

Jet Lag: Pathophysiology and Cures

The longest Monday of my life

I recently returned to the US from Australia. The 14-hour flight took me from Monday morning in Sydney to Monday morning, again, in L.A. Crossing the date line messed up my sense of time enough without the added bonus of thinking I should be heading to bed just as the sun began to climb into the California sky.

You may be familiar with the concept: Jet lag. The catch-all name for circadian misalignment, the disruption of sleep cycles and circadian rhythms. If you've had the pleasure of crossing time zones in a jet plane, whether it was a mere three-hour hop from one coast of the US to the other or a trip to another continent, chances are, you've experienced some amount of jet lag.

The pathophysiology of jet lag

Normally, two systems--the homeostatic system and the circadian system--work together to produce a 24-hour sleep cycle. During the day, the homeostatic system slowly accumulates a 'sleep drive,' a desire to sleep that increases as a function of time spent awake. The circadian system generates an alerting signal in opposition to this sleep drive, which, during the day, keeps a person from feeling increasingly sleepy. An hour or two before bedtime, this signal subsides, and s/he realizes it's time to hit the pillow. The sleep drive dissipates as a person sleeps and by morning (assuming a full night's rest and possibly some coffee), s/he will be feeling alert and ready to go again.

So we've got a nice cycle of sleep. Jet lag is what happens when the homeostatic and circadian processes are misaligned. For example, the circadian system may signal a person to be alert when it's not actually morning, or may be reduced during daytime hours, causing daytime sleepiness because the homeostatic sleep drive is no longer cancelled out.

But I don't want to be sleepy!

How do you beat jet lag?