For a WEB EXTRA with a short video from Yeh's lab that depicts brain cells migrating, see dartmed.dartmouth.edu/summer08/html/disc_scratch_we.php.

Only 9% of U.S. physicians practice in rural communities, according to the AMA, but 20% of the population lives in rural areas and rural patients tend to be older and sicker.

A scratch on the surface of a big story

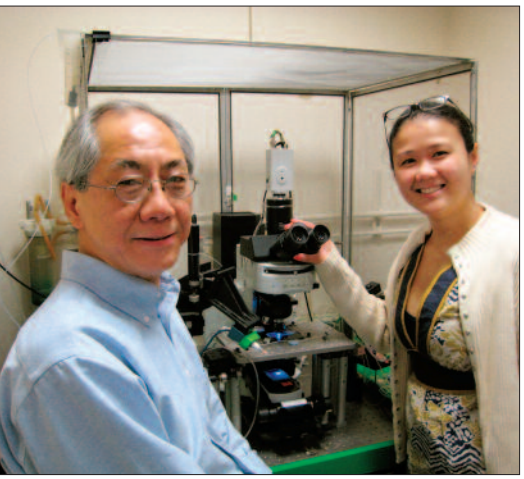
Researching fetal alcohol syndrome often involves getting rats drunk. Hermes Yeh, Ph.D., uses mice instead, because mouse genes can be more easily manipulated to test various hypotheses.

Mice, it turns out, are also more sensitive to alcohol. When Yeh and Verginia Cuzon, a doctoral student in Yeh's lab, studied the effects of excessive alcohol consumption on fetal development, they found that mice could tolerate only very low blood-alcohol levels and still have a successful pregnancy.

Even low levels of alcohol can alter fetal brain development.

Low: "There's some serendipity involved in this project," says Yeh. By decreasing the alcohol—so much that they didn't know if they'd see any effect at all—they made a surprising discovery: that chronic exposure to even low levels of alcohol can alter fetal brain development.

A fetus's developing brain is essentially a sea of migrating cells. The cells move to specific locations where they specialize and mature, forming various structures of the brain. Anything that disrupts those migrations can therefore have lasting effects. Alcohol (ethanol) seems to increase the number of certain brain cells—called GABAergic interneurons—in the embryonic brain, Cuzon and Yeh reported in the February 2008 *Journal of Neuroscience*.



Yeh, left, and Cuzon looked at fetal brain formation.

In a mature brain, GABA (gamma-aminobutyric acid) "inhibits things," Cuzon explains. "It kind of keeps the balance of excitatory stuff down to a more manageable level." But when the brain is developing, "GABA's really not playing that role," Cuzon says. "It's doing a whole bunch of different things. It can stop cells from proliferating and [make them] more mature. It can start them migrating." It can also modulate where and how fast they migrate.

"Ethanol is one of the very well-established modulators of the GABAergic system," says Yeh. It causes more GABA to circulate, which, in turn, has a numbing effect. "That's what happens in the adult brain, when everything is all formed and there are a lot of synaptic connections," he continues. "But during development, there are no synaptic connections because things are very immature. The cells are still moving around. . . . Yet we think that alcohol can still work through the GABAergic system to affect GABA receptors or the level of GABA" in the early stages of brain development.

Prolonged: Understanding how ethanol causes these changes is the next step for Yeh and Cuzon. For now, the "take-home message," says Yeh, "is that even a relatively low blood-alcohol level for a prolonged period of time is detrimental to fetal development."

It's difficult to say how applicable the findings in mice are to humans. But pregnant women who regularly consume alcohol, even at a low level, are taking a risk, Yeh believes. It will take a while to determine the size of that risk. "All we've done, really," he says, "is scratch the surface of a big, big story."

Jennifer Durgin

Paging Dr. C-3PO

Robotic-assisted prostate surgery can result in less blood loss and a shorter hospital stay than surgeries performed by sentient beings alone, yet only 7% of hospitals own the necessary equipment. According to DMS researchers, that might be for the best. After examining the costs associated with purchasing a robot—about $1.5 million—and the time it takes to train a surgeon, they concluded that it simply doesn't make sense for many hospitals to own one. They wrote in *Urology* that although there are advantages to robotic-assisted procedures, "expenditures on a robot are taken from other portions of the health-care system."

Carpe medicamentum

There is no one-size-fits-all drug treatment for epilepsy; some patients suffer serious side effects, while others do not respond at all. But researchers from the Neuroscience Center at Dartmouth reported recently that they had success using uridine—a molecule involved in cell metabolism—to reduce the number and severity of seizures in rats. Just as important was the fact that they did not see any side effects. "These properties," they concluded in the journal *Epilepsy and Behavior*, "make uridine a potentially promising agent for the treatment or prevention of epilepsy."