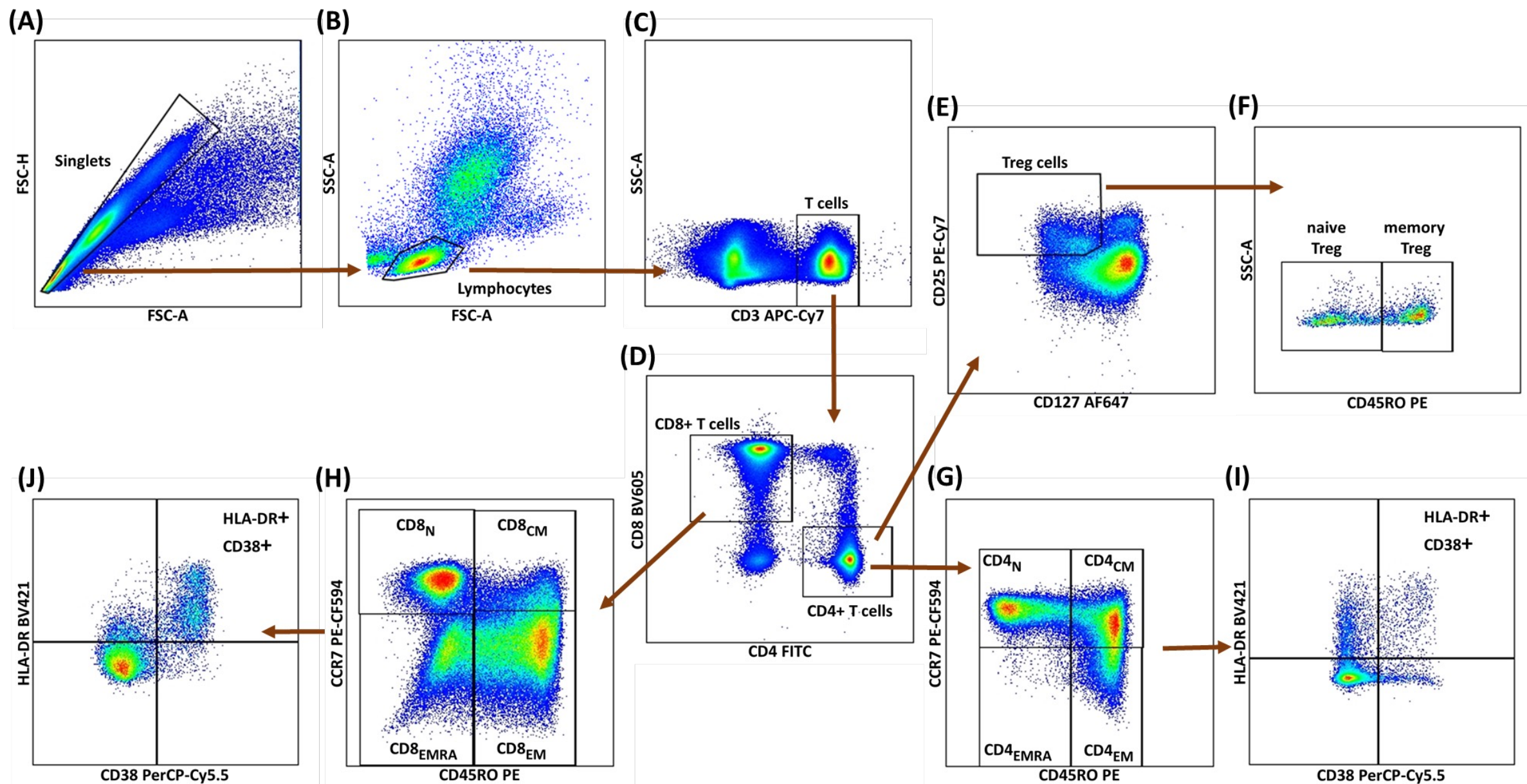
Infected

Plasma cells 3.10

PB

Figure S1. Representative flow cytometric gating strategy for lymphocytes, monocytes, neutrophils, eosinophils, NK cells, NKT like cells and subsets within these cells.
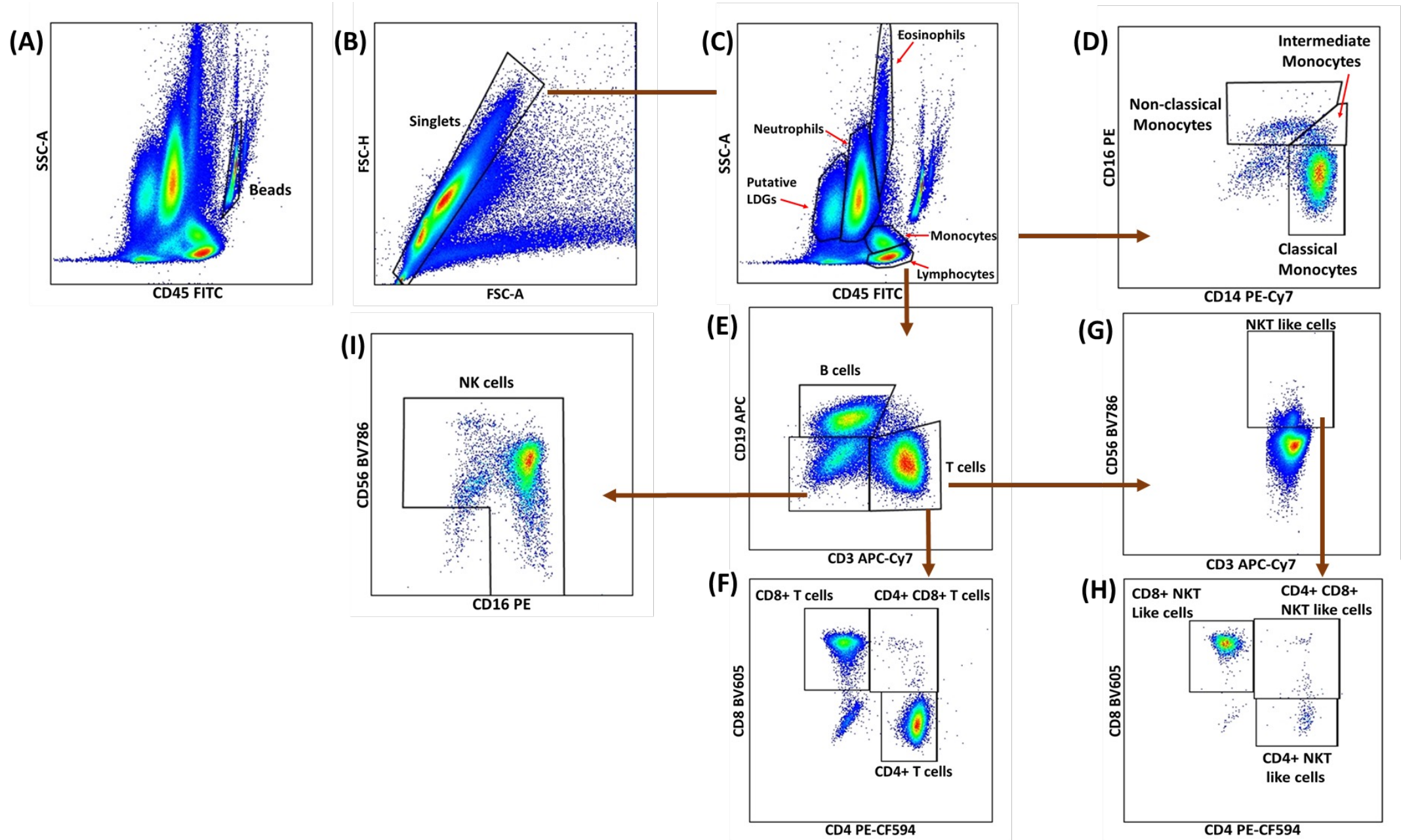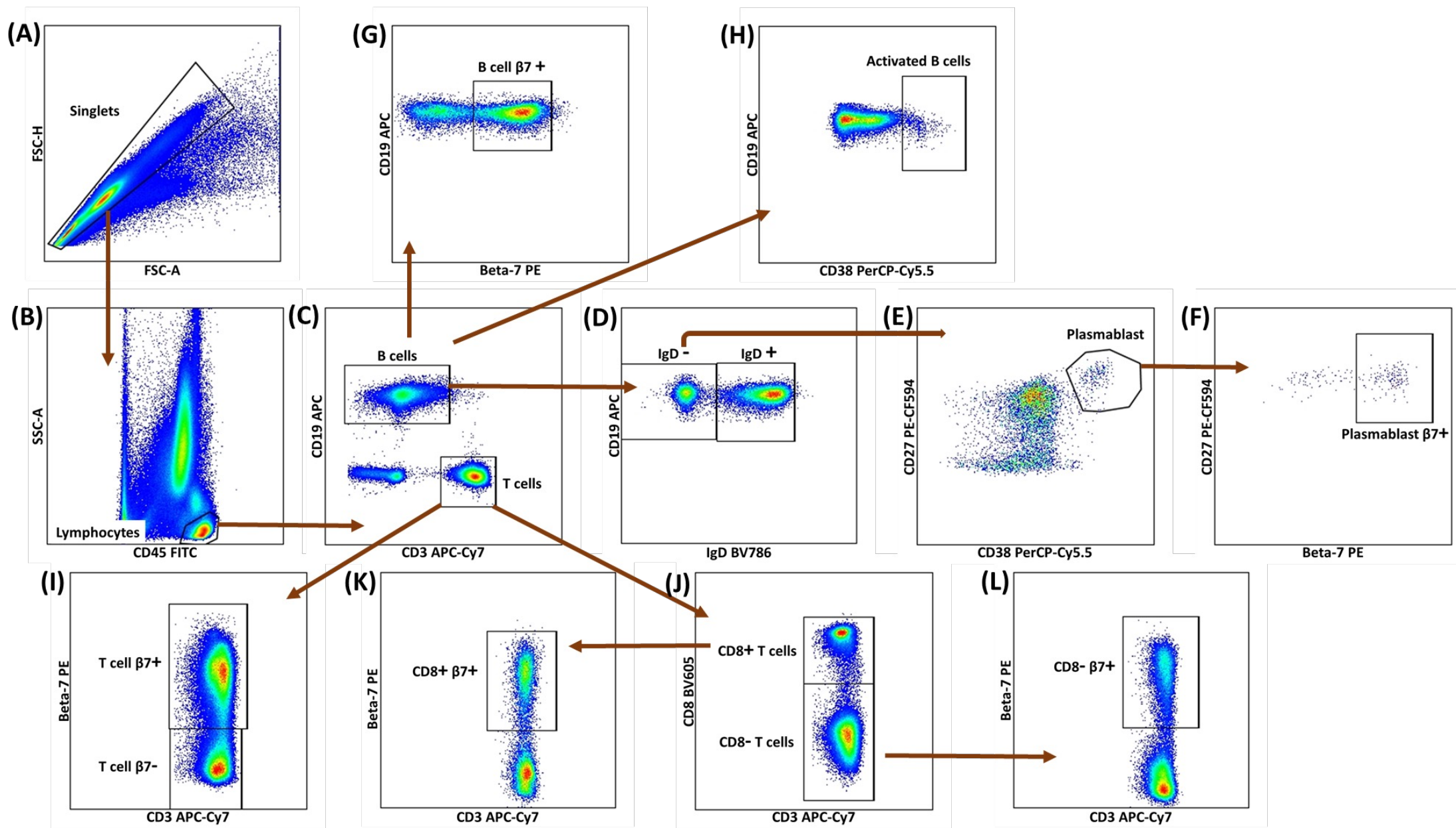
Figure S2. Representative flow cytometric gating strategy for CD4+ and CD8+ T cell subsets.

Figure S3. Representative flow cytometric gating strategy for detection of plasmablast and expression of integrin Beta-7 within different cell population.

RESEARCH ARTICLE | 🔒 Full Access

Comparative immune profiling in survivors of the 2023 Nipah outbreak in Kerala state, India

Rima R. Sahay, Harsha C. Palav, Anita M. Shete, Deepak Y. Patil, Sreelekshmy Mohandas, Chandni Radhakrishnan, P. Shihabudheen, Anoop Kumar, Anitha Puduvail Moorkoth, Nandan Mohite, Pranay Gurav, Niyas K. Pullor, Rajlaxmi Jain, Yash Joshi, Lathika Velichapat Ramakrishnan, Nivedita Gupta, Vainav Patel ✉, Pragya D. Yadav ✉

... See fewer authors ∧