



## **FIRST PATIENTS TREATED WITH EKOS' ULTRASOUND-ACCELERATED THROMBOLYSIS FOR ACUTE STROKE**

Company's Technology May Help Overcome Limitations of Current Drug Treatment

Bothell, WA, August 17, 2000 -- EKOS Corp. today announced that the company's MicroLYSUS™ ultrasound-enhanced drug delivery system has begun to be used to treat patients suffering from ischemic stroke. This marks the first time this novel therapeutic strategy has been employed to interrupt a "brain attack" in progress.

The EKOS device is designed to deliver ultrasound and thrombolytic (clot-dissolving) drug directly into the area of a brain clot. Clots in brain arteries account for approximately 80 percent of the 700,000 strokes that occur each year in the United States alone. The MicroLYSUS device is a miniaturized catheter that is inserted into an artery in the brain until it reaches the clot. Drug is infused through the catheter to the tip where a tiny ultrasound transmitter is located. The ultrasound and drug are designed to be administered simultaneously, because it has been shown that ultrasound energy induces a temporary change in the structure of clot that allows the drug to penetrate more efficiently into the inner reaches of the blockage.

To date, 11 stroke patients have been treated with the MicroLYSUS device with no reported adverse effects associated with the device. In most of these cases, the clot-dissolving agent used was tissue plasminogen activator (rt-PA), although the system has been designed to work with other thrombolytic drugs as well. While the early experiences have focused on safety rather than efficacy, some centers have begun to report favorable outcomes.

For example, the first U.S. site to use the EKOS system was the Oregon Stroke Center at Oregon Health Sciences University (OSHU) in Portland. "In the one patient we've treated so far, the neurologic deficit has nearly completely resolved, despite the large area of brain that had been at risk", said Stanley Barnwell, M.D., Ph.D., associate professor of neurosurgery at OHSU. "This is clearly just a single case and much more research is needed, but I do believe that this patient is at a high functional status today because of the ultrasound-and-thrombolysis strategy."

The MicroLYSUS device is also being used in Vancouver, British Columbia, as well as in sites in Germany and Japan. Additional sites in the United States and Canada are expected to soon begin using the EKOS system.

The need for improved treatments for ischemic stroke is compelling. Currently, the only proven therapy is intravenous thrombolysis with t-PA administered within three hours of the onset of symptoms. However, it is estimated that fewer than 2 percent of stroke victims meet this criterion and are treated in this fashion. As a result, researchers have been looking for ways to expand the time window for treatment. One of the most promising appears to be local, or intravascular, administration of clot-dissolvers, instead of systemic delivery through a distant vein. This has the advantage of maximizing the amount of drug delivered directly into the area of the clot. The EKOS system takes this approach one step further and adds ultrasound to cause the clot to be more receptive to the drug. As a result, the MicroLYSUS device has the potential to achieve more effective clot dissolution, and therefore could be used later in the evolution of a stroke.

“Approaches such as the EKOS device that improve drug penetration into the clot and enable us to open blocked arteries more quickly could be of great clinical utility and could significantly increase the number of stroke patients to benefit from thrombolytic therapy,” said Tom Marotta, M.D., FRCPC, an interventional neuroradiologist who, with the stroke team at Vancouver General Hospital, is participating in the MicroLYSUS research.

Currently, the technology is being used in the United States under physician-sponsored Investigational New Drug (IND) procedures. Patients eligible for treatment under these INDs are those who present beyond three hours after the onset of symptoms and therefore are not candidates for intravenous thrombolytic therapy. EKOS plans to pursue company sponsored U.S. study activities later this year.

Human studies in stroke were initiated after positive laboratory and animal studies at EKOS and other laboratories consistently showed a significant acceleration of thrombolysis when clots were simultaneously exposed to ultrasound and thrombolytic agent. One study, presented at last year’s annual meeting of the American Heart Association by Dr. Barnwell, used a canine stroke model to compare ultrasound plus drug with drug alone. In this case, the drug used was urokinase. The study demonstrated 100 percent vessel opening in the ultrasound group at 30 minutes compared with only 50 percent in the drug-only controls, a difference that was statistically significant.

EKOS Corporation, located in Bothell, Washington, develops proprietary ultrasound-based systems and devices for local drug delivery. Such ultrasound drug delivery is designed to shorten treatment time, reduce toxicity, and improve penetration into target tissue compared to standard techniques. EKOS is currently focusing its research and development efforts in the areas of ultrasound-enhanced thrombolysis for treatment of stroke and in gene therapy for treatment of cardiovascular disease.