

The oxygen-rich postnatal environment induces cardiomyocyte cell-cycle arrest through DNA damage response (Cell. 2014 Apr. 24; 157(3):565-579). At birth our hearts have quite remarkable regenerative capabilities. This facility is lost soon after birth. This report concludes that that loss—cardiomyocyte cell cycle arrest—is linked to postnatal oxygen exposure and explores some potential therapeutic implications. The 29 May 2014 issue of *Nature* published a comment on this article, entitled “Cardiovascular biology: Switched at birth.”

Cumulative neurobehavioral and physiological effects of chronic caffeine intake: individual differences and implications for the use of caffeinated energy products (Nutr Rev. 2014 Oct.; 72(Suppl. 1):34-47). This article is one of fifteen published in the NIH topic review supplement: “Special Issue: The Use and Biology of Energy Drinks: Current Knowledge and Critical Gaps.” Collectively they provide some very interesting insights into the caffeine-based energy drink phenomenon ... a \$12.2 billion USD market in 2012 alone.

The power of the mind: The cortex as a critical determinant of muscle strength/weakness (J Neurophysiology. 2014 Oct. 1; pii: jn.00386.2014). Subjects’ wrists were immobilized to induce weakness. One group of subjects undertook mental exercises, of strong muscle contractions, regularly during the immobilization period and exhibited approximately 50% less weakness as a result of the immobilization. The authors suggest neurological, probably cortical, mechanisms as contributing significantly to disuse induced weakness.

Effects of sex and gender on adaptation to spaceflight: behavioral health considerations (J Women’s Health. 2014 Sep. 26). Part of a larger work this manuscript explores gender differences in adaptation to spaceflight and identifies differences in: 1) sleep, circadian rhythms, and neurobehavioral measures; 2) personality, group interactions, and work performance and satisfaction; and 3) stress and clinical disorders. Those differences were further considered to “substantially impact the risks and optimal medical care required by spacefaring women” and the imperative of understand further the influences that sex and gender have on behavioral health changes occurring during spaceflight.

Distance and size perception in astronauts during long-duration spaceflight (Life. 2013; 3(4):524-537). Like many other orientation illusions induced by microgravity exposure, astronauts’ perceptions of size and distance appear to also be altered.

Cognitive neuroscience in space (Life. 2014; 4(3):281-294). An informative review article available online without charge.

Two weeks of predatory stress induces anxiety-like behavior with comorbid depressive-like behavior in adult male mice (Behav Brain Res. 2014 Sep. 6; pii: S0166-4328(14)00579-8). Animal models are often used in the exploration of mechanisms underlying the relationship between stress and mental health disorders in the hope of developing improved treatment options. This paper describes the use of natural predator-prey relationships to induce stress in mice and “elicit robust anxiety-like behaviors with evidence of co-morbid depressive-like behavior, as well as changes in cognitive behavior.”

How much gravity is needed to establish the perceptual upright? (PLoS One. 2014 Sep. 3; 9(9):e106207). Approximately 0.15 G for a 50% threshold, at least in the centrifuge model used in this study. That’s close to the gravity level of the Moon, but much higher than the threshold for detecting linear acceleration along the long axis of the body. That difference may partially explain the instability of Moon-walkers, but is seen by the authors as being good news for future missions to Mars.

Reviewed by
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McGuire S, Sherman P, Profenna L, et al. White matter hyperintensities on MRI in high-altitude U-2 pilots. Neurol. 2013; 81:729-735. The authors evaluated the imaging (MRI) findings of 102 U-2 pilots, comparing this cohort with a cohort of 92 controls. The U-2 pilots demonstrated a significant increase of volume and number of white matter hyperintensities. Although the article did not suggest any clinical significance, the authors did hypothesize that the lesions are associated with exposure to a hypobaric environment.

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