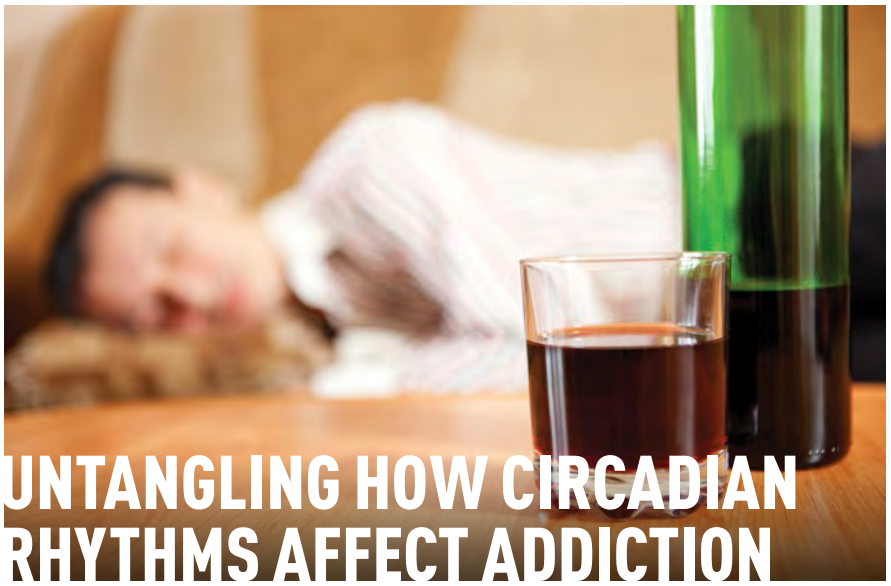
children and provides some funding for the initiative. The leaders for the 2012-13 academic year were Samantha Batman, Ben Blais, and Afton Chavez. All three are leaning toward a specialization in pediatrics and express great excitement for the program and the experience it offers, not only for the children but also for them. Each welcomed the break from intense studies and the opportunity to interact with the children as kids rather than as patients. "It's important to be reminded that these kids are very capable, just like other kids," Batman says.

The children are equally enthusiastic. "Why are you here?" Torjusen recalls asking one youngster. "To do art!" he gleefully replied. "The children come back again and again," Torjusen observes, "and siblings are welcome too." A child's illness impacts the entire family, Torjusen says. Welcoming siblings to take part in the classes ensures that everyone gets attention, while the parents get a respite from caregiving. "We provide an open atmosphere and lots of positive reinforcement for all of the participants," Torjusen notes.

"It's a judgment-free zone," agrees Blais. "The kids quickly discover that they're not alone in their illnesses and can just be themselves. Art for Kids provides them with a support system without being overt."

James Weinstein, chief executive officer and president of the Dartmouth-Hitchcock health system, and his wife, Mimi, are enthusiastic supporters of the program through the Brie Fund, a foundation they created in memory of their daughter Brieanna, a victim of childhood leukemia. "Art for Kids is a beautiful expression of a partnership between medical students and patients learning from each other," Mimi Weinstein notes. "The medical students gain privileged access into what patients are experiencing during their treatment and, by creating art together, both benefit and become enriched in the process. The joy these classes bring is a delight to behold. John Ruskin said, 'When love and skill work together, expect a masterpiece.' There are many masterpieces being created at AVA Gallery!"

LORI FERGUSON



UNTANGLING HOW CIRCADIAN RHYTHMS AFFECT ADDICTION

DISRUPTIONS IN NORMAL CIRCADIAN RHYTHMS can increase susceptibility to alcohol and drug addiction—that much is known. What isn't known is why this connection exists.

This elusive kinship between circadian function and addiction compelled two Geisel postdocs, Joshua Gamsby and Danielle Gulick, to explore how two key genes involved in regulating circadian rhythms affect alcohol consumption.

Working in the lab of Jay Dunlap and Jennifer Loros, who are both professors of genetics and of biochemistry at Geisel, Gamsby and Gulick compared male and female mice with mutated versions of the genes *Per1* and *Per2* to normal mice without the mutations. They used the mice to study how these mutations affected alcohol consumption, reinforcement, and metabolism between groups.

"*Per* mutant mice do not mind the taste of alcohol," Gamsby says. "Essentially, they are little binge drinkers." Mice without *Per* mutations drink at significantly lower levels.

He and Gulick observed that all mice with mutations in *Per1* or *Per2* found alcohol more rewarding. But among males, only those with *Per1* gene mutations had significantly higher blood alcohol levels than normal mice, whereas all female mice did regardless of whether the mutation was to *Per1* or *Per2*. The female mice with the mutations also drank more at all concentrations than did males with the mutations.

"The finding that the *Per* mutant mice drink more than normal mice was not surprising," Gamsby notes. "However, discovering that this phenomenon might be due to changes in alcohol reward and in part to changes in how alcohol is metabolized was surprising."

From a basic science perspective this is an exciting development. Physiologically, the circadian clock governs the timing of metabolism, body temperature, and the sleep-wake cycle. Disruptions in these functions are associated with a wide variety of physical, mental, and emotional disorders, including substance abuse and dependence. Gamsby points out, however, that the question remains whether the effects on alcohol consumption are due to changes in the circadian clock generally or specifically to mutations in the *Per* genes.

The temptation to apply findings such as these to human behavior is difficult to resist, but while there are implications for further understanding alcoholism, Gamsby cautions that there is much more to learn. "This study is a starting point for how *Per* genes are related to alcohol reinforcement" he says. "Before we can develop treatments targeting this connection, we must have a better understanding of the biology behind it."

Now adjunct faculty at the University of South Florida Morsani College of Medicine, Gamsby and Gulick are continuing their research into the relationship between alcohol consumption and changes in the circadian clock.

SUSAN GREEN