miRagen Team Outside Company's Boulder Headquarters

miRagen: Comprehensive, microRNA Targeted Therapies

TINY MOLECULES MODULATE CELLULAR PROCESSES AND CAN RE-PROGRAM CELLS INVOLVED IN DISEASE

miRagen

COMPANY SNAPSHOT

FOUNDED
2007

HEADQUARTERS
BOULDER
COLORADO

EMPLOYEES
60

Colorado BioScience Association presents *Breakthrough Profiles*, in partnership with:

COLORADO
Office of Economic Development & International Trade

Metro Denver
Economic Development Corporation

Bill Marshall was in Vienna, Austria, when he got the news. A prominent researcher had, for the first time, found a way to use a molecular cousin of DNA, called a microRNA, to prevent heart failure in mice with high blood pressure. In the world of cardiac medicine, "that was a eureka moment," said Marshall.

It meant that a drug could potentially be developed to inhibit the microRNA molecule in order to treat the abnormal enlargement of the heart condition and potentially prevent cardiac arrest.

Marshall returned to the States, met with molecular biologist Eric Olson, who had made the microRNA discovery, and within six months co-founded Boulder-based miRagen with Olson, cardiologist Mike Bristow, chemist Marv Caruthers and venture capitalist Bruce Booth. Atlas Venture and Boulder Ventures provided the founding investment for the company. Although everything was happening fast, Marshall said he was able to rapidly build a stellar team from the Colorado bioscience community.

"WHAT WE CAN RECRUIT WELL IN COLORADO ARE INNOVATORS, PEOPLE THAT ARE FOCUSED ON EARLY STAGE DRUG DISCOVERY AND DEVELOPMENT," HE SAID. MARSHALL ATTRIBUTES THE STRONG STARTUP CULTURE TO THE LOCAL LIFESTYLE, WHICH ATTRACTS ACTIVE, ADVENTUROUS PEOPLE. "THEY'RE A LITTLE MORE RISK-TOLERANT OVERALL," HE SAID.

A Wisconsin transplant, Marshall came to Colorado in 1986 to pursue his Ph.D. in chemistry and biochemistry from the University of Colorado Boulder. He continued with postdoctoral training at CU Boulder and CU Denver and has been immersed in the state's bioscience research and investment community ever since. As part of doing business, he travels regularly to Boston and San Francisco, where he's seen the consolidation of biotech startups become more and more dense.

"There may be good reasons for localizing in a hub, but when you begin to oversaturate those areas, it can become a big issue," he said. Employee loyalty starts to run low, rents run high and the process for collaborating with local research institutions can be slowed by competition over resources and talent, he said.

That's why Colorado's flourishing bioscience sector is the ideal home for miRagen.

"The work ethic is refreshing," said Paul Rubin, Executive Vice President of Research and Development at miRagen. "The team is tenacious about developing breakthrough therapies that improve human health."

miRagen develops cutting-edge drugs that not only treat the disease but the network of cellular processes that contribute to a disease and its symptoms. Cancer, for example, is a proliferation of abnormal cells growing out of control. Conventional treatments, such as chemotherapy, kill the cells. But miRagen is working on microRNA-based therapeutics that target the molecular pathways that drive cell growth in the first place.

MicroRNAs were once thought to be junk DNA. But now scientists know the molecules are vital to gene regulation. Each microRNA can influence the expression of many genes at once and regulate entire biological pathways. That means modulating a single microRNA—increasing its level or decreasing its activity—can, for example, regulate cell growth, while at the same time reduce inflammation.

"It's like giving a combo therapy in a single molecule," said Paul Rubin, Executive Vice President of Research and Development at miRagen.

The team Bill Marshall built has grown quickly from 20 employees to more than 60. They focus on therapies to treat diseases of the heart, those implicated in blood-based cancers such as lymphoma and leukemia, pathologic scaring of the skin, lung, liver and eyes, and neurological degenerative disorders such as amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease.

"We've created a culture here that's driven by teamwork and collaboration and trying to do something that changes people's lives," said Marshall.