

Celebrex may well be the most famous drug discovered in St. Louis, a blockbuster medicine that relieves arthritis symptoms and pain without causing stomach ulcers. Celebrex works by selectively inhibiting the enzyme cyclooxygenase-2 (COX-2), which is involved in causing pain and inflammation where there is trauma or arthritis. But the drug allows another type of COX enzyme—called COX-1—to continue its everyday role of helping protect the stomach. Aspirin and other older nonsteroidal anti-inflammatory drugs block both COX-1 and COX-2 enzymes, which may increase the likelihood of stomach irritation.

The U.S. Food and Drug Administration granted accelerated approval for **Prezista** in 2006 to help treat people with human immunodeficiency virus (HIV). Effective against resistant strains of the virus, Prezista blocks an HIV enzyme to help prevent it from reproducing.

Xeljanz, a rheumatoid arthritis treatment that helps reduce joint pain and swelling.

Inspira is used to treat high blood pressure. Pfizer Inc.'s research laboratories in St. Louis played a significant role in the development of this drug and the four others attached below. The Fortune 500 pharmaceuticals firm provided support—ranging from preclinical development to the clinical development or launch—in making available the following treatments for both common and rare ailments.

Genotropin, a man-made copy of the natural growth hormone used to treat growth disorders.

Somavert, which treats an uncommon disorder called acromegaly caused by too much growth hormone.

Deramaxx Dogs with osteoarthritis benefited from the discovery of the coxib drugs, which were later modified to apply to canines. This non-steroidal anti-inflammatory drug—sold as a flavored, chewable tablet—helps relieve arthritic pain and inflammation as well as postoperative pain in dogs.

Not only did the makers of **Listerine** come up with a treatment for halitosis—they let people know that's what they had. Dr. Joseph Lawrence and chemist Jordan Wheat Lambert created Listerine as a disinfectant for surgery in St. Louis in 1879, naming it after an English antiseptic surgery pioneer, Sir Joseph Lister. But Lambert soon realized his product's effectiveness as a mouthwash. In an advertising campaign still noted today, Lambert Pharmacal Company promoted Listerine during the 1910s as a cure for a condition it dubbed "halitosis" (according to the online Gale Virtual Reference Library). Consumers turned to Listerine to cure this newly coined hygienic problem, making the mouthwash a household champion against bad breath.

Elelyso, an injectable drug that treats Gaucher disease, a genetic disorder that causes fatty substances to accumulate in major organs.

Japanese encephalitis (JE) virus vaccine Former Saint Louis University Associate Professor Thomas Chambers invented a vaccine that helps prevent infection by the Japanese encephalitis (JE) virus. Spread by mosquitos that live in some parts of Asia, JE is described by the World Health Organization as one of the most important viral brain inflammation conditions in the region. The JE virus vaccine is in use in Thailand and Australia, and awaiting approval in other countries.

Dynastat Another COX-2 inhibitor is Dynastat, a water soluble and injectable drug used in Europe to ease short-term, severe pain following operations. It's what is called a "prodrug," which means it is converted by the body's enzymes into the drug valdecoxib. Valdecoxib was initially sold under the name "Bextra" in the United States but was withdrawn from the market in 2005 due to concern over the risk of heart attack and stroke as well as serious skin reactions. Neither valdecoxib nor its prodrug, Dynastat, is used in the United States. 🍷

People afflicted by the incurable lung disease known as **idiopathic pulmonary fibrosis (IPF)** may find their best hope of survival in a new St. Louis biotechnology company. The start-up—Antegrin Therapeutics LLC—was founded by Saint Louis University researchers David Griggs and Peter Ruminski to turn their molecular discovery into a lifesaving medical treatment for IPF sufferers who typically live just three to five years following diagnosis. Ruminski and Griggs are scientific advisors in Antegrin Therapeutics' effort to develop an inhaled IPF medicine based on their patented discovery of molecules that block proteins which cause another protein—called Transforming Growth Factor (TGF) beta—to go into overdrive and create dangerous amounts of scar tissue in the lungs. The goal is to bring TGF beta activity back to normal, halting the disease's progression. Antegrin Therapeutics is conducting preclinical tests of the patented molecules now, and researchers hope to begin clinical testing by 2016.

Washington University School of Medicine faculty member and STLCOOP alumnus Irving Boime and his laboratory team created a long-lasting hormone in 1988 that powers an in-vitro fertilization drug called **Elonva**. Boime '64 added a short chain of amino acids to a naturally occurring hormone to develop the drug while working for what was then the university's pharmacology department. Currently sold by Merck & Co. in Europe and other overseas countries, Elonva replaces daily injections aimed at stimulating egg production with a single weekly shot. The drug is awaiting U.S. Food & Drug Administration approval.

Made in St. Louis

By Vicki Hodder

Drug discoveries involve years of research, clinical trials, and development. Yet at their core, drug discoveries start with one not-so-simple idea—doing something that hasn't been done before. While some drug discoveries are just getting off the ground, a number

of drugs that are already relied upon by people throughout the world got their start in the Gateway City. Take a look at some of the local drug discoveries that are helping people at home and abroad cope with everyday challenges ranging from arthritis to HIV.