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## Neurology Firm NuPathe Gets \$15M For Lead Migraine Patch

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While its lead migraine product prepares for Phase III trials next year, NuPathe Inc. raised \$15 million in a Series A round enough to take the young firm to a regulatory filing within two years.

"It's our first big venture round. We've only had seed financing before, so this is a critical raise for us," said Jane Hollingsworth, the company's CEO.

Hollingsworth and her colleague, Terri Sebree, founded NuPathe in 2005 with the goal of focusing on central nervous system disorders and "honing in on those that a small company could most effectively address," Hollingsworth told BioWorld Today.

Sebree currently serves as the five-person company's president.

Based in Conshohocken, Pa., NuPathe received seed financing in November. Birchmere Ventures, of Pittsburgh, and BioAdvance Ventures, of Philadelphia, a fund managed by Quaker BioVentures, co-led the Series A round, which included participation from Safeguard Scientifics Inc., of Wayne, Pa., and other institutional investors. In addition, early stage money came from Ben Franklin Technology Partners, of Harrisburg, Pa., and two significant angel investors.

NuPathe "named to signify its neurology focus and its path to improve patient Medication" aims to develop therapeutics to treat conditions such as migraine headaches, Parkinson's disease and schizophrenia. NP101, the lead product, uses the company's transdermal patch technology called SmartRelief to deliver sumatriptan to treat migraine. The patch can be placed on the arm or other places of the body. Through a low level electrical current, it delivers an initial burst of the drug to give the patient's system a rapid onset of action, and then the drug is released for up to six hours for continued relief.

"We're taking the best triptan on the market with sumatriptan and enhancing the delivery of that," Hollingsworth said. "So we think there's a very good size market for the drug."

Patients receive triptans only through prescriptions, and they are delivered through injections, intranasally or orally with pills.

"One of the big problems with migraine is nausea and vomiting. It's a big part of the disease," Hollingsworth said, explaining that an oral pill is not necessarily the best option for patients. "So to have a more tolerable way of taking a drug that's easy to use is ideal, and that's where the patch comes in."

If it gains regulatory approval, NP101 would be the first migraine treatment of its kind. Phase I data from the ongoing study have so far shown the medication is delivered rapidly and has improved pharmacokinetics over current standards of care. "This will be a 505(b)(2) development plan, so it's a little bit of a quicker development program than the traditional NDA," Hollingsworth said. "We expect to have something filed in 2008."

The migraine market is worth more than \$2 billion a year in the U.S., which represents an estimated 2 million to 3 million people. But the market could be expanded significantly, considering about 30 million people suffer from migraines, but many do not seek treatment.

NuPathe licensed the patch technology used in NP101 from Minneapolis-based Iontophoresis. A second platform technology, used in two follow-on products, was licensed from the University of Pennsylvania in Philadelphia. Those products, NP201 and NP202, currently are in preclinical trials and are targeted to treat Parkinson's disease and schizophrenia, respectively. They use the company's LAD (long-acting delivery) technology, which consists of a small biodegradable polymer matrix. A dose is injected subcutaneously where it degrades over a defined period of time. The technology enables drugs to be delivered for one to 12 months with a single application.

NP201 consists of a dopamine agonist used with LAD to provide a stable, continuous drug delivery that could decrease the dose complications associated with current treatments. NP202 consists of an antipsychotic formulated with LAD to provide sustained drug delivery over three months to improve treatment compliance. Hollingsworth said it was too early to say when the lead Parkinson's disease and schizophrenia products would move into the clinic.

NuPathe likely will seek partners for commercialization of its products, particularly for the migraine candidate, Hollingsworth said, and as the company tackles worldwide markets.

Before starting NuPathe, Hollingsworth co-founded and served as a director and executive vice president of the specialty pharmaceutical firm Auxilium Pharmaceuticals Inc., of Malvern, Pa., where Sebree also worked as a senior vice president of development.