NASA HRP INVESTIGATORS MEETING

INTEGRATED IMMUNE

February 2, 2009

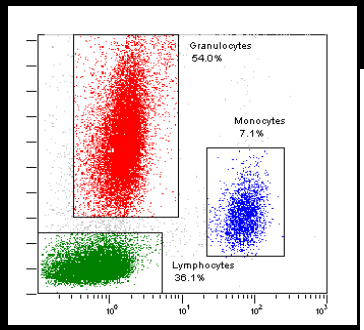
Objectives

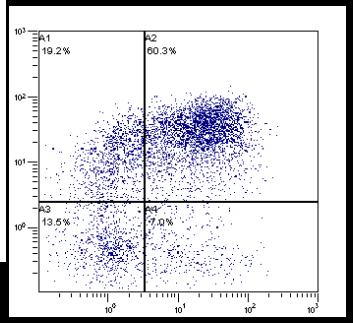
- Address significant lack of data regarding immune status *during* flight.
- Replace several recent immune studies with one comprehensive study that will include in-flight sampling.
- Determine the in-flight status of immunity, physiological stress, viral immunity/reactivation.
- Determine the clinical risk related to immune dysregulation for exploration class spaceflight.
- Determine the appropriate monitoring strategy for spaceflight-associated immune dysfunction, that could be used for the evaluation of countermeasures.

ASSAYS FOR ***INTEGRATED IMMUNE***

JSC Immunology Laboratory

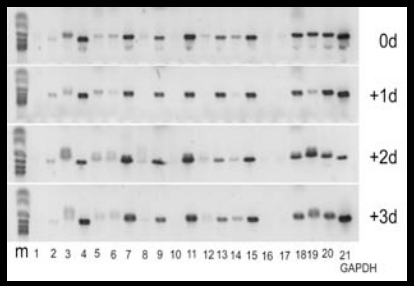
- Leukocyte subsets
- T cell function
- Intracellular/secreted cytokine profiles





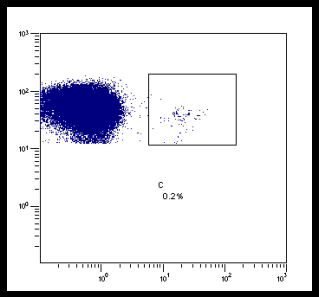
Mercer University

- Plasma cytokine balance
- Leukocyte cytokine RNA



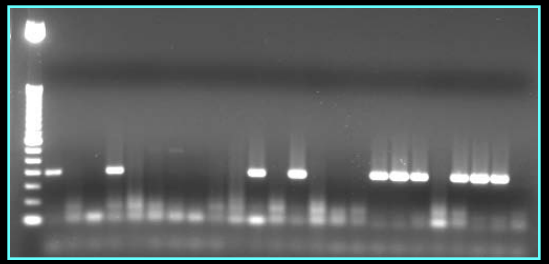
Microgen Laboratories

- Virus specific T cell number
- Virus specific T cell function
- Plasma stress hormones



JSC Microbiology Laboratory

- Latent herpesvirus reactivation (saliva/urine)
- Saliva/urine stress hormones
- Circadian rhythm analysis



INTEGRATED IMMUNE – EXPERIMENT TEAM













NASA SMO-015/SDBI-1900

SUBJECTS

Completed to date:

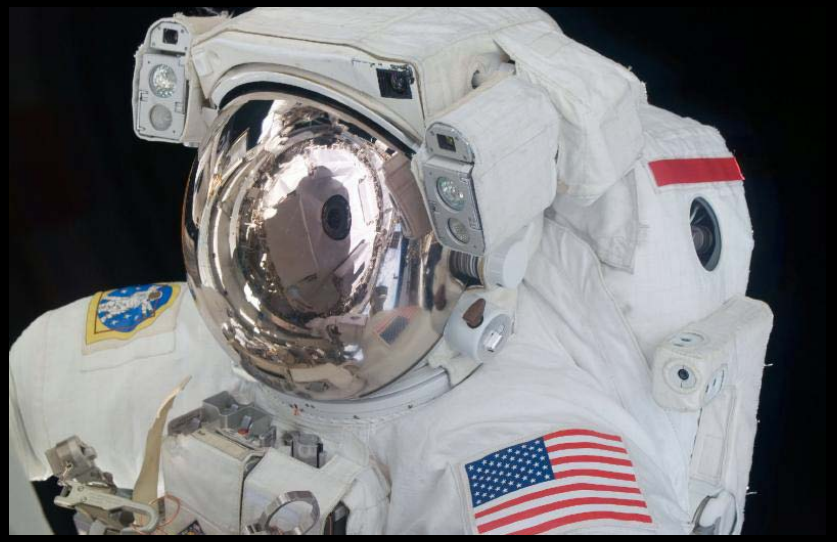
10 Short duration

5 Long duration

Total ‘n’:

17 Short duration

17 Long duration

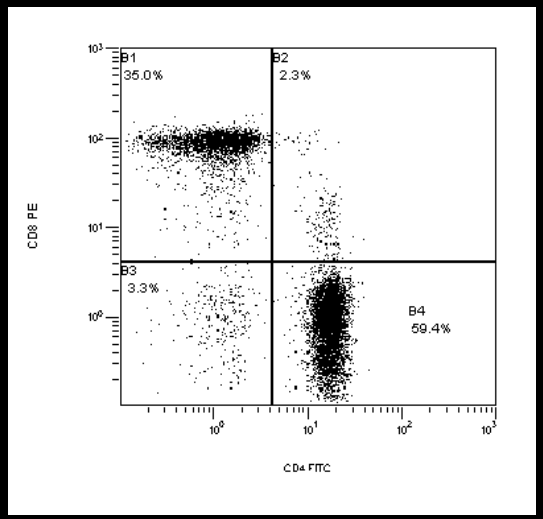


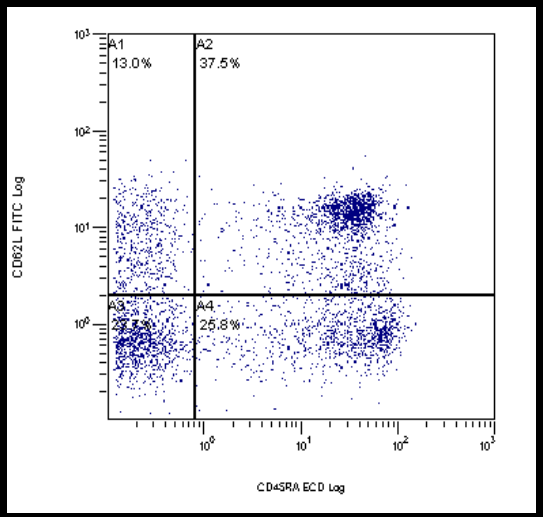

WHEELOCK PARAZYNSKI MELROY ZAMKA WILSON NESPOLI
TANI
STS-120

A. Immunophenotype, T cell function, intracellular/secreted cytokine profiles.

LEUKOCYTE SUBSET DISTRIBUTION

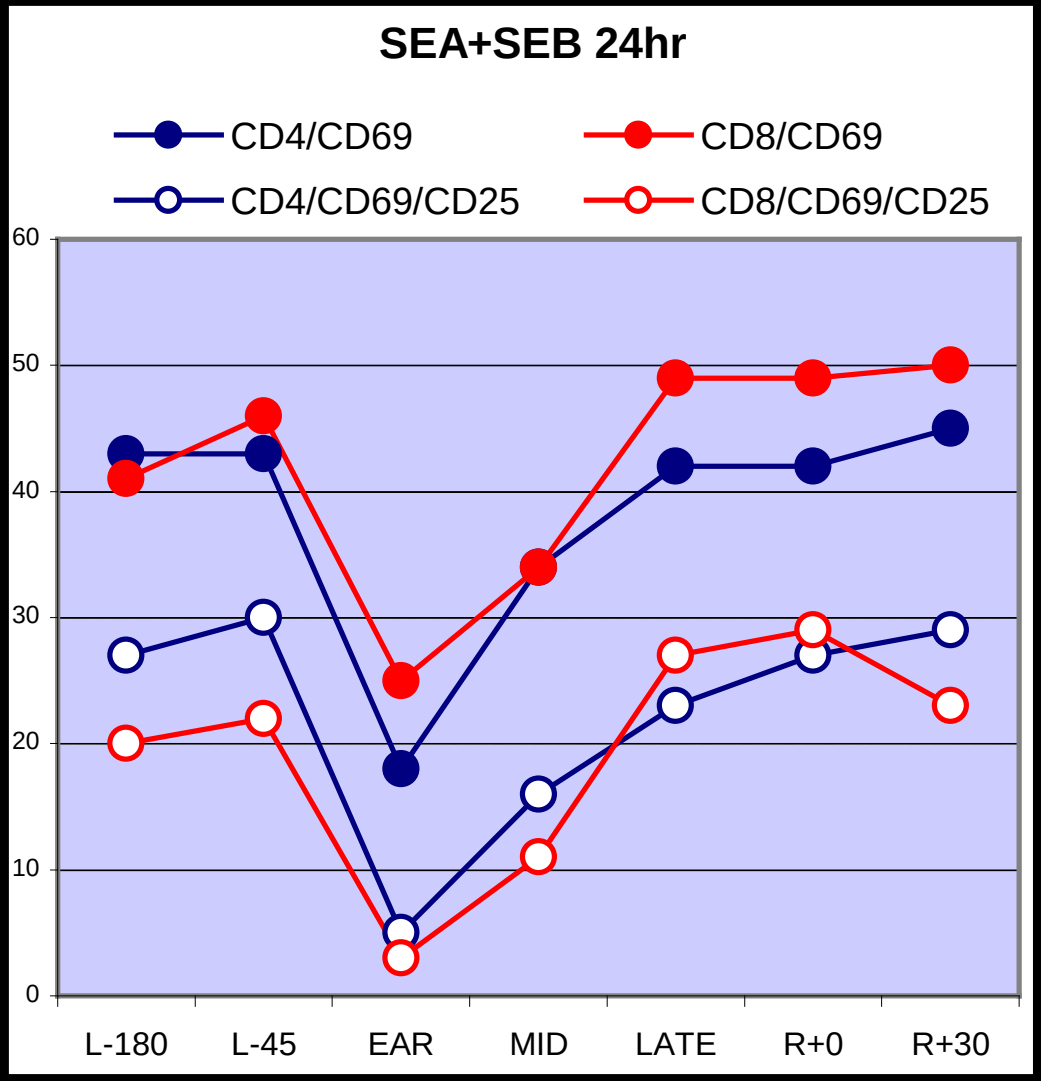
- No in-flight changes in bulk leukocyte subsets
- Post-flight granulocytosis
- Late in-flight/postflight elevated B cells, reduced NK cells
- In-flight, post-flight trend towards elevated CD4:CD8 ratio, elevated memory T cell subsets
- Elevated effector memory, central memory in-flight
- No change in peripheral constitutively activated T cells

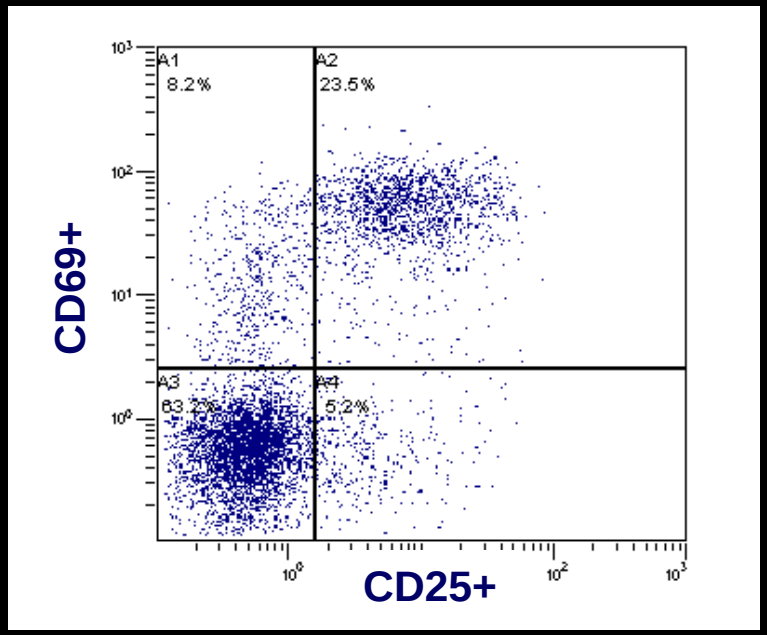




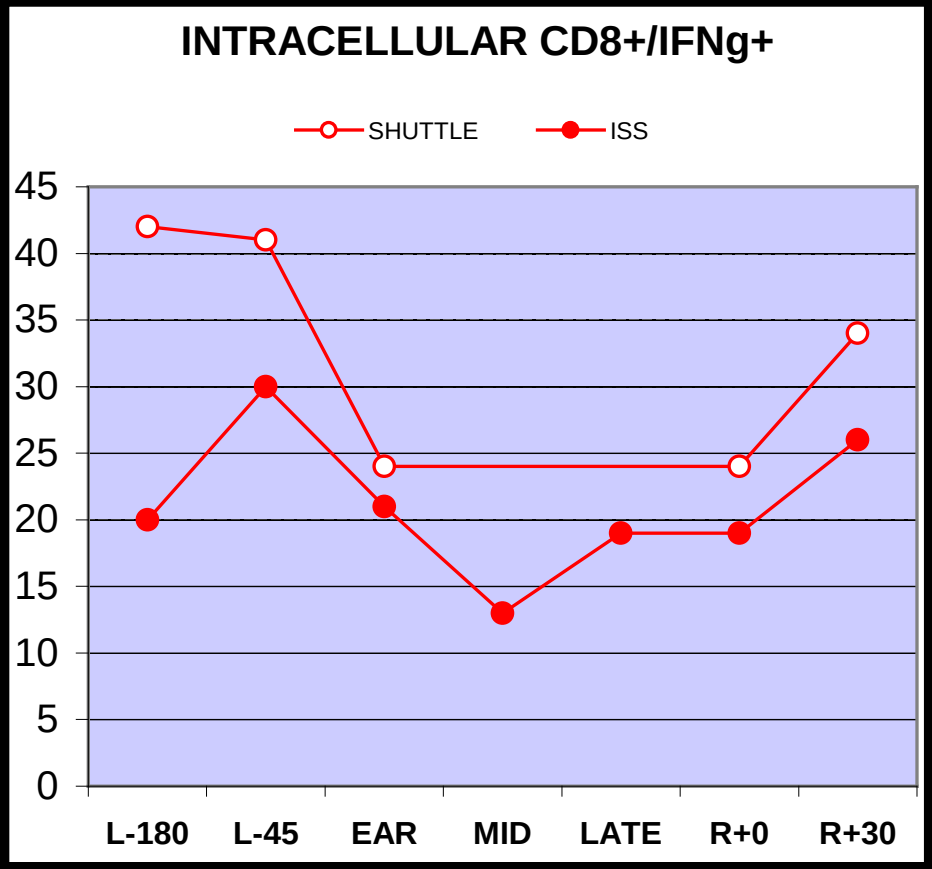
CD8+ T CELL FUNCTION: A+B 24 hours

ISS

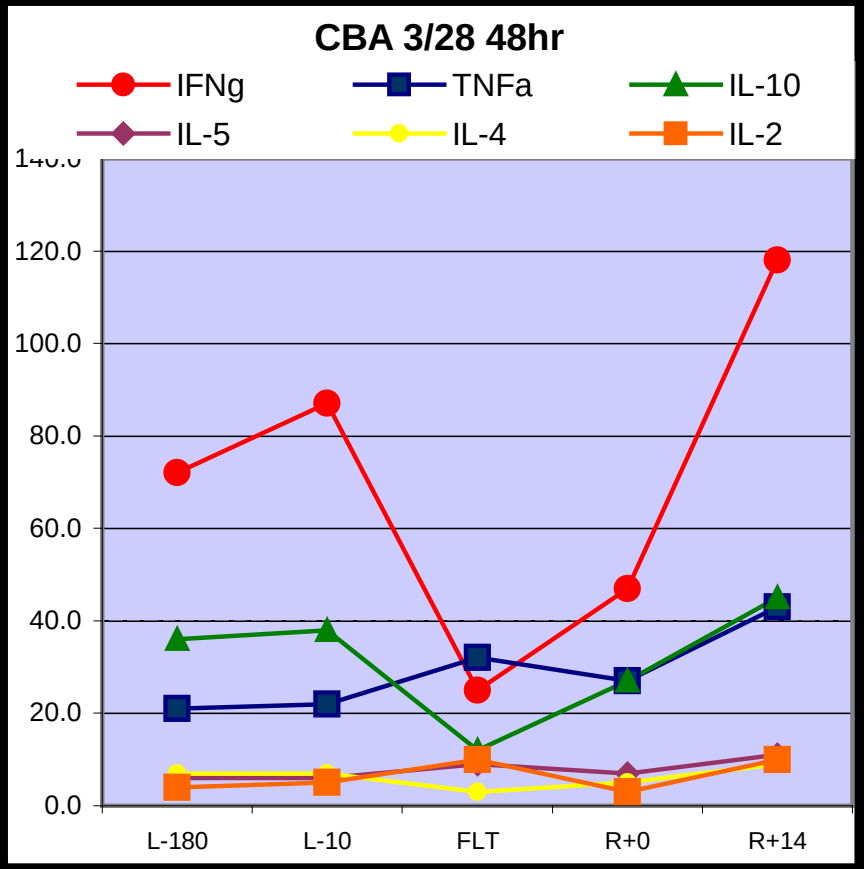




CD8+ T cell – Intracellular IFNg

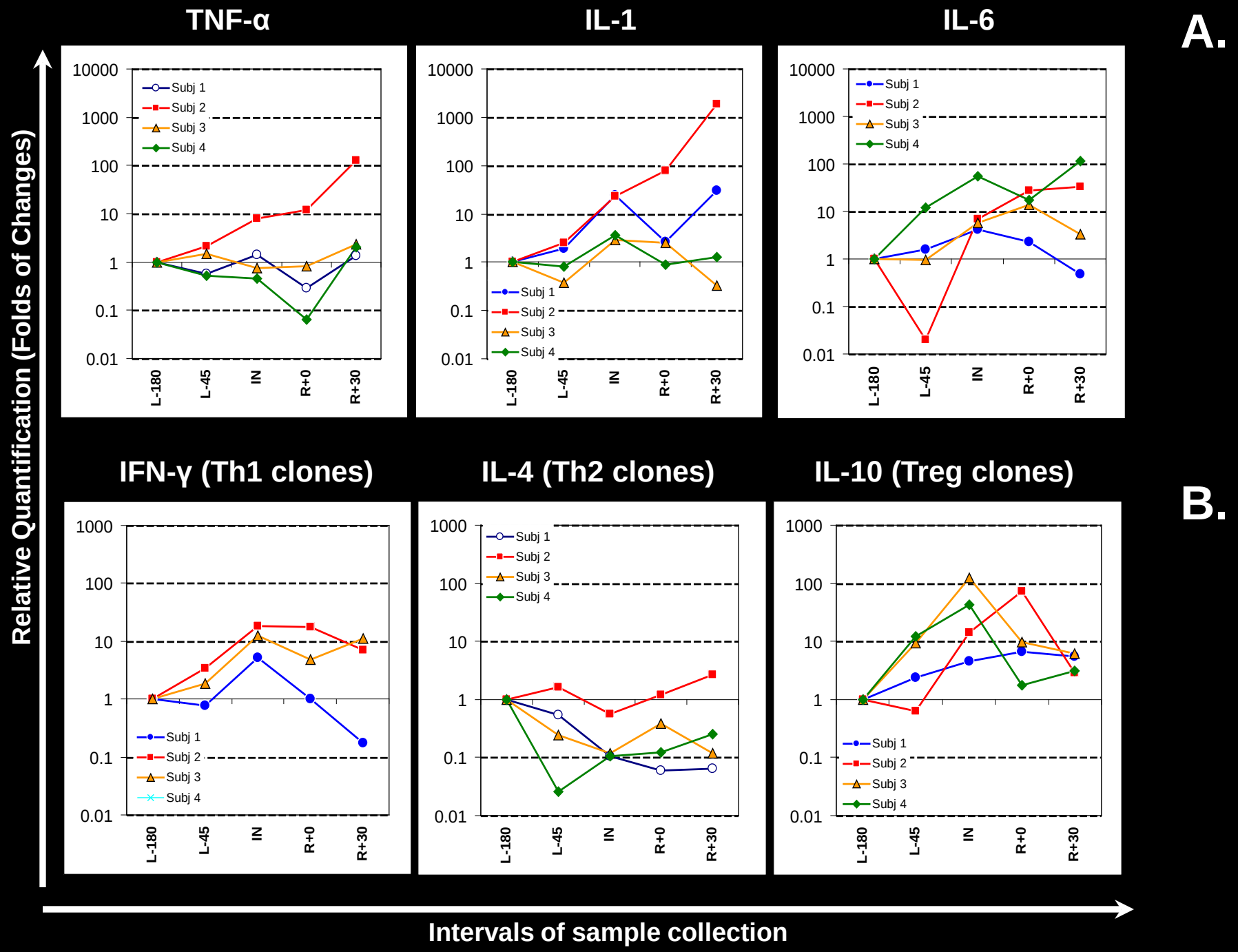


Secreted Cytokine Profiles (CD3/CD28 48hr)

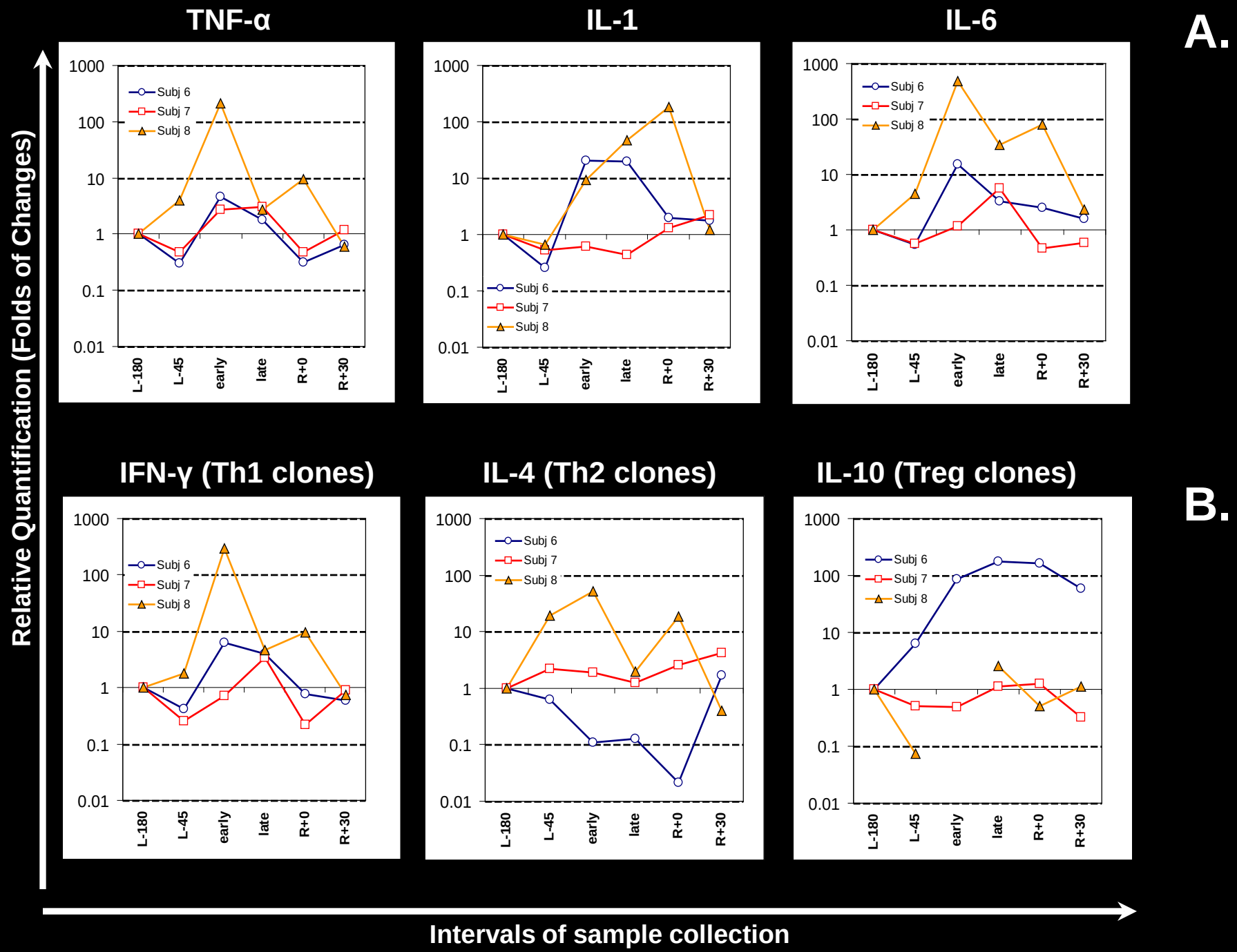


B. Leukocyte cytokine mRNA

Gene Expression of Markers of Innate (A) and Adaptive (B) Immune Responses (short-duration flights).



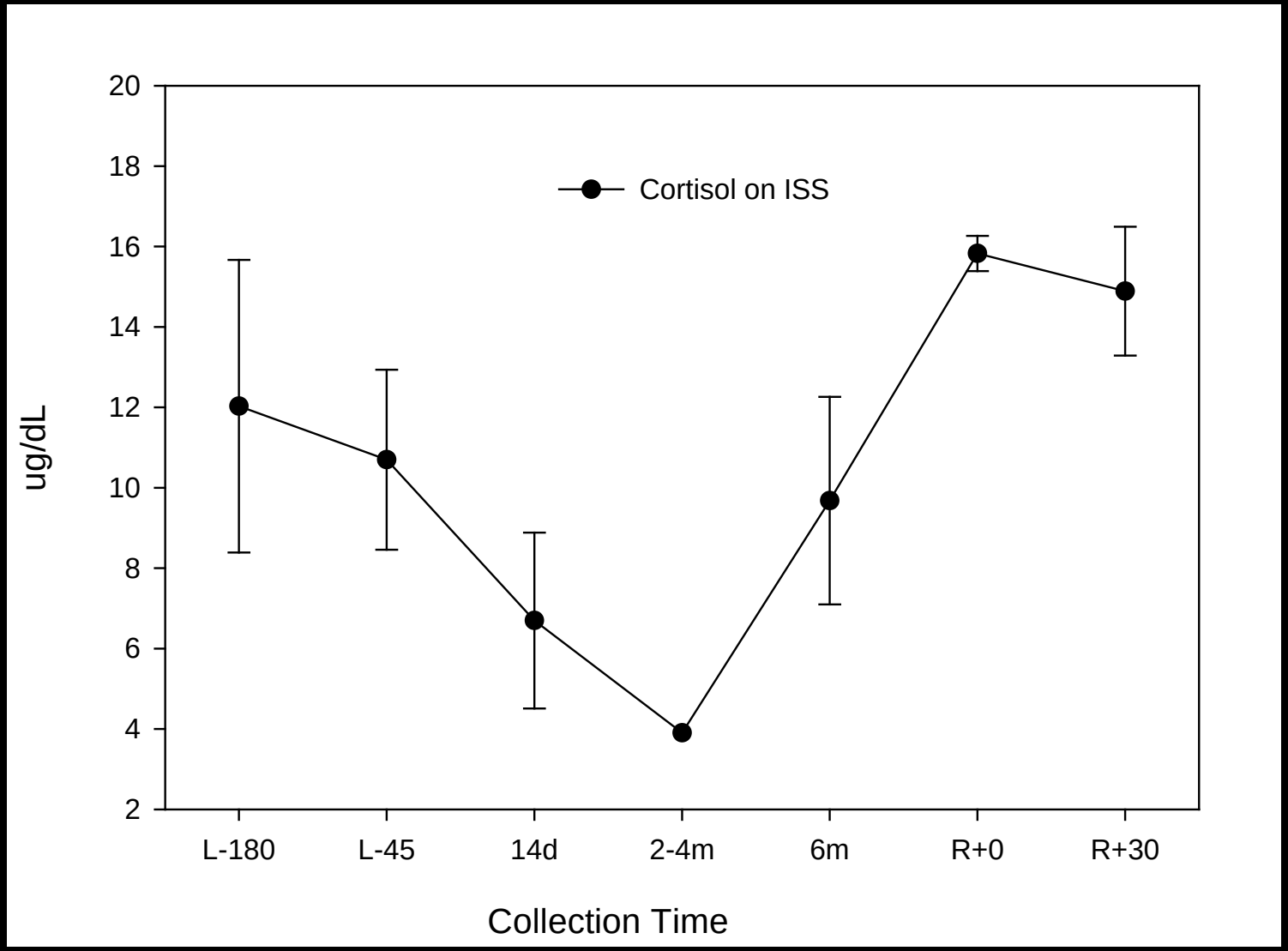
Gene Expression of Markers of Innate (A) and Adaptive (B) Immune Responses (long-duration flights).



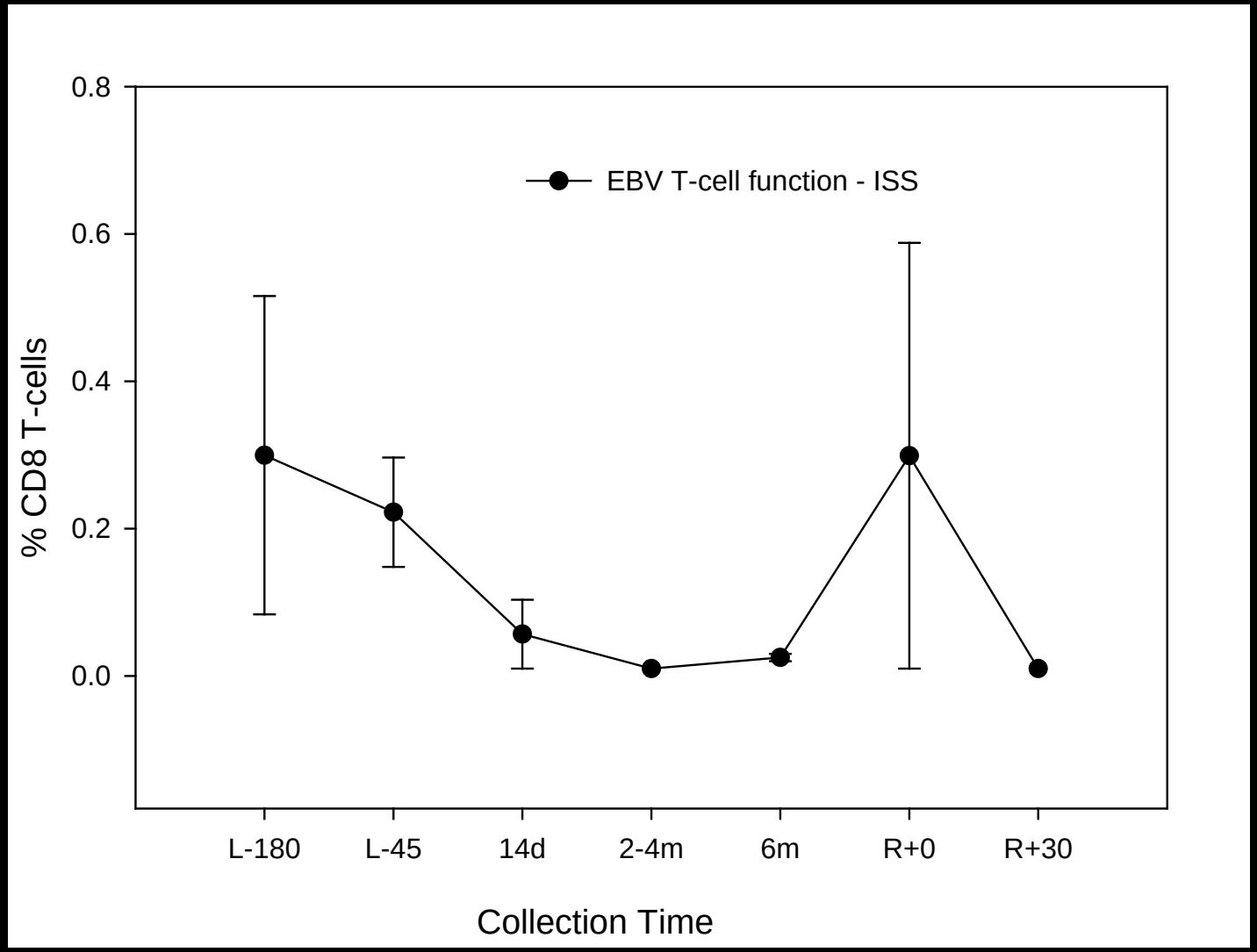
C. Virus specific T cell number,
function, plasma stress hormone levels.

Microgen Laboratories

Plasma cortisol levels - ISS



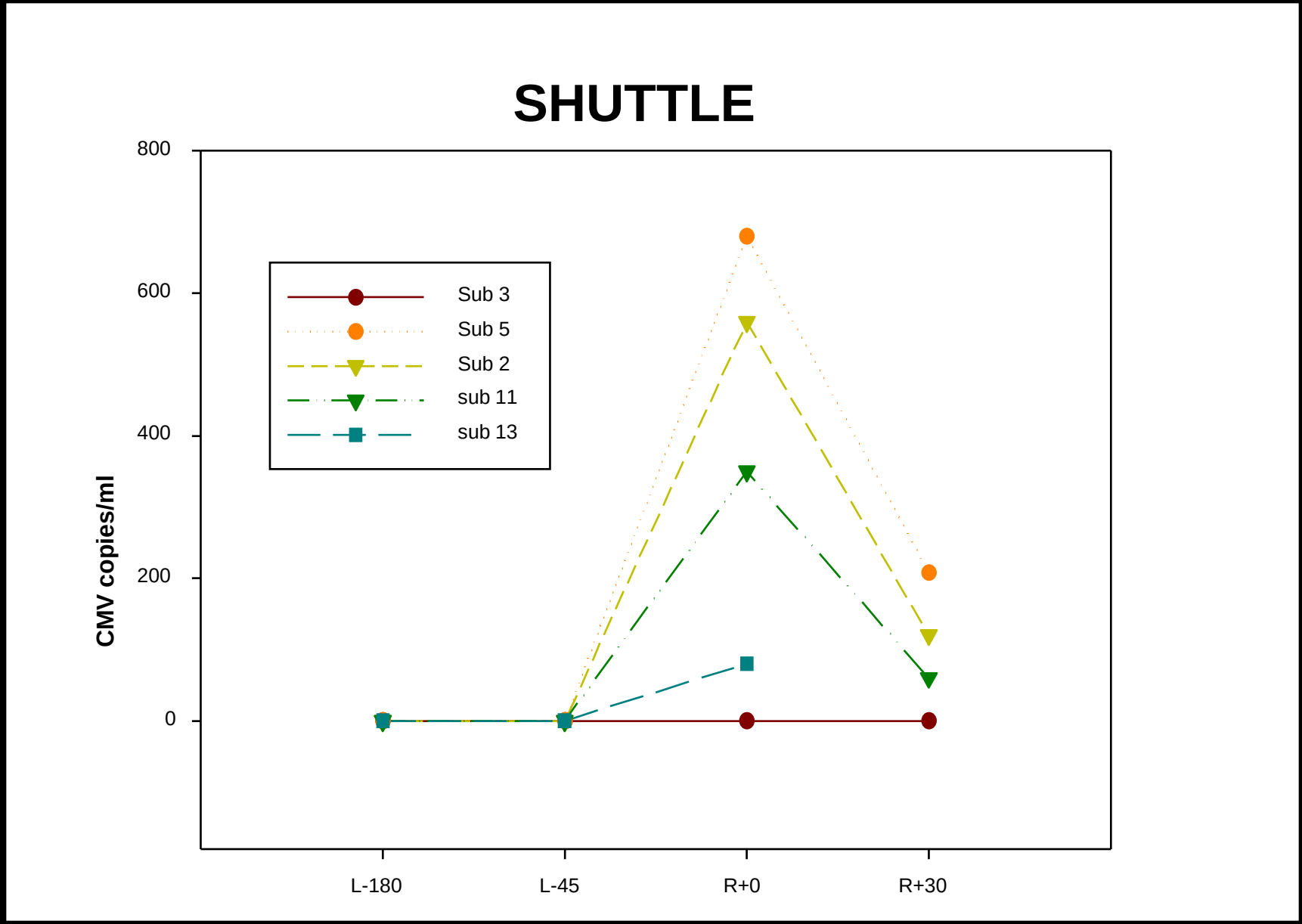
EBV T cell function - ISS



D. Latent herpesvirus reactivation (saliva/urine), saliva/urine stress hormones, circadian rhythm analysis.

JSC Microbiology Laboratory

Urine CMV Assessment



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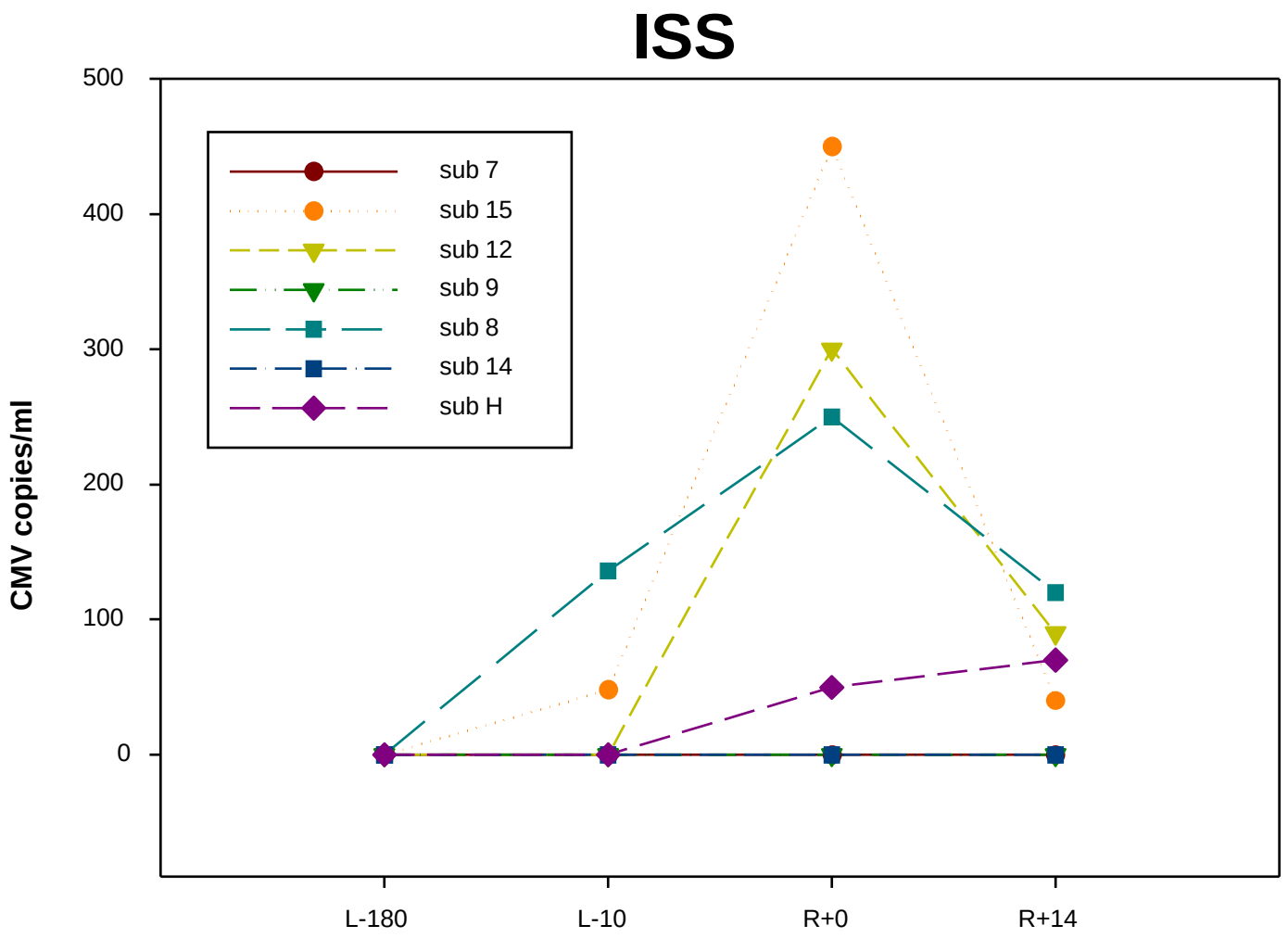
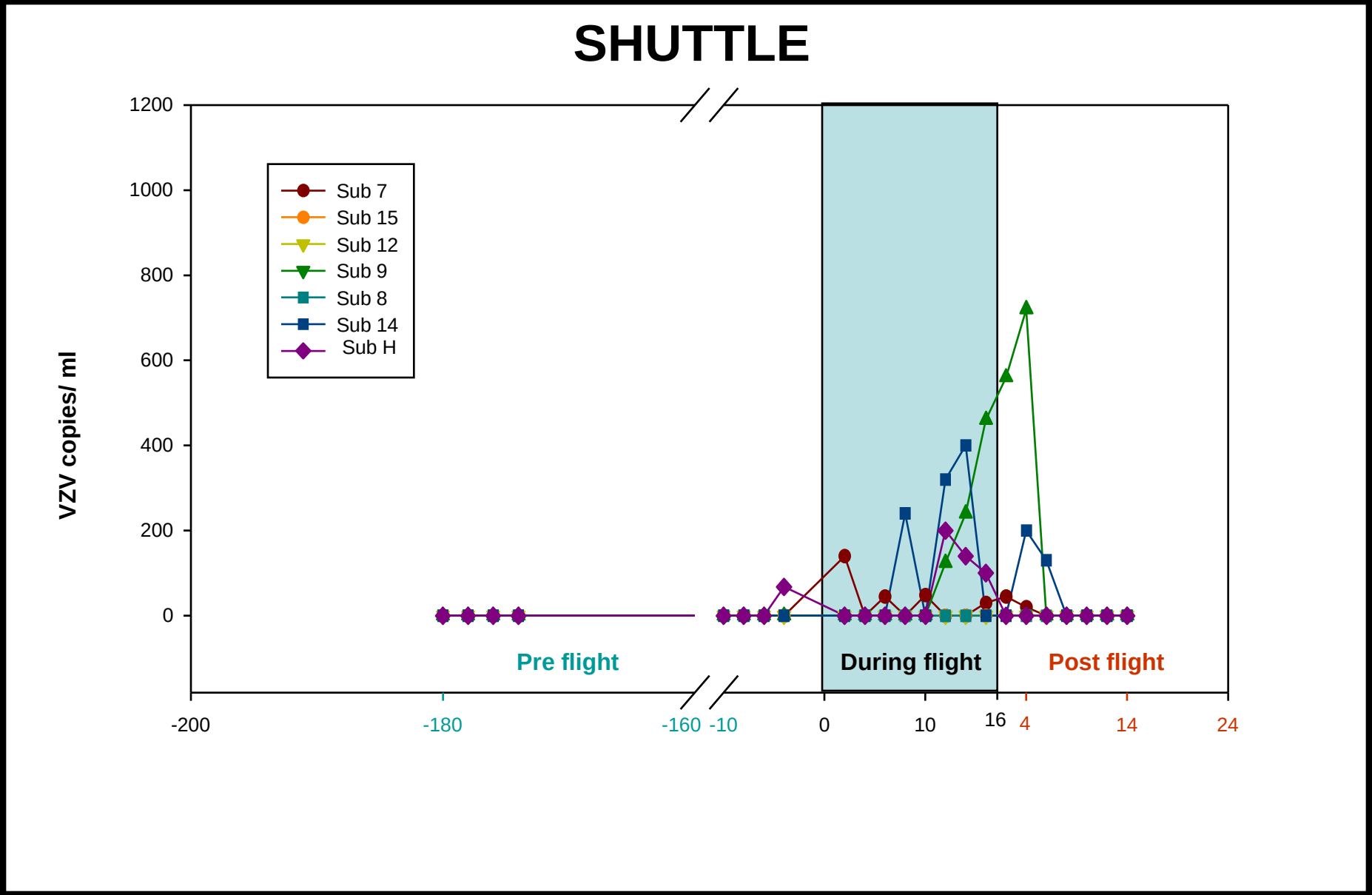
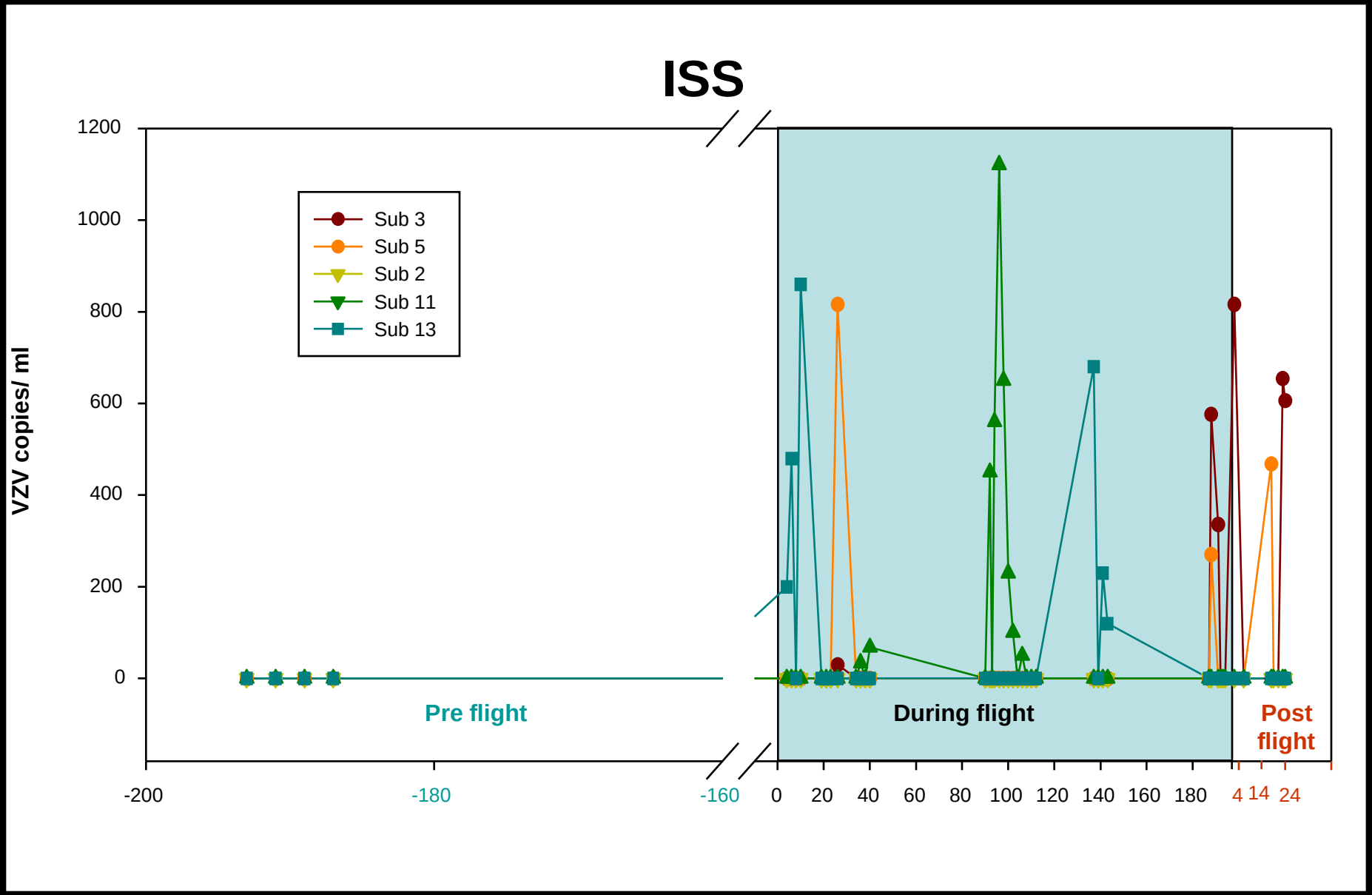


Saliva VZV Assessment



Saliva VZV Assessment



Questions?