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Friday, July 17, 2009

Microbes take center stage

Claire Fraser-Liggett and the Institute for Genome Sciences strive for scientific renown

Baltimore Business Journal - by [Julekha Dash](#) Staff

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It's easy to forget that you're among leading academics when you walk into the Institute for Genome Sciences.

There's eye-catching modern art on the walls. You are greeted not by microscopes but a balcony overlooking Baltimore Street as you enter the office of Director Claire Fraser-Liggett — a balcony that you could imagine an advertising agency using to entertain clients.

But tucked away in a corner of that office are tiny letters that remind you that, yes, you are in a pretty intense scientific research environment.

They read: "Microbes run the world, it's that simple ... but they need good spokespeople."

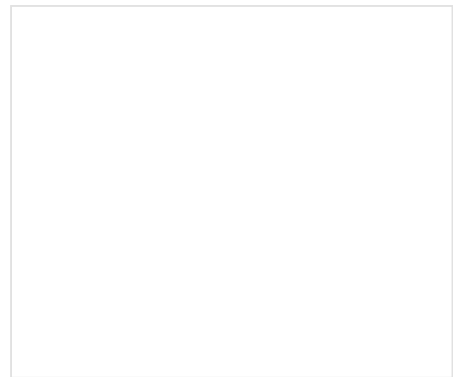
And speaking on behalf of microbes is Fraser-Liggett's mission at the University of Maryland School of Medicine. A rock star in the world of microbiology, Fraser-Liggett and her staff of 92 have won nearly \$80 million in research grants in the past two years to

study everything from how microbes contribute to obesity, Crohn's disease and yeast infections. That is double the amount of genomics research funding the University of Maryland School of Medicine had received prior to her joining in 2007.

The school, much like the rest of Maryland, is placing big bets on the biotech industry. The University of Maryland is banking on the reputation of star researchers like Fraser-Liggett to grow its \$800 million biopark on the city's west side. And it's happening while, on the other end of town, a nonprofit spearheads a \$1.8 billion residential and biotech development near Johns Hopkins Hospital.

Now that Fraser-Liggett is there, she is making some bold pronouncements. The group's biggest research effort, the National Institutes of Health's Human Microbiome Project, will surpass the Human Genome Project, she said.

And University of Maryland officials are banking on that. Having outfitted the institute with cutting-edge equipment and a 40,000-square-foot space at the University of Maryland, BioPark, they expect Fraser-Liggett to make the school one of the world's premiere genomics research centers. Microbial research could lead to breakthroughs in personalized medicine to treat a variety of diseases.



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“It’s got a wonderfully broad impact that touches all sorts of areas,” said James Hughes, University of Maryland Baltimore’s vice president for research and development.

A lot left to learn

One of science’s greatest feats, the Human Genome Project involved researchers from all over the world who sequenced all of the human genes in 2000. Fraser-Liggett’s ex-husband, J. Craig Venter, was a key architect. The effort was hailed by former President Bill Clinton and former U.K. Prime Minister Tony Blair as an accomplishment that would usher in new disease treatments.

The Human Microbiome Project has been called an extension of the Human Genome Project. But will the study of microorganisms surpass its ancestor?

“I wouldn’t discount that statement,” said Mark Adams, an associate professor at Case Western Reserve University in Cleveland.

Adams worked as a scientist with Fraser-Liggett at the Institute for Genomic Research in Rockville, often referred to as TIGR. That institute, which Fraser-Liggett headed, was a division of the J. Craig Venter Foundation, run by Venter. After working at TIGR for nearly a decade, Fraser-Liggett brought about 60 former employees from TIGR, including 15 senior scientists, to the University of Maryland. The leading scientists on the Microbiome project include Owen White, the center’s director of informatics, and microbiologist Jacques Ravel.

Only 10 percent of the cells in our body are human cells while 90 percent are microbe cells, or tiny organisms such as bacteria and fungi that support life. And yet, Adams said, we understand just a tiny fraction of how microbes operate in our bodies.

“It’s enormous what has been left to learn,” he added.

Understanding how microbes operate can offer a new perspective on what it means to be healthy, Fraser-Liggett said. In one research project, Fraser-Liggett will study the Amish to see how changes in microorganisms in the gastrointestinal tract can lead to obesity. The Amish make good research subjects because of their narrow gene pool and large families. Studies on mice suggest that the presence of some microbes explain why mice pull in more calories. Microorganisms could also explain why people get inflammatory bowel disease or Crohn’s disease.

Apart from her work at the University of Maryland, Fraser-Liggett’s research has touched on everything from anthrax to the everyday ailments. This year, she coauthored a paper with her husband, University of Maryland Professor Dr. Stephen Liggett, that decoded the genomes of the common cold. In 2001, she and a team at TIGR decoded the DNA sequence of the anthrax genome.

In 1995, she coauthored a groundbreaking publication of the first complete genome sequence of a free-living organism, Haemophilus influenzae, that essentially launched the field of microbial genomics.

Getting the goods

But just because the University of Maryland can get a top scientist does not guarantee that it will reap a payoff.

The university had to create an environment in which the staff can be successful, said Dr. Bruce Jarrell, executive vice dean of the University of Maryland School of Medicine. So to get there, the university pulled out all of the stops. That includes the sweeping balcony.

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