ANNALS OF RESEARCH IN SPORT AND PHYSICAL ACTIVITY

The impact of a 6-month mission to the International Space Station (ISS) on salivary antimicrobial proteins

Autor(es): Agha, Nadia H; Baker, Forrest L.; Kunz, Hawley E; Spielmann, Guillaume; Mylabathula, Pritish Leo; Rooney, Bridgette; Laughlin, Mitzi; Simpson, Richard J.

Publicado por: Imprensa da Universidade de Coimbra

URL persistente: URI:<http://hdl.handle.net/10316.2/44089>

DOI: DOI:https://doi.org/10.14195/2182-7087_ex2018_26

Accessed : 26-Apr-2023 13:20:59

A navegação consulta e descarregamento dos títulos inseridos nas Bibliotecas Digitais UC Digitalis, UC Pombalina e UC Impactum, pressupõem a aceitação plena e sem reservas dos Termos e Condições de Uso destas Bibliotecas Digitais, disponíveis em <https://digitalis.uc.pt/pt-pt/termos>.

Conforme exposto nos referidos Termos e Condições de Uso, o descarregamento de títulos de acesso restrito requer uma licença válida de autorização devendo o utilizador aceder ao(s) documento(s) a partir de um endereço de IP da instituição detentora da supramencionada licença.

Ao utilizador é apenas permitido o descarregamento para uso pessoal, pelo que o emprego do(s) título(s) descarregado(s) para outro fim, designadamente comercial, carece de autorização do respetivo autor ou editor da obra.

Na medida em que todas as obras da UC Digitalis se encontram protegidas pelo Código do Direito de Autor e Direitos Conexos e demais legislação aplicável, toda a cópia, parcial ou total, deste documento, nos casos em que é legalmente admitida, deverá conter ou fazer-se acompanhar por este aviso.

ANNALS OF
**RESEARCH IN SPORT
AND
PHYSICAL ACTIVITY**

THE IMPACT OF A 6-MONTH MISSION TO THE INTERNATIONAL SPACE STATION (ISS) ON SALIVARY ANTIMICROBIAL PROTEINS

Nadia H Agha¹; Forrest L. Baker¹; Hawley E Kunz²; Guillaume Spielmann³; Pritish Leo Mylabathula¹; Bridgette Rooney¹; Mitzi Laughlin¹; Richard J. Simpson¹

Maintaining immune system integrity is of paramount importance for astronauts embarking on long-duration spaceflight missions. Immune system dysregulation has been documented during and after short-duration (14-days) spaceflight missions⁽¹⁾, although less is known about the potential impact missions of longer duration will have on host immunity⁽²⁾. Salivary antimicrobial proteins (sAMPs), such as lactoferrin and lysozyme, act as a first line innate host immune defense⁽³⁾. We determined the impact of a 6-month mission to the International Space Station on a host of salivary biomarkers in both ISS crewmembers (n=8) and ground-based controls (n=7). All participants provided 7-consecutive days of saliva samples immediately after waking at various time points over a ~14-month period; pre-flight (L-180/L-60), in-flight (FD10/FD90/R-1) and post-flight (R+0/R+18/R+33/R+66). Saliva samples collected over the 7-days were pooled and analyzed for: C-reactive protein (CRP), salivary IgA, lysozyme and lactoferrin. Lysozyme levels were significantly elevated in crewmembers when compared to controls ($p=0.009$) at FD10 (33.3×10^3 vs. 8.1×10^3 ng/mL, $p = 0.014$) and FD90 (31.0×10^3 vs. 6.0×10^3 ng/mL, $p = 0.015$). Lactoferrin levels were also significantly elevated in crewmembers when compared to controls ($p = 0.001$), at FD10 (65.6×10^5 vs. 20.4×10^5 pg/mL, $p = 0.043$). No significant differences were observed for CRP or salivary IgA between crewmembers or controls over the duration of the study ($p > 0.05$). In conclusion, salivary lactoferrin and lysozyme concentration increases during long duration space flight, which may be due to sustained elevations in sympathetic nervous system activity. Whether or not these have clinical implications for crewmembers embarking on exploration class missions (i.e. to Mars or an asteroid) remains to be determined.

• 99

¹ University of Houston.

² NASA Johnson Space Center.

³ Louisiana State University.

Email: nhagha@uh.edu

REFERENCES:

1. Mehta, S. K., Laudenslager, M. L., Stowe, R. P., Crucian, B. E., Sams, C. F. & Pierson, D. L. (2014), "Multiple latent viruses reactivate in astronauts during Space Shuttle missions" *Brain Behav Immun*, Vol. 41, pp. 210-7.
2. Crucian, B. E., Stowe, R. P., Pierson, D. L. & Sams, C. F. (2008), "Immune system dysregulation following short- vs long-duration spaceflight", *Aviat Space Environ Med*, 79, 835-43.
3. Fabian, T. K., Hermann, P., Beck, A., Fejerdy, P. & Fabian, G. (2012), "Salivary defense proteins: their network and role in innate and acquired oral immunity" *Int J Mol Sci*, Vol. 13, pp. 4295-320.