TOUCHING**base**

Sleep on it

Researchers at the University of Utah have identified the first mammalian gene underlying a rare sleep disorder. Familial advanced sleep phase syndrome (FASPS) is an autosomal dominant syndrome in which the circadian rhythm is advanced by nearly four hours, causing affected individuals to fall asleep in the early evening and wake several hours before dawn. A group led by Louis Ptácek discovered that mutations in *hPer2*, a homolog of the *Drosophila period* gene, cause FASPS (published online, 11 January). *Drosophila* mutants have a similar phenotype to affected humans: their sleep–wake is advanced. Ptácek and colleagues carried out a linkage analysis of a large family with FASPS. They implicated a region near the telomere on chromosome 2, where *hPer2* resides, but found no evidence of other loci linked to the syndrome. They went on to identify four base changes in exon 17 of *hPer2*, of which one resulted in an amino-acid change. This substitution (S226G) occurs in the casein kinase I ε (CKIε)-binding domain of hPer2. Biochemical analysis of the mutant hPer2 indicates that it binds CKIε but has a reduced degree of phosphorylation compared with wild-type hPer2. So it seems that one critical function of CKIε is to phosphorylate hPer2—but how phosphorylation affects the function of hPer2 has yet to be determined. Further study of this FASPS family and others that show no linkage to *hPer2* should provide additional insight into the mechanics of human circadian rhythms.

The latest buzz in microarrays

From its inception, microarray technology has been used enthusiastically (and almost exclusively) by geneticists studying humans or a few of the favored model organisms. Times are changing. Writing in a recent edition of the online journal *GenomeBiology*, Jay Evans and Diana Wheeler report the use of gene expression profiling in the study of one of the more remarkable products of evolution: the development of honeybee larvae into either queens or workers (http://www.genomebiology.com/2000/2/1/research/0001/). Eusocial insects like the honeybee (*Apis mellifera*) are polyphenic; that is, they exhibit two or more morphologies depending on the environmental cues received. For the honeybee, this allows for an exquisitely calibrated division of labor between fecund queens and sterile workers. In their study, Evans and Wheeler have provided the first genomic view of the patterns of gene expression underlying the worker and queen developmental caste programs. The findings include differential expression of genes involved in the regulation of steroid hormone levels, nutrient storage and metabolic rates. As has been noted elsewhere, however, reducing the results of such a study to a few highlights in a synopsis hardly does the work justice. Readers interested in the whole picture are encouraged to view the raw data and to see the commentary by Evans and Wheeler in January's issue of *BioEssays*.

> *I have photographs of my father walking along this exact stretch of Riverside park in the 1940s, which must prove that the desire to find peace and quiet in New York is a genetic predisposition*
>
> —Allan Ishac

The beat goes on

Heart failure affects at least 700,000 individuals in the United States every year, with costs running in the tens of billions of dollars. Unfortunately, in half of the patients diagnosed with dilated cardiomyopathy—the group of disorders underlying end-stage heart disease—the cause is unknown, and cardiac transplantation is the only long-term treatment option. Kevin Campbell and his colleagues at the University of Iowa College of Medicine have now made some progress in understanding and treating a subset of these idiopathic cardiomyopathies in a genetic mouse model. In a recent issue of the *Journal of Clinical Investigation* (published online 12 January), they report that mice deficient in either the β- or δ-subunits of the smooth-muscle sarcoglycan complex develop cardiomyopathy characterized by vascular constrictions and reduced blood flow. Moreover, in an experiment with potentially exciting implications, they found that long-term treatment of these mice with verapamil, an L-type calcium-channel blocker and vasodilator, prevented the development of severe cardiomyopathy. Clinicians have been reporting an increasing number of patients with cardiomyopathies arising from defective sarcoglycan function, including those with limb-girdle muscular dystrophy types 2E and 2F, caused by mutant β- and δ-sarcoglycan subunits, respectively. As verapamil is already an effective treatment for patients with hypertension and cardiac arrhythmias, this work suggests that its use might be extended to the treatment of cardiomyopathies in patients who are known to have, or are suspected to have, mutations in sarcoglycan genes.

Building a better 'board

You're doing an 'air to fakie' in the half pipe on your new, genetically modified…snowboard? A company in Washington State may be riding the wave of genetics research to create a new snowboard named, perhaps inappropriately, Altered Genetics. The developers and designers at Gnu Snowboards teamed up with wood producers to exploit the characteristics of three different woods—the light weight of balsa, the high flex strength and accelerated growth rate of bamboo, and the shear strengths of aspen—to create a new breed of tree. It is not clear whether the wood is genetically modified or the "altered genetics" are obtained through standard breeding practices; regardless, the manufacturers claim that the resultant snowboard is lighter—by nearly 30 percent—than similar boards.

On a tree farm near Gnu's Olympic Peninsula factory, the trees grow tall, fast and straight; their quickest growth (up to 18 feet per year) occurs in the first two years. The growth surge allows a good harvest after one year, resulting in only one ring of xylem in which the wood fibres are nearly linear in their orientation. This approximates more closely the perfect fiber orientation found in synthetic fiberglass—and endows the wood with a greater degree of strength. Because the boards are made of material from young, two-year-old trees, the wood has economic and environmental advantages as a fast-growing renewable resource. Riders on Altered Genetics boards bring a whole new meaning to the phrase "carving through the trees."