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SCIENCE OF LIFE

Bozeman-based Montana Molecular uses new approach to

By DAVE RICHARDSON Chronicle Staff Writer

When most people think of protein, they think of peanut butter or meat. For Anne Marie Quinn and her husband Tom Hughes, protein is a magical word. When they think of protein, they think of fascinating science, strange glowing images of living cells and, perhaps most importantly, money. Quinn is the founder of Montana Molecular, a still small high-tech start-up that has yet to sell a product, but that could have a hand in changing the world. The company blossomed out of a revolution in the synthesis of phosphorescent proteins that can provide new insights into the inner working of living cells and maybe even help cure deadly diseases. “We’re pretty excited about it,” Quinn, 51, said. She should be. Fluorescent proteins have been used to study cells for more than a decade, but the process of creating those proteins has – until now – been a tedious one. Researchers typically spend weeks in the lab synthesizing proteins to suit their needs, reinventing the wheel each time a new protein was needed.

Montana Molecular’s approach, pioneered by Hughes, an associate professor of cell biology and neuroscience at Montana State University, uses a single gene to produce the needed protein, a job that can be done in as little as a day, Quinn said.

Those proteins can be hand-tailored, mass-produced, packaged and marketed to researchers all over the world.

“It could take a month of research just to create the tool you need,” Quinn said. “Having a way to create the tool very quickly will really change the way people look at this. Now there’s no question of build versus buy. You’ll just buy what you need because it’s more cost effective.”

TAKING A SHINE T O PROTEIN

Fluorescent proteins are fairly common in living organisms – from fireflies to jellyfish to plankton.

In the past, fluorescent proteins could not be used to examine the inner workings of living cells because there was no way to get the protein into a cell while the cell was alive, Hughes said.

Now, the gene that produces the fluorescent protein can be essentially fused to the DNA of a cell, then implanted in living tissue. The gene expresses itself in the cell, and the protein, illuminated with light, fluoresces, allowing a researcher to view – in real time – exactly what the protein does inside the cell.

“All the work done in cells is mediated by proteins,” Quinn said. “We want to be able to see those proteins. The work is very dynamic. The proteins move around inside the

cells, interact with other proteins and mediate connections between cells."

Being able to see those interactions is critical to studies like immunology. By attaching a fluorescent protein to an antibody, researchers can watch and understand exactly how the antibody reacts to and interacts with a virus, a cancer cell or other disease process.

Hughes said he is fascinated by the research he does.

"Essentially my lab (at MSU) builds tools that empower research," Hughes said. "What I'm asking scientifically is, what are the things we want to measure but can't measure right now? And how can we build a gizmo that will allow us to do that?

"The process we've stumbled upon here allows us to make oodles of these things really quickly."

CREATING NETWORKS

By working with MSU's Technology Transfer Office and with Tech Ranch, Hughes is able to find real-world commercial applications for his "gizmos," feeding them to companies able to take advantage of them and eventually bring them to market.

Tech Ranch was founded in 2000 as an incubator for hightech startup companies.

John O'Donnell, Tech Ranch's executive director, said his goal is to create a muchneeded merger between academia and commercial ventures, with the goal of creating viable, prosperous companies that will create more, betterpaying high-tech jobs for Montanans.

"That's really different from typical economic-development efforts in Montana," O'Donnell said. "Most are based on agriculture, tourism and servicebased things. If you're trying to do the kinds of things Montana Molecular is doing, it's a different ball game."

Tech Ranch also offers help and advice to companies to turn their ideas into sound and profitable businesses.

Quinn said close relationships between the university and budding high-tech companies are a real bonus for companies like hers. With Hughes working directly in the field on a daily basis — subject, he said, to strict ethical oversight to prevent conflicts of interest — Quinn's job is considerably easier.

"It's really cool because he can get to know the students and their interests," Quinn said. "Some go off to medical school, but some get very interested in research. He can identify the stars and give me an edge in recruiting and finding talent. It's a real asset."

One of the biggest guns in the research world – the National Science Foundation – recently awarded Montana Molecular a $150,000 grant to help the company pursue its new technology.

And though Quinn has yet to get a product to market, close working partnerships with other local biotech companies like Ligocyte Pharmaceuticals Inc., who can bring their marketing expertise to bear, mean it's only a matter of time before Montana Molecular's first product ships.

"I think we'll be able to make an announcement soon," she said. "Some of our partners have product ready to market, so I think we'll be ready within the next month."

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SEAN SPERRY/CHRONICLE Montana Molecular research scientist Erica Haggen uses a pipette while working on the Montana State University campus recently.

SEAN SPERRY/CHRONICLE
Montana Molecular founder Anne Marie Quinn, above, is excited about the new scientific uses the living cells may produce. Tom Quinn, left, scans his computer for video of living cells. The video allows scientists to view the inner workings of living cells by using a process of fusing fluorescent proteins to the DNA of a cell.