

the dynamical system) are absent or distributed uniformly across the circadian cycle. Thus, for example, the circadian period of the perch-hopping rhythm in the finch observed under 8 lux is further removed from the "intrinsic" circadian period of the finch's circadian pacemaker than the period observed under 0.4 lux, because light imposes a direct drive onto the dynamical system. This is why most genetic studies of circadian period in mammals are carried out in constant darkness.

The efficacy of the forced desynchrony protocol in removing or uniformly distributing these driving factors—as predicted by a mathematical model of this dynamical system (7)—is demonstrated by our observation that the observed period of the pacemaker was nearly identical in forced desynchrony protocols with markedly different cycle lengths—for example, 11, 20, 28, or 42.85 hours—and with markedly different levels of physical activity. This is in contrast to the cited "eat and sleep when so inclined" paradigm, in which Campbell *et al.* reported that even though all of the participants were given the same instructions, the circadian period averaged 24.73 hours among those who chose to not nap during the experiment and 24.22 hours among those who did nap (8). As Campbell *et al.* noted at the time, their observation thus raised the possibility that intrinsic circadian period differed in nappers compared with non-nappers. In contrast, we consistently observed a near-24-hour intrinsic circadian period (averaging 24.18 ± 0.04 hours), despite the fact that none of the individuals in our experiments was allowed to nap. We thus conclude that the reason Campbell *et al.* observed the near-25-hour period among non-nappers (8) was because their sleep episodes and associated light-dark cycles were less evenly distributed across circadian phases, resulting in feedback resetting effects on the circadian pacemaker, rather than representing a systematic difference between those population groups.

Although we claimed to have estimated the intrinsic period of the human circadian pacemaker using this protocol, we do not contend that the period of the human circadian pacemaker is invariant. It has been known for 30 years that prior entrainment influences the intrinsic period of the pacemaker (an aftereffect of entrainment that can last for months) in mammalian species. In fact, as we noted in our report, the slightly longer circadian period observed in blind individuals may in part be a reflection of the absence of such an aftereffect of entrainment to the 24-hour day in some blind people. Such aftereffects do not invalidate the concept of a genetically

determined circadian period; natural selection most certainly acted on the parameters of circadian pacemakers in organisms that were entrained to a 24-hour light-dark cycle. We chose to assess the intrinsic period of the human circadian pacemaker immediately on release from entrainment to a 24-hour day because it is this "aftereffect" period that is most relevant for understanding entrainment to the 24-hour day.

Charles A. Czeisler,* Derk-Jan Dijk, Richard E. Kronauer, Emery N. Brown, Jeanne F. Duffy, James S. Allan, Theresa L. Shanahan, David W. Rimmer, Joseph M. Ronda, Jude F. Mitchell, Edward J. Silva, Jonathan S. Emens

*To whom correspondence should be addressed at Circadian, Neuroendocrine, and Sleep Disorders Section, Division of Endocrinology, Department of Medicine, Harvard Medical School, Brigham and Women's Hospital, 221 Longwood Avenue, Boston, MA 02115, USA.

References

1. J. Aschoff, *Pfluegers Arch.* 270, 9 (1959).
2. ——— and R. Wever, *Biological Rhythms: Handbook of Behavioral Neurobiology*, J. Aschoff, Ed. (Plenum, New York, 1981), p. 311.
3. J. Aschoff, *Science* 148, 1427 (1965).
4. ———, U. V. Saint Paul, R. Wever, *Z. Verh. Physiol.* 58, 304 (1968).
5. E. D. Herzog, J. S. Takahashi, G. D. Block, *Nature Neurosci.* 1, 708 (1998).
6. *Webster's New Collegiate Dictionary*, 10th ed.
7. E. B. Klerman, D.-J. Dijk, R. E. Kronauer, C. A. Czeisler, *Am. J. Physiol.* 270, R271 (1996).
8. S. S. Campbell, D. Dawson, J. Zulley, *Sleep* 16, 638 (1993).

CORRECTIONS AND CLARIFICATIONS

Letters: Response by John Olney under title "Induced damage in the developing brain" (12 May, p. 977). It was an editorial error to list only John Olney as the author of the response to letters by R. W. Montgomery and by A. Sharma and S. Kumar. Olney was the corresponding author for the report under discussion by C. Ikonomidou *et al.*, "Ethanol-induced apoptotic neurodegeneration and fetal alcohol syndrome" (11 Feb., p. 1056). The author list should have been as follows: C. Ikonomidou, P. Bittigau, M. J. Ishimaru, D. F. Wozniak, C. Koch, G. Genz, M. T. Price, V. Stefovsk, F. Hörster, T. Tenkova, K. Dikranian, J. W. Olney. *Science* regrets the error.

News Focus: "Science and policy clash at Yucca Mountain" by Richard A. Kerr (28 Apr., p. 602). John Greeves is with the Nuclear Regulatory Commission (NRC). All appearances of "NRC" referred to the Nuclear Regulatory Commission.

News of the Week: "Pruned sanctions list points to closer ties" by Jeffrey Mervis (14 Apr., p. 244). The director of the Aeronautical Development Establishment, a defense institute that remains on the banned list, was misidentified. His correct name is Krishnapuram Gopalakrishnan Narayanan.

INTERNATIONAL AWARDS TO SUPPORT COOPERATION IN HEALTH RESEARCH FOR DEVELOPMENT

To be announced at The International Conference on Health Research for Development, Bangkok, 10-13 October 2000

CALL FOR APPLICATIONS

A number of International Health Research Awards will be made in association with the International Conference on Health Research for Development to be held in Bangkok, Thailand in October 2000. The awards, funded by the Rockefeller Foundation, are intended to encourage cooperation between institutions to enable the environment for health research. Applications are invited from institutions in Africa, Latin America, the Caribbean, South and South East Asia, China, the Pacific islands, the Middle East, or Eastern Europe. A council of distinguished researchers from amongst these regions will select the awards.

Proposals are requested from partnerships of institutions representing, or proposing to create, national or regional initiatives targeting several of the following themes:

- Strengthening national or regional health research agendas
- Increasing awareness of the importance of research among stakeholders
- Promoting good ethical practices in health research
- Improving communication and dissemination of research results
- Translating research into action
- Improving the processes and indicators for evaluating the impact of research
- Strengthening capacity in the management of research

Preference will be given to proposals that meet the following criteria:

- Potential to catalyze national or regional health priorities
- Multi-disciplinary approach with a mix of senior and junior researchers, and some evidence of proven track record within the team
- Ability to monitor and evaluate the initiative
- Demonstration of likely long-term sustainability and capacity building potential
- Low administrative costs relative to likely research impact, with efficient financial administration between institutions
- Leadership ability to coordinate the proposed activities within the partnership
- Creative partnerships, especially those involving non-governmental organizations that could give the initiative greater relevance to communities or policymakers.

These non-renewable awards will cover a 2 to 3 year project period and will likely total between USD 200,000 and USD 300,000 each. Applications should identify one lead institution to receive and manage the award. This institution should hold charitable, not-for-profit status, and the proposed activities must not include advocacy efforts that involve lobbying for legislation. Awards to individuals will not be considered.

Proposals of between 5-10 pages should reach the Awards Selection Council Secretariat no later than June 30, 2000 and should be organized under the following headings:

1. Background
2. Objectives and how they relate to the spirit of the awards
3. Partners including letters of support/agreement from all participating institutions
4. One page curriculum vitae for each key investigator
5. Methodology and proposed activities
6. Time frame with evidence of longer term sustainability
7. Budget: the total budget, indication of any other sources of funding and a breakdown of the proportion of the budget requested for the award, in USD.
8. Expected results and means of dissemination
9. Monitoring and evaluation procedures

Applications should be sent to: The Awards Selection Council Secretariat, c/o College of Public Health, Chulalongkorn University, 10th Floor, Institute Building 3, Soi Chula 62, Phayathai Road, Bangkok 10330, Thailand. To facilitate the selection process, applications should ideally be sent electronically by email to ihresearch@hotmail.com or by fax to 4122 7914169 or 662 2556046. Website of the Awards Selection Council Secretariat: <http://www.ihresearch.ch>. Requests for further information should be sent by email to ihresearch@hotmail.com

Final selection of successful initiatives will be made by the Awards Selection Council by the end of July 2000, with notification to all applicants in August 2000. The awards will be announced at the Bangkok Conference on Health Research for Development (<http://www.conference2000.ch>).

Circle No. 47 on Readers' Service Card