

The human genome leads back to BC

When he was growing up on his parents' farm in Quesnel, BC, Marco Marra didn't plan on becoming a cutting-edge research scientist. Marra, the 34-year-old associate director of the Genome Sequence Centre at the British Columbia Cancer Agency, thought about working at the local lumber mill, but his parents insisted that he go to university. Since he'd done well in science at high school, he decided to give it a whirl. He put himself through school by pounding railway spikes every summer, and eventually graduated from Simon Fraser University with a doctorate in biology.

The first curve in his genome career path came a decade ago, when Dr. David Baillie at Simon Fraser offered him graduate work in his laboratory. It was an "excellent opportunity" that let Marra get acquainted with genomics while the science was still in its early years.

Marra's interest was solidified in 1994 by a postdoctoral fellowship at Washington University in St. Louis, then site of the largest genome sequencing centre in the US. Following 5 years of work there on projects involving the International Human Genome Project, he returned to Canada in the fall of 1999 to join BC's Genome Sequence Centre.

Marra's interest in medicine, especially endocrinology, was heightened 3 years ago when his own case of diabetes was diagnosed. Did he ever consider a career in clinical medicine? "I did and I do," he says with a laugh. "A career is a difficult concept for me, actually. I believe that whatever you do you do passionately, and when you are no longer pushing yourself it's time to do something else. I think that clinical medicine must be a very challenging thing to do. . . . I find it intriguing to deduce what might be ailing an individual from that individual's description of the ailment. I do think that there is something enormously attractive about clinical medicine — the opportunity to help people be healthy."

For now, though, Marra looks at genome research as his chance to have an impact on people's health. Our understanding of genes is "at a very fundamental stage," he says. "We are so naïve about biology. I see this very much as an open-book situation. We can write down the characters in the book — this is the DNA sequence — but interpreting it will consume people for a very long time."

As for potential health benefits such as more focused therapies, "I have no idea how that will come about. Knowing a person's DNA sequence may influence the choice of drugs for a condition. You can imagine how the technology might

be used as a prognostic or diagnostic tool. These possibilities will continue to swirl, and some will eventually consolidate into reality."

When it comes to ethical application of all the information that is emerging, Marra says he "generally has faith in society and hopes cool heads prevail." He already has personal experience with one of the problems predicted for people with certain diseases because of genetic research: he has been declined insurance due to his diabetes.

On the controversial issue of the commercialization of DNA sequencing, Marra says that the fundamental DNA sequence is not a product. However, "products based on intelligent and humane interpretation of the data should be marketed. I would buy them if they made my existence easier." Public access to genome data is essential to maximize its usefulness, Marra says. "It really does have to be open for interrogation by anybody on the

planet. Otherwise, there will be no sensible or humane use of the information."

At the BC centre, says Marra, a young and "remarkable" staff has created an invigorating environment. "It's a lot of fun to talk with people well outside your field and learn from them. These people are like my family."

Last fall there were 36 engineers, physicists, molecular biologists, computer scientists and physicians on staff, and now there are about 50. Most of the staff, which includes Marra's wife, Sharon, a biologist, are from BC. He says there is no shortage of local talent. "We can do big things efficiently."

With millions of DNA sequences in demand, the need to make DNA sequencing "very cheap" is a priority. The commercial sector charges about \$25 for a single gene sequence; the cost at Marra's laboratory, where he and his colleagues are responsible for fingerprinting DNA from the mouse genome, is \$6. They are currently identifying 20 000 fragments of mouse DNA, which will be sequenced at Washington University and the Whitehead Institute for Biomedical Research.

Marra rises at 5 am and checks his email at home before heading out for an early-morning jog or weight-lifting session. When he has free weekends, he enjoys wilderness hiking, but he clearly thrives on his work.

"I enjoy what I do," he says. "I don't know what workaholic really means — I don't track hours — but I think that the ability to be in an invigorating environment is really a privilege." — Heather Kent, Vancouver



Marco Marra: a privilege to work here