



A laboratory clean room at Brookwood Pharmaceuticals is the factory floor for development of the company's growing portfolio of 19 drug delivery patents.

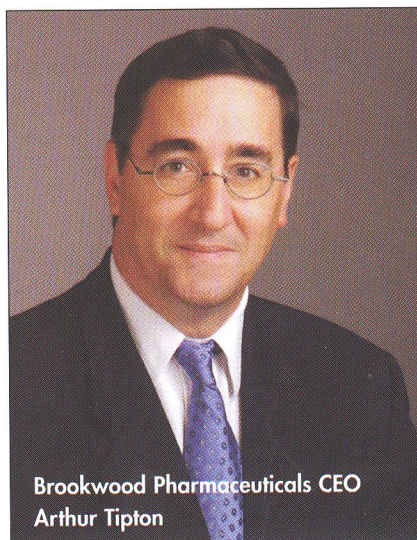
DRUG DELIVERY SYSTEMS SPECIALISTS

Brookwood Pharmaceuticals delivers drugs in ingeniously clever ways that command a profit. Drug addicts and alcoholics may be among the next to benefit from Brookwood's research.

BY HEATHER HORNYAK
STRONG

Brookwood Pharmaceuticals in Birmingham is the three-year-old, for-profit fledgling of one of the Southeast's oldest non-profit research institutions.

Although a relatively small chip off the old block, in just three years



Brookwood Pharmaceuticals CEO
Arthur Tipton

Brookwood, a wholly owned subsidiary of Southern Research Institute, has tripled revenues and employees — on track with its mission of

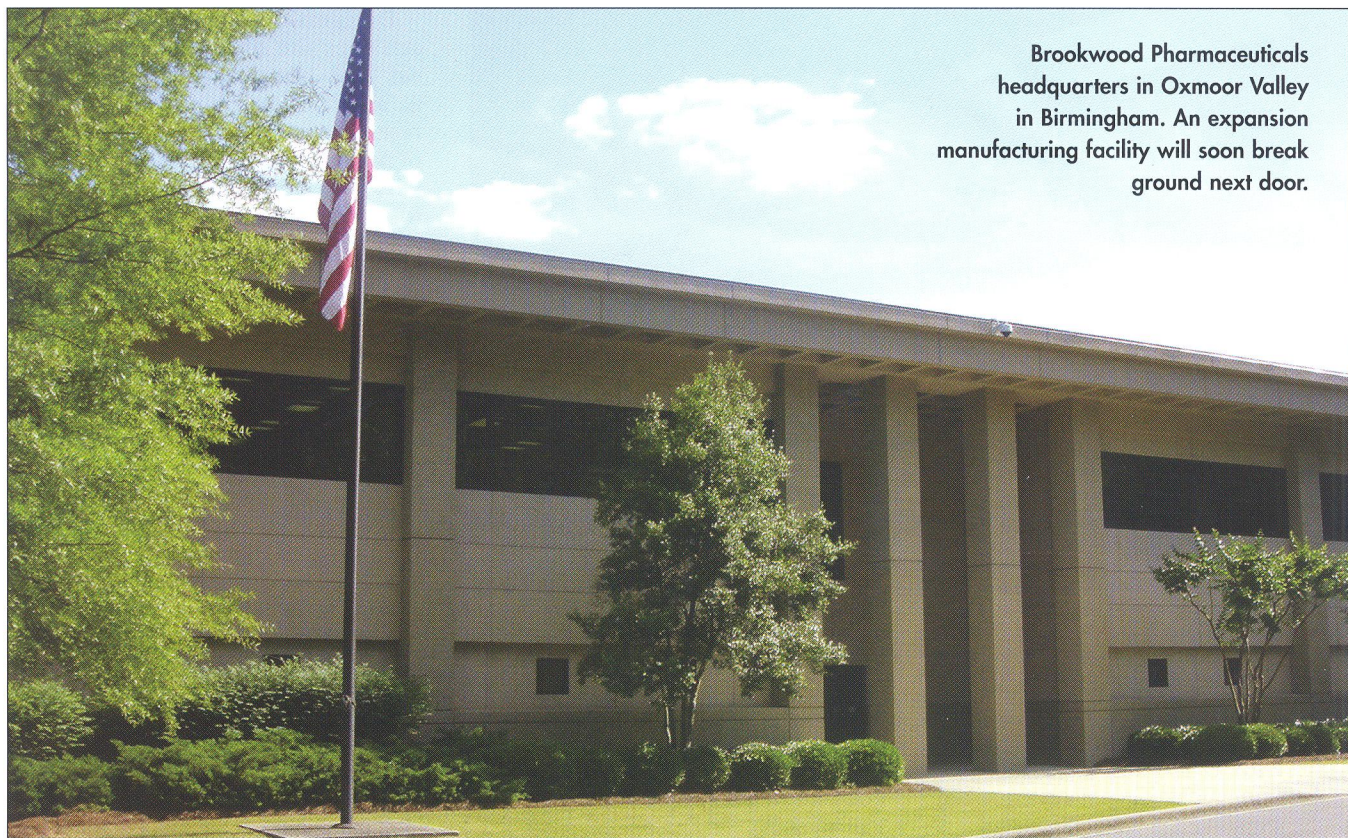
claiming a greater return on research spawned by its think-tank parent.

Founded in 1941, Southern Research Institute has annual revenues of over \$85 million, employing around 600 workers in a wide array of research, from environmental engineering to drug development.

As a private company, Brookwood chooses not to release revenue and employment numbers, but the 2006 annual report for Southern Research Institute noted that Brookwood, in its first year of operations revenues, "exceeded budget by over 25 percent" and "the number of top 50 pharmaceutical company clients tripled."

Brookwood Pharmaceuticals concentrates on drug-delivery systems, and the company holds more than 20 drug-delivery patents and multiple foreign counterparts to those patents.

Currently the focus is on time-



Brookwood Pharmaceuticals headquarters in Oxmoor Valley in Birmingham. An expansion manufacturing facility will soon break ground next door.

release drugs. Dating to research that began in the 1970s, among the most widely recognized achievements of Southern Research Institute have been contributions to what is more technically known as these "controlled-release" drug mechanisms.

Brookwood's researchers begin with drugs that have to be injected once a day, then develop ways to convert them into drugs that can be injected once a month or once every three months.

TIME-RELEASE ADDICTION TREATMENT

Alcoholics and drug addicts are some of the first beneficiaries of such applications. Brookwood teams with drug manufacturers to create longer-acting drugs that make the patients' therapy more controllable and effective over the long haul of kicking addictions.

Researchers recently have worked with Buprenorphine and Naltrexone, which block the euphoria of alcohol and opiates.

"Naltrexone is also the first line in therapy for drug overdose," says Arthur Tipton, CEO and president of Brookwood. "When given after an opiate overdose, it reverses the

effects of the drug."

Brookwood is collaborating with Elbion NV, a leading drug discovery and development company in Belgium. Elbion bought Naltrexone Depot and Buprenorphine Depot from a French company, DrugAbuse Sciences. Along with the company, Elbion bought licenses for controlled-release applications developed by Brookwood. The Birmingham biotech is working under contract to supply Elbion with products that are now in clinical trials.

Naltrexone Depot is a sustained-release formulation of Naltrexone, an antagonist that blocks receptors in the brain to switch off the euphoric effects of alcohol. Naltrexone usually comes in the form of a once-a-day injection or pill. Naltrexone Depot is a once-a-month intramuscular injection that Elbion believes will offer advantages in the treatment of alcoholism, in which patient compliance is an obvious problem.

Buprenorphine Depot is a sustained-release formulation of Buprenorphine that acts much like Naltrexone Depot for the purpose of treating opiate addiction. Brookwood will be developing a once-a-month injection.

"It's a novel product that has yet

to be named for distribution in the United States," Tipton says. "We have developed a positive relationship with the senior team at Elbion, and we're enthusiastic to be working with such a reputable organization."

STRATEGIC ACQUISITION, COLLABORATION

Brookwood's for-profit status gives it strategic advantages, Tipton says. "There are a number of reasons to create a for-profit company," he says. "We can raise revenue and collaborate with other companies to work on ways to improve the treatment of disease like never before. And a for-profit company, unlike a not-for-profit company, can acquire other companies in order to manufacture its products."

In 2005, Brookwood moved quickly to reduce costs for one of its most basic research supplies, polymers. The Birmingham company bought the external polymer manufacturing business of Alkermes Inc., an Ohio manufacturer of biodegradable polymers, which are building blocks for sustained-release drug delivery systems. A wholly owned subsidiary of Brookwood, the manufacturing business has been renamed Lakeshore



Subsidiary Lakeside Biomaterials Inc. supplies polymers.

Biomaterials Inc.

Brookwood also pursues active collaboration with other pharmaceutical companies, and one of its biggest such deals was announced last May, with Genzyme, a Boston biotech giant, with annual revenues of \$3 billion.

"We're doing a number of things together. In one area, they manufacture therapeutic peptides, and many peptides can benefit from delivery technology at Brookwood, so we are working together to design peptide and delivery system in parallel," Tipton says.

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Designing for peptide delivery achieves the most desirable chemical and physical properties early in a drug's development. It allows researchers to match the properties of microparticles, implants and other very precise characteristics required for optimal drug delivery.

"By working with an industry leader like Genzyme, we envision this collaboration to generate plenty of energy, creativity and new drug delivery solutions and products, from which our clients will greatly benefit," Tipton says. "From our experience in peptide delivery, we've learned that focus on peptide modification and peptide properties can greatly aid in the stability and performance of a peptide drug delivery product."

One of Brookwood's most recent collaborations to be announced is with an Australian company, Clinuvel Pharmaceuticals. The two companies are teamed in development of a drug that treats several congenital skin disorders.

Currently in Phase II clinical trials, the drug, called CUV 1647, increases the levels of eumelanin in the skin, protecting against UV irradiation. Owing to Brookwood's contributions, the drug is delivered from a subcutaneous implant approximately the size of a grain of rice. Increased pigmentation appears after a few days and may last up to several months. Researchers are proposing that the drug can treat the millions of people worldwide who suffer from UV-related skin disorders.

The most visible evidence of Brookwood's growth owing to such deals is in bricks and mortar.

"Since we've increased drug-delivery systems production, we need an additional manufacturing facility," Tipton says. The company is in the advanced planning stages of an expansion, and hopes to locate the facility close to its headquarters in Oxmoor Valley.

"We will continue to focus on our drug-delivery technology to develop a wide range of products for our clients," Tipton says. "We will add additional technology to our portfolio, and will continue looking at therapeutic products for us to internally focus our resources in the development of proprietary products." •

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