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## **Palm Beach Gardens Biotech Firm Contributed to Scripps-Florida Discovery of Natural Mechanism Controlling Cocaine Use**

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Scientists from the Scripps Research Institute and Ocean Ridge Biosciences, both in Palm Beach County, Florida, have discovered that a specific type of endogenous genetic material plays a central role in determining individual vulnerability to cocaine addiction. This finding may lead to the development of a new class of pharmaceuticals that can block drug addiction. Dr. Paul Kenny, an Associate Professor in the Department of Molecular Therapeutics at Scripps Florida, and his team determined that the brain levels of a naturally occurring small ribonucleic acid (RNA), microRNA-212, controlled whether rats compulsively increased self-administration of cocaine. A collaboration between Kenny's group and Dr. David Willoughby, Senior Scientist and Manager at Ocean Ridge Biosciences used DNA microarray technology to determine that microRNA-212 was increased in the dorsal striatum of rats that were given extended access to cocaine but not in rats given limited access. The microarray survey also identified several additional microRNAs that were induced by cocaine, but these microRNAs were not unique to the extended access group. Because dorsal striatum is a key brain region regulating the development of habit formation, Kenny hypothesized that induction of microRNA-212 could be a compensatory protective response in addicted animals. Kenny and his team used transgenic technology to prove that microRNA-212 could reduce cocaine use.

"When we used a virus to drive a large over-expression of the microRNA, there was no effect on the behavior of the limited-access animals," Kenny said. "In the extended-access animals, however, their behavior changed abruptly – they took less and less cocaine. In fact, their intake became so low that it appeared they actively disliked the drug. Conversely, when we blocked the actions of the microRNA, the extended access animals began to consume the drug in a compulsive-like manner. MicroRNA-212 is therefore a protective factor helping to prevent the loss of control over drug-taking behavior. Individual differences in microRNA-212 signaling are therefore likely to play a key role in determining vulnerability to cocaine addiction."

The study, which was published in the July 8, 2010 issue of the prestigious Nature journal also elucidated the details of a molecular signaling pathway within brain cells explaining how microRNA-212 is induced and how it exerts an effect on behavior.

Ocean Ridge Biosciences (<http://oceanridgebio.com>) is an emerging Palm Beach Gardens, Florida-based research services company providing Genome Analysis and Biomarker Discovery services to biomedical scientists in academia, government, and the biotechnology industry. The company is additionally developing an intellectual property portfolio in RNA sample preparation technology and RNA-based predictive biomarker sets.

The first author of the study, "Striatal MicroRNA Controls Cocaine Intake through CREB Signaling," is Jonathan A. Hollander of The Scripps Research Institute. In addition to Kenny and Willoughby, other authors include Heh-In Im, Antonio L. Amelio, Jannet Kocerha, Purva Bali, Qun Lu, Claes Wahlestedt, and Michael D. Conkright of The Scripps Research Institute; and David Willoughby of Ocean Ridge Biosciences. See <http://www.nature.com/nature/journal/v466/n7303/abs/nature09202.html>. The study was supported by Ocean Ridge Biosciences and the National Institute on Drug Abuse of the National Institutes of Health.

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