

# A PILL FOR JET LAG

## Beating the Transatlantic Blahs

The hormone melatonin has been hailed as a cure for jet lag, a fast fix for insomnia, and even a breast cancer preventive.

Does it deliver? Mary Roach crosses eight time zones to find out

**f**light 93, San Francisco to London, the indeterminate hours between the second bad movie and the third bad meal. The man beside me is staring out the window. He looks miserable, puffy, disheveled. What is wrong with him? Has he left his heart in San Francisco? More likely he has left his pineal gland in San Francisco. More likely, he is jet-lagged.

The pineal gland is a biological pocket watch deep in the middle of the brain. It produces melatonin, the hormone that, along with daylight and darkness, helps control our circadian rhythms. When darkness falls, the eye cues the pineal gland to begin making melatonin. Melatonin alerts the other parts of the brain, which can't otherwise tell, that it's nighttime. The brain, in turn, begins slowing things down. Body temperature falls. We grow drowsy, less alert, more likely to knock over glasses or melt down nuclear reactors (Chernobyl and Three Mile Island were night-shift disasters). When daylight returns, we come back to life. Bright light tells the pineal gland it's time to shut down melatonin production.

Unlike a real pocket watch, the body clock is not easily reset. Hence there is jet lag. Your mind crosses eight time zones; your body remains at home. Left to its own devices, the body clock adjusts itself at a rate of about an hour a day. Your luggage on the airport conveyor belt moves faster. Cross eight time zones, and it will take about eight days for your various rhythms to adjust completely to their new locale.

To speed recovery, you must wrest control of the clock. There are two ways to do this. You can use daylight, by going outdoors at certain times and staying inside at other times (see "How to Conquer Jet Lag," page 295). A more convenient tactic is to take melatonin pills.

Research on melatonin and jet lag has been going on since 1986, when Josephine Arendt, an endocrinologist at the University of Surrey, in Guildford, England, put seventeen volunteers on this exact route, half on melatonin, half on a placebo. Seven days after their return to England, the volunteers were asked to rate their jet lag on a scale from 1 to 100. Sixty-seven percent of the placebo takers rated theirs higher than 50. Among the melatonin group, ratings ranged from 2 to 17. The melatonin group had less trouble falling asleep and staying asleep. They felt more alert during the day, and their moods were better.

Arendt's melatonin studies are ongoing: 484 subjects and counting. I am the latest. The day I flew out of San Francisco, I swallowed either a five-milligram capsule of synthetic melatonin or a placebo. If it's melatonin, my body clock should be resetting itself to London time. I took my first pill at 6:00 P.M. on the day I left. Six P.M. in San Francisco is 2:00 A.M. in London, 2:00 A.M. is when the body's natural melatonin levels are highest. Having brought on the night earlier, I should be ready for morning along with the rest of London. If I'm on a placebo, it'll be the usual transatlantic drag: the middle of the night in broad daylight. "Walking through treacle," Arendt calls it.

1:00 P.M. London time. I must be on melatonin. Since arriving at 8:00 A.M., I've checked into my hotel, gone to lunch, and browsed through a half dozen bookstores without so much as a yawn. Normally it's all I can do to get myself to a bed and collapse.

4:00 P.M. Back in my hotel. I'm sapped. My brain is a swollen, pickled thing. Given that I dozed only three hours on the plane, it may be my lack of sleep. This is one of the snags of jet-lag research. How wrecked the subjects felt depends on the timing of their flights as well as on the timing of their body rhythms. To control for bad plane sleep, Arendt puts subjects in a simulated jet-lag chamber, a windowless room with beds and banks of artificial daylight. The findings are consistent with her field studies. (Except in the category of mood: Subjects who score a free trip to Los Angeles tend to be in better moods than subjects locked in a University of Surrey office building.)

11:00 P.M. Already falling asleep. This is impressive, considering that it's three in the afternoon in San Francisco. It would appear that the body clock has been reset. Just in case, the alarm clock has also been reset. I've got an early train to Guildford.

Josephine Arendt has studied melatonin since 1972, and it shows. She owns a T-shirt with a melatonin molecule on the front and a framed photograph of Aaron Lerner, melatonin's discoverer.

Jet lag is only part of Arendt's research. She's given melatonin to blind people to replace the missing visual cues of day and night and thus regulate their circadian rhythms. She's given it to the Guildford police to help night-shift officers stay alert and to goats to influence when they breed and grow thick coats. (Melatonin pills fool the goats' brains into thinking that winter and its extra hours of darkness have arrived.)

Arendt herself takes melatonin - for jet lag and for what she calls

"middle-age insomnia," difficulty falling asleep and a tendency to wake up too early. Melatonin's most common side effect happens to be one of its major selling points: It tends to make you sleepy for about two hours after you take it. (The other side effects are headache in 1.7 percent of subjects and nausea in 0.8 percent.) In a 1994 study at the Massachusetts Institute of Technology (MIT), subjects who had taken as little as 0.3 milligram of melatonin fell asleep an average of 20 to 30 minutes faster than control subjects.

Unlike other compounds that help people fall asleep, melatonin is nonaddictive. In low doses, it doesn't knock you out or leave you groggy the next morning. It's very subtle. "If you give it to someone for jet lag around 5:00 or 6:00 P.M. and they then go out to dinner, most of them don't notice a thing," Arendt says. "But if you set them down in a warm, quiet room, they feel sleepy.

**m**ore coffee?" In case I'm a placebo, Arendt has brewed a pot of diesel-strength French roast. The conversation has turned to melatonin's most intriguing - and least documented - properties. The hormone has also shown promise as a breast cancer preventive in certain women. About 30 percent of breast cancer patients have tumor cells with abnormally large numbers of estrogen receptors. (Estrogen triggers tumor-cell growth.) These same women tend to have low levels of melatonin. Researchers at Tulane University School of Medicine in New Orleans investigated whether melatonin might reduce the number of estrogen receptors. The results were promising. When treated with melatonin, estrogen-receptive breast cancer cells grew only one-fourth to one-half as fast as before. Clinical trials of melatonin as a breast cancer preventative are under way in the Netherlands.

Melatonin also appears to be a potent free-radical scavenger. Free radicals are cancer-promoting molecular thugs that damage healthy cells. Russel Reiter, a neuroendocrinologist working with animals at the University of Texas Health Science Center in San Antonio, has found melatonin to be "remarkably protective" against three different types of free-radical damage: DNA damage, cell-membrane damage, and cataracts.