Jet lag-induced internal desynchronization is associated with deficits in adult neurogenesis in mouse hippocampus.

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Introduction
In 2008, the Danish government granted financial compensation for dozens of female citizens who 1) had a history of working overnight shifts at least once per week and 2) had contracted breast cancer. This connection between abnormal work schedules and heightened cancer incidence is not limited to the Danish population: approximately 15-20% of workers in all developed nations perform periodic night or rotating shift work or are involved in frequent transmeridian travel. Several epidemiologic studies have shown that rotating shift workers, flight attendants, and others with frequent exposure to light at night have suffered from various health-related maladies ranging from cardiovascular disease to prostate cancer (3). In order to understand the possible carcinogenic influence of abnormal daily cycles, it is important to first become familiar with circadian rhythms and the effects of circadian disruption on internal homeostasis.

Shift work and frequent jet lag are associated with a variety of health maladies. For example, one report found that airline workers with frequent jet lag exhibit temporal lobe atrophy and cognitive deficits (1,2). West-East bound travel (i.e. advances of the LD cycle) is more detrimental than East-West bound travel (phase delays). We determined if phase advances of the LD cycle impact adult hippocampal neurogenesis in mice.

Hypothesis
We propose that negative health effects due to jet lag may result from a disruption in the phase relationship of the master circadian clock in the suprachiasmatic nuclei (SCN) of the hypothalamus and peripheral organs.

Materials & Methods

- c57/BL6 and Per2Fret females, aged 2-4 months
- 8h phase advances
- Control group
- Immunohistochemistry: BrdU, PCNA, GFAP, NeuN
- Per2Fret bioluminescence analysis
- c57B16 and Per2Fret females, aged 2-4 months

References