

Immune system dysregulation and latent herpesvirus reactivation during winterover at Concordia Station, Dome C, Antarctica.

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Immune system dysregulation occurs during spaceflight and consists of altered peripheral leukocyte distribution, reductions in immunocyte function and altered cytokine production profiles. Causes may include stress, confinement, isolation, and disrupted circadian rhythms. All of these factors may be replicated to some degree in terrestrial environments. NASA is currently evaluating the potential for a ground-based analog for immune dysregulation, which would have utility for mechanistic investigations and countermeasures evaluation.

For ground-based space physiology research, the choice of terrestrial analog must carefully match the system of interest. Antarctica winter-over, consisting of prolonged durations in an extreme/dangerous environment, station-based habitation, isolation and disrupted circadian rhythms, is potentially a good ground-analog for spaceflight-associated immune dysregulation. Of all Antarctica bases, the French-Italian *Concordia Station*, may be the most appropriate to replicate spaceflight/exploration conditions. Concordia is an interior base located in harsh environmental conditions, and has been constructed to house small, international crews in a station-environment similar to what should be experienced by deep space astronauts.

The ESA-NASA *CHOICE* study assessed innate and adaptive immunity, viral reactivation and stress factors during Concordia winterover deployment. The study was conducted over two winterover missions in 2009 and 2010. Final study data from NASA participation in these missions will be presented.

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