Drug decreases alcohol cravings

November 2 2010, By Amy Pyle

Rapamycin, an FDA-approved drug prescribed to prevent the rejection of transplanted organs, has been shown for the first time to decrease excessive alcohol consumption, binge drinking, and alcohol-seeking behavior in rodents. The finding is in a study by researchers at the Ernest Gallo Clinic and Research Center at the University of California, San Francisco.

The study, led by Dorit Ron, a Gallo Center researcher and a professor of neurology at UCSF, appears in the online Early Edition section of the Proceedings of the National Academy of Sciences.

The study demonstrated, also for the first time, that alcohol consumption in rodents activates a key signaling pathway in the nucleus accumbens, a brain region that in both rodents and humans is part of the reward system that affects craving for alcohol and other addictive substances.

In the brain, that signaling pathway - a complex of proteins called the Mammalian Target of Rapamycin Complex 1, or mTORC1 — plays a significant role in learning and memory. "This makes sense," says Ron, "since addiction is a maladaptive form of learning and memory." She says that the mTORC1 pathway has been well-studied in other areas of the body, such as the immune system, "but has not been explored that much in the brain."

Ron notes that rapamycin specifically diminishes the rodents' craving for alcohol. It does not change their desire to consume sucrose. "This is significant," she says, "because current medications used to treat alcohol

abuse interfere with the brain's reward system in a larger way, blocking pleasure in general, which discourages people from taking those medications."

The study also showed that rapamycin does not lead to alteration of the rodents' general motor coordination or other taste preferences.

Ron emphasizes that the study was conducted on rodent models designed to mimic human drinking behavior, and cautions that rapamycin itself — a powerful drug with side effects — should not necessarily be considered for immediate use as a treatment for alcohol abuse. "The important point is that we have shown that the mTORC1 pathway is a potential drug target for alcohol abuse disorders," she says. "Our laboratory will continue to actively pursue this line of research."

Ron notes that rapamycin is currently being investigated for potential anti-tumor and other beneficial properties in animal models, "and a new generation of rapamycin-like compounds that targets the mTORC1 pathway is being developed. Some of these compounds look very promising."

Provided by University of California, San Francisco