

Glue binds N.B. scientist with native home

Banquet Yves Brun honoured to return to his Shediac high school and attempt to raise funds for a trust at the same time

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SHEDIAC - Yves Brun discovered the strongest super glue in the world among the tiniest organisms - bacteria.

And his grasp of how the minute bugs suck nutrients from their surroundings could mean they will someday be used to clean up industrial waste.

Renowned in North America for his contributions to fundamental biological

research, the New Brunswick native is coming home from his Indiana laboratory to accolades here.

Brun will be awarded alumnus of the year status at a Nov. 1 banquet to raise money for his Shediac high school's Louis J. Robichaud Trust Fund - named after the school and former New Brunswick premier - which provides bursaries to bright graduating students for post-secondary studies.

He's glad he will get to speak to stu-

dents Friday at the school and at Saturday's banquet about his body of work and his desire to pursue science, which was inspired by a former teacher at Louis J. Robichaud school, his father.

"As kids, my father would play a game with my brother and me, and ask us, 'What do you think makes the sky blue?'" Brun said.

His interest in finding out how nature works, evident even at a young age, is clear in his work today.

Brun became a media darling across the continent two years ago after finding the kidney-shaped bacterium he studies - the *Caulobacter crescentus* - has a head that secretes a sticky glue-like substance so strong that bacteria covering a quarter of a table could hold the weight of an elephant.

He believes if the glue were to be manufactured commercially, it could bind human skin, replacing staples and stitches.

But Brun's primary interest is in know-

ing how and why the adhesive is so strong and how the bacterium works to produce the sticky substance.

The scientist first became fascinated with the shapes of different bacteria - some like kidneys, others like corkscrews and some with propeller-like structures on their heads - in graduate school at Université de Moncton.

Now 47, Brun's curriculum vitae of

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Brun's work has caught the attention of the U.S. National Science Foundation

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awards, posts, visiting lectures and publications fill nearly 30 pages.

As a professor and researcher at Indiana University, Brun has 18 researchers carry out the lab tests his curious brain devises.

His research is considered basic but Brun has garnered the attention of the U.S. National Science Foundation and the Department of Energy, which have given him and his team grants to continue their research in the domain so it can be applied later.

In 2006, Brun's work helped him prove that *C. crescentus* bacterium's stalk-like structures help it to siphon nutrients from its environment.

The U.S. agencies hope that the information they glean from his research will mean bacteria can be used to clean up small amounts of toxic industrial effluent, difficult to trap otherwise.

"This bacterium is a champion at being able to absorb substances at low concentration," Brun said.

While Brun has stumbled upon real-life applications for bacteria, the purpose of his work is to use the *C. crescentus* bacterium as a model for how all bacteria behave.

Brun's knowledge of how bacteria bind to humans and what roles their shapes play is part of a body of work that he hopes will help drug companies develop new, powerful drugs to fight bacterial infections in what Brun calls today's "warfare" between the bugs and antibiotics.

"Bacteria, through random mutations and evolution, will develop resistance to those antibiotics," he said.

Brun left New Brunswick in the mid-'90s, lured by U.S. funding for his basic biological research.

He complains that Canadian agencies do not dole out enough grant money for important basic research.

"When penicillin was discovered, this was discovered in the context of someone (Alexander Fleming) who was trying to understand bacteria," Brun said, adding, "This has had a huge impact on antibiotics, I mean, has there been a more important discovery? Probably not."

Brun's friend and the person who will present him to speak this weekend, Rodney Ouellette of the Atlantic Canada Research Institute, said Canada has improved its grants programs since Brun set up shop south of the border.

In the late '90s and early 21st cen-



Yves Brun and Xinguo Wang, left, discuss the sequencing of bacterial genomes at the Indiana University Center for Genomics and Bioinformatics. The Roche Applied Sciences 454-GS20 high-throughput DNA sequencer is capable of sequencing whole bacterial genomes in a few days. Dr. Brun is leading a project involving a large group of microbiologists, bioinformaticians, and computer scientists to develop tools for genome sequence analysis that will enable rapid prediction of the properties of new microbes, for example emerging pathogenic bacteria.

tury, the Canadian Institutes of Health Research, the Canada Foundation for Innovation and the Canada Research Chairs program, Genome Canada were formed, Ouellette said.

But Brun said only a select few researchers are able to access those monies. He said Canada focuses more on funding applied science and does not put enough money towards basic research, such as his.

In the U.S., he said, basic researchers would receive more than twice the cash to fund their laboratories.

His colleagues in Canada who have grants from the Natural Sciences and Engineering Research Council of Canada – the Canadian equivalent of the National Science Foundation – are receiving typical annual budgets of \$30,000 CAD over five years.

Brun gets \$150,000 US per year from the National Science Foundation for his lab after the amount that goes directly to his university over three years.

And it's easier for Brun to get multiple grants south of the border than in Canada, he said.

His annual research funding after removing the university's portion is \$770,000 – two grants from the National Institutes of Health, one from the National Science Foundation and one from the Department of Energy.

A fellow graduate from Louis J. Robichaud high school hailing from the village of Cap-Pelé like Brun, Ouellette said the region's quality education has propelled a number of prominent researchers to the forefront of their fields, researchers he hopes would consider coming home to do their work.

"I think it's case in point that this region, New Brunswick in particular, has been able to produce very, very, high-calibre scientists...that maybe had to leave at one point because maybe we didn't have the capacity to allow them to go the next step," Ouellette said.

"Wouldn't it be great if we could bring more of them back?"

Ouellette recognized, though, that it would be tough for someone like Brun, who has set up his lab, staff and teaching south of the border, to pick up and come home.

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