

Embera Compound Takes New Addiction Treatment Tack

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Addictive behaviors – from tobacco use to eating disorders – are among the most difficult to treat and the least likely to result in permanent recovery. That's precisely why Embera NeuroTherapeutics Inc. is excited about prospects for its EMB-001. Rather than seeking to block the effects of an addictive substance or substitute a safer compound, the firm's drug combination suppresses the craving that drives addiction.

"We take a very different approach to addiction," Robert B. Linke, the company's president and CEO, told *BioWorld Today*.

Rather than seeking to block the effects of an addictive substance or substitute a safer compound – routes taken by existing products – the venture-backed firm is developing a drug combination to suppress the craving that drives addiction. The combination of two off-patent, FDA-approved drugs – the benzodiazepine oxazepam and the cortisol synthesis inhibitor metyrapone – targets specific brain functions associated with craving and relapse.

Shreveport, La.-based Embera has exclusively licensed its technology from Louisiana State University Health Sciences Center (LSUHSC-S), where it was developed in the lab of Nicholas Goeders, a professor and the head of the department of pharmacology, toxicology and neuroscience. Goeders, who also serves as Embera's chief scientific officer, has spent more than 25 years studying the role of physiologic responses to chronic stress in addiction.

The company's EMB-001 targets two components of addiction to break the neural pathways in the brain related to craving. The compound prevents overactivation of the stress response system while inhibiting circuits that are prone to hyperexcitability. In essence, EMB-001 takes the foot off the "accelerator" – the corticotropin-releasing factor (CRF) – while boosting the "brake" of the gamma-aminobutyric acid (GABA) system. The company's goal is to develop a drug regimen that can be paired with psychosocial care to induce abstinence and prevent or reduce relapse.

Embera – whose name and floral logo are derived from a flower used for medicinal purposes by Panama's indigenous Embera Indians – was launched in 2005 by two Louisiana-

based seed-stage VCs: Louisiana Ventures and Louisiana Fund I. Linke declined to disclose the amount of funding Embera has received to date, but acknowledged the VCs continue to provide most of the company's capital.

Earlier this month, the National Institute on Drug Abuse (NIDA) awarded a \$3.9 million grant to LSUHSC-S, as Embera's partner, to support the next stages of development for EMB-001 to treat cocaine dependence and advance the compound into clinical testing. (See *BioWorld Today*, Oct. 4, 2010.)

In animal studies, EMB-001 effectively treated cocaine addiction even at doses of each drug that had been found ineffective as monotherapy. In 2009, Embera also demonstrated preliminary clinical proof of concept for the compound in a six-week, randomized, double-blind, placebo-controlled pilot study in cocaine-dependent human subjects. Treatment with EMB-100 led to significant reductions in cocaine craving at several time points during the study and was well tolerated over the treatment period.

The NIDA grant will advance the cocaine treatment program through Phase I studies while supporting Embera's lead clinical development program for smoking cessation – a market that represents a \$3.5 billion global opportunity. Earlier this year, Embera completed animal studies in nicotine dependence that demonstrated EMB-001 to be more effective than Chantix – Pfizer Inc.'s \$833 million smoking cessation product.

"The grant we've received with LSU will fund all of the preclinical work required to file an [investigational new drug application] for cocaine dependence and to execute a Phase I study," Linke said. "That same work will also enable our clinical program in smoking cessation, so we're moving both programs forward."

Over the next 12 to 18 months, Linke plans to begin animal studies of EMB-001 in alcohol dependence and obesity – the next two indications in the company's pipeline – and progress quickly to human studies. In 2009, the Substance Abuse and Mental Health Services Administration classified an estimated 22.5 million

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Americans 13 and older – nearly 9 percent of the U.S. population – as substance abusers. More than 15 million were solely dependent on alcohol, and another 3 million abused both alcohol and illicit drugs.

Obesity, which affects more than one-third of the U.S. population, is another promising application, since food cravings arise from the same dysregulated brain systems that affect smokers and drug abusers.

“Our goal is to take these drugs into Phase II clinical development, then seek partners to help us with commercialization,” Linke said. “We think the best use of our resources is to develop as many indications of this drug as possible and look for partners that have existing infrastructure to help us do late-stage development.”

To that end, Embera has retained Exponential Pharma Ventures LLC to assist in establishing a clinical development

partnership for its cocaine dependence program. (See *BioWorld Today*, Feb. 17, 2010.) The pharmaceutical partner would receive an option to license and commercialize the product after clinical proof of concept. In addition, Embera is actively raising a round of capital, led by its current investors, to fund the remaining clinical development, Linke noted.

For the time being, Embera is operating virtually and outsourcing most of its development work. Linke is the only full-time employee in the company’s five-person management team.

“We have experienced consultants in research and development, regulatory and business development who can take the company through our preclinical studies,” he said. The structure has allowed Embera to use capital efficiently, but “as we move forward, we’ll be looking to bring on additional full-time resources,” Linke added. ■