



*Michael Owens, Ph.D., Brooks Gentry, M.D., and Ralph Henry, Ph.D., are partners in InterveXion, a new biotech company formed at UAMS.*



# The Business of Science

**Researchers are translating antibody discoveries into anti-addiction medications.**

In an era when it can take several hundred million dollars to develop a new drug, there's not much incentive for big pharmaceutical companies to invest in a medication for drug addicts that has yet to be tested in humans.

College of Medicine faculty members Michael Owens, Ph.D., and Brooks Gentry, M.D., have taken creative steps to help ensure that their promising antibody-based treatments for addiction achieve effective clinical usage.

“We have a vision to develop medicines to treat drug abuse,” says Owens, a Professor in the Department of Pharmacology and Toxicology and Director of the UAMS Center for Alcohol and Drug Abuse. “There are currently no specific medicines available to treat the adverse health effects of PCP or methamphetamine.”

With two other partners, they've formed a startup company, Intervexion Therapeutics, LLC. Developed through UAMS BioVentures, a campus-based business incubator, the company will shepherd the drugs through the regulatory process and raise venture capital.

The company has received a \$3 million, five-year grant from the National Institute on Drug Abuse (NIDA) of the National Institutes of Health (NIH) to conduct clinical trials for an antibody treatment for phencyclidine, also known as PCP or angel dust. Gentry, an Associate Professor in the Department of Anesthesiology and the Department of Pharmacology and Toxicology, serves as the company's Chief Medical Officer and will lead the clinical trials. He and Owens hope to have approval within 18 months to start Phase 1 trials to determine the drug's safety.

The company also has developed an antibody that targets methamphetamine and related drugs. The company will pursue clinical trials for that antibody in the future.

Owens, Intervexion's Chief Science Officer, developed the two highly specific antibodies to be used in the addiction treatments. The antibodies work by binding to drug molecules in the blood stream, preventing the drug from getting to the brain or crossing the placenta. Experiments in rats have shown that the antibodies ►

block the effects of the drug, precluding continued use. The antibody treatment could be used with other therapy to help abusers overcome their dependency. Unlike other anti-drug medications, such as methadone for heroin, the antibody drugs themselves are not addictive.

“We anticipate that these new medications will be used for people who want to get well but can’t get over the addiction on their own,” says Gentry. “These medications act like a long-term surveillance system, offering protection for weeks against a compulsive need to use the drug.”

To help cut development and manufacturing costs, the InterveXion partners will grow and harvest their drug-fighting antibodies in plants. Ralph Henry, Ph.D., an Associate Professor of Biology at the University of Arkansas at Fayetteville and the company’s Vice President for Biopharmaceuticals, has already begun growing genetically engineered tobacco plants and extracting the antibodies for use in pre-clinical trials. In June, the company signed a co-development agreement with Medicago, a Canadian biopharmaceutical company that will mass produce InterveXion’s antibody medicines in plants to be used in the first human clinical trials.

InterveXion’s fourth partner and its President and Chief Executive Officer, Barry Holtz, brings pharmaceutical company expertise to the group as a former Senior Vice President of a biopharmaceutical firm, Large Scale Biology Corp. of California.

From Owens’ perspective, the antibody drugs already have come a long way on their translational journey from the laboratory bench. The research team has received numerous grants and pre-clinical funding from NIDA/NIH, the National Science Foundation and other sources. It also has benefited from research funding from the 1998 tobacco industry legal settlement, which helped establish the Arkansas Biosciences Institute. The Institute is a partnership of organizations that helped bring together the research team to explore plant-based antibody production.

“I have been working on this for 20 years,” Owens recalls. “Dr. Gentry joined me over 10 years ago. We started out with a basic research idea and developed a proof of concept. Now we can translate it into a human treatment and thereby pay back the American public for the years of investment in our research program and ideas.”

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