

Some “Difficult Conversations” Are Worth Having

Strategies for successful GE³LS/Genome collaborations to be explored at National Symposium’s GE³LS plenary session.

Put two strangers in a room together and, depending on each personality, the conversation can become lively or stilted. It’s not so different when you put a GE³LS researcher and a genome scientist in a room together: the dialogue can be highly productive or completely unworkable. It all depends on the nature of the relationship.

Collaboration is at the heart of the GE³LS story. Not only between the different social science disciplines — ethics, environmental studies, and economics, the ‘E’ of the GE³LS moniker, as well as law and sociology — but also between those disciplines and the science of genomics and proteomics.

Ultimately, the success of those collaborations depends on individuals finding common ground and building trusting relationships. Developing those partnerships is no easy task, but when it works, it can produce some remarkable results.

That’s the focus of the GE³LS plenary session at the upcoming National Genomics and Proteomics Symposium, to be held in Vancouver on

November 24th and 25th. Organized by **Michael Burgess**, professor and chair in biomedical ethics at UBC’s W. Maurice Young Centre for Applied Ethics, the plenary session will showcase two real-life, practical examples of productive collaborations, one from Genome Atlantic, the other from the Ontario Genomics Institute.

As evidenced by the session’s title — “Difficult conversations: Do GE³LS/Genome collaborations work?” — the idea is not to downplay the tensions inherent in such alliances, but to describe what works and what doesn’t. Rather, presentations are intended to stimulate dialogue with the audience about how to form constructive relationships between GE³LS and genome researchers.

“It’s the first time in Canada that we’ve seen this kind of massive and systematic investment in a GE³LS-type program,” says Burgess. “We’re actually putting together people who don’t often talk to each other. For example, anthropologists and sociologists, who are very similar, often talk at different conferences. Philosophers who specialize in health care ethics, like I do, talk to healthcare lawyers, but not as often to lawyers in other areas such as intellectual property. With

Continued on page 002



DON’T MISS IT!

GE³LS PLENARY SESSION

WHEN > 11:00 am to 12:30 pm, Thursday, November 25th

WHERE > The National Genomics and Proteomics Symposium, Vancouver, BC

Panel Discussion: “Difficult conversations: Do GE³LS/Genome collaborations work?”

Chair: *Michael Burgess*, W. Maurice Young Centre for Applied Ethics

Panelists: *Sharon Regan* and *Ken Culver*, Genome Atlantic, *Cheryl Cline* and *Richard Wintle*, Ontario Genomics Institute

Moderator: *Tim Caulfield*, Genome Prairie

GE³LS Research Presentations:

The plenary session will be preceded by the presentation of two GE³LS research papers:

Denise Avard: “Research in Genetics and Genomics: Rights and Responsibilities”.

James Tansey: “Leaping to Transgenics in GE³LS Discussions: The Model of Salmon Genomics”.

For more information on the GE³LS plenary session, contact mburgess@ethics.ubc.ca

GE³LS Researcher Cited in *Monsanto vs. Schmeiser* Remedy Finding

An article written by legal expert and GE³LS researcher **Norman Siebrasse** proved to be decisive in the Supreme Court’s decision to award a zero monetary remedy to Monsanto in its lawsuit against farmer Percy Schmeiser.

In the May 2004 ruling, the Supreme Court upheld the Federal Court of Appeal’s decision that farmer Percy Schmeiser had infringed Monsanto’s patent on its pesticide-resistant canola, but it reversed the lower court’s remedy decision.

In the earlier decision, Schmeiser was ordered to forfeit all profits earned by cultivating the patented canola — effectively his entire 1997 earnings — and to cover all of Monsanto’s legal costs. The total was estimated at \$175,000. Under the Supreme Court ruling, however, Schmeiser now owes nothing to the AgBiotech giant.

While that reversal may have puzzled some legal experts, it came as less of a surprise to



Siebrasse, whose article on patent remedies was cited by the Supreme Court in its decision not to grant profits to Monsanto.

A University of New Brunswick law professor and co-investigator on the Canada Potato Genomics Project GE³LS team, Siebrasse wrote

the article after reviewing the Federal Court of Appeal’s earlier decision to award an accounting of profits to Monsanto.

Entitled “A Remedial Benefit-Based Approach to the Innocent User Problem in the Patenting of Higher Life Forms” and published in the *Canadian Intellectual Property Review*, the article proposes a remedies-based system for protecting so-called “innocent bystanders” — those individuals who unwittingly use a patented higher-life form.

Well-known examples of innocent bystanders include aquaculturalists whose pens are penetrated by genetically modified fish, livestock operators whose animals cross-breed with a transgenic animal that wandered onto their land, and farmers whose crops are cross-pollinated with patented seed that blew onto their fields, which was Schmeiser’s claim.

Continued on page 002

GE³LS Websites to watch

Genome Canada: www.genomecanada.ca
Genome British Columbia: <http://gels.ethics.ubc.ca>
Genome Prairie: www.genomeprairie.ca/gels/
Ontario Genomics Institute: www.utoronto.ca/jcb/genomics/index.html
Genome Quebec: www.humgen.umontreal.ca/en/projects.cfm

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of knowledge

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OntarioGenomicsInstitute
GenomeQuébec
GenomeAtlantic

GE³LS Researcher Cited in Monsanto vs....

Continued from page 001

"My concern is with the innocent bystander," argues Siebrasse, who alerted Schmeiser's lawyer to the existence of the then-unpublished article. "The principle that I was arguing for, which was unclear in the existing law and not applied by the Court of Appeal, is that there should be a causal link between benefiting from the special properties of the invention and the profits that are awarded to the patent owner."

In its decision, the higher court followed Siebrasse's reasoning, which argued that even if Schmeiser knowingly used the patented seeds, he did not benefit from the special properties of the invention, namely, pesticide resistance. In other words, the farmer would have earned the same profit even if he'd used unpatented seeds.

"I'm not particularly sympathetic towards Schmeiser," notes Siebrasse. "My understanding is that many people consider him to be an innocent bystander, but in fact he was found to be an intentional infringer. However, since he didn't benefit from using the patented canola seed, he still shouldn't be liable for an accounting of profits."

In a forthcoming article, however, Siebrasse argues that since Schmeiser was found to have intentionally used the patented seeds, he should have been found liable for damages in the form of royalties — the \$15-per-acre licensing fee that Monsanto normally charges users of the patented seeds.

As for why Schmeiser avoided paying Monsanto's court costs, Siebrasse believes the Court

may have been motivated by "sympathy" for the farmer, who likely would have been ruined by such a financial burden, and probably also viewed the litigation as a test case for Monsanto.

Siebrasse concedes the topic of patent remedies may seem "obscure" or "technical", but points out that it has important implications for policy makers who are considering overhauling the patent act to accommodate innocent bystanders. He cites in particular the Canadian Biotechnology Advisory Committee report, which recommends the patent act be amended to include provisions protecting innocent bystanders from claims — a move he considers unnecessary.

"Before we start worrying about innocent bystanders at a substantive level, let's see what happens to them at the remedial level," says Siebrasse. "If you're an innocent infringer and

did not benefit from the special properties of the invention, then there should be no remedy against you whatsoever."

"If you're an innocent infringer and you did benefit, then you would be liable, but only to the extent of any excess profit," he explains, adding, "If the invention gave you a 10% higher yield, then you're liable for 10%, but not for the entire profit. From the point of the view of the innocent bystander, that's not so bad." ♦

Norman Siebrasse, a University of New Brunswick Law professor and GE³LS co-investigator on the Canada Potato Genomics Project, has written extensively on the Monsanto vs. Schmeiser decision.

For more information, contact Norman Siebrasse, Faculty of Law, UNB, at (506) 453-4725 or siebrass@unb.ca.

A PRIMER ON PATENTS

Patent: A patent is the right to exclude all others from making, constructing, using and selling an invention for a period of 20 years from the date an application for the patent was first filed. Simply having a patent does not permit the patent holder to use the invention; he or she may do so only if there are no conflicting property rights or any laws or regulations preventing use of the invention. The patent also allows the holder to assign a whole or partial interest in the invention to another. Patents are granted on a country-by-country basis. Canadian patents are provided under the Patent Act.

Intellectual Property: People sometimes confuse patents with trademarks, copyrights, industrial designs and integrated circuit topographies. Like patents, these are rights granted for intellectual creativity and are forms of intellectual property. However, patents cover new inventions (process, machine, manufacture, composition of matter), or any new and useful improvement of an existing invention.

Invention: According to the Patent Act, something must be "new, non-obvious and useful" to be considered a patentable invention.

Higher life form: The term "higher life form" has no technical meaning within the law. In common parlance, it includes plants and animals other than single-celled organisms. The term "higher life form" can encompass whole plants and animals (including non-human primates), and parts of an animal or plant, such as an organ, tissue, cell and genetic material.

Gene patents: Some argue that since genes are part of nature they cannot be deemed human inventions, and should therefore remain unpatentable. A common retort is that it takes considerable time and intellectual effort to identify, isolate, purify and find a use for a gene, which qualifies as invention.

Naturally-occurring life forms, from plankton to people, can't be patented. But genetically engineered plants and animals, such as GM corn or lab mice designed to be prone to cancer, can. So can the naturally-occurring chemical codes and substances which allow all plants and animals, including humans, to function on a cellular level — like genes, or hormones — as long as the 'inventor' can specify a use for them.

Holding a patent on a human, plant or animal gene gives the holder control over commercial exploitation of that gene. If it's a human gene, that may involve diagnosis or therapy for a disease; if plant or animal, it may also involve disease, the promotion of a desirable characteristic like a sweet taste, or the transfer of the gene from one organism to another.

One of the claimed advantages of the patent system is that it obliges the inventor to publish details of his or her invention, allowing academic scientists to study it. But as soon as a researcher tries to make commercial use of developments based on the original patent — by going into partnership with a drugs firm, for instance, or charging patients at cost for a genetic test — the patent holder can step in to stop them, or oblige them to pay a licence fee. ♦



Sources: Canadian Biotechnology Advisory Committee (CBAC); Canadian Intellectual Property Office Patent Guide; The Guardian's Beginner's guide to gene patents

Some "Difficult Conversations" ...

Continued from page 001

GE³LS, we end up with an 'inter-disciplinarity' that's necessary to sort out the issues in genomics, but it's a struggle for us."

Part of the struggle is between competing social science research methods, but there's also a pressing worry about being consumed by the well-funded GE³LS research program.

"Some social scientists are a little suspicious of directed funding that pulls them into areas that have social utility for the commercialization of 'big science'," argues Burgess. "They worry about neglecting other areas, maintaining credibility with the public and their peers, and preserving a capacity to say critical things about genome science or policy."

From the genome scientist's point of view, there's the ever-present risk that a GE³LS researcher might discover areas where the science may have to be restricted. This can threaten the scientist's sense of autonomy and foster a perception that the GE³LS researcher is simply a "rule enforcer" — much like a research ethics board.

Genome scientists also feel frustrated when social scientists "get the science wrong", which Burgess admits is a "serious problem" in GE³LS research. And they feel "betrayed" when the public inevitably steers the debate to transgenics, when that's not the focus of their research.

"GE³LS researchers not only look embarrassingly naïve when they get the science wrong, but they can also create issues that don't exist," explains Burgess. "Many of us in the GE³LS area carry enough authority that if we say something is a problem, policy makers will often believe us, even if we're wrong."

However, Burgess resists the notion that GE³LS researchers become "mouthpieces for science to quash concerns" or "science educators", and notes that even when researchers get the science right, ethical problems don't simply vanish.

To truly collaborate, genome scientists need to appreciate the public's concerns — for example, the anxiety that underlies the current focus on transgenics — and accept the possibility of placing restrictions on research, while social scientists must work harder to understand the science and articulate the nuances of public values and perceptions.

"Collaboration is not for everyone," adds Burgess. "I don't think every genome scientist should be obligated to deal in-depth with GE³LS issues. If you impose it, they'll just resent it. And how can you build trusting relationships when it's imposed from outside?"

"On the other hand, it's ideal for those genome and GE³LS scientists who can together identify interesting problems, and are willing to invest time and creativity so they can come up with innovative responses." ♦

INVITATION TO READERS

Do you find this Newsletter interesting? What is your perspective on ethical, environmental, economic, legal and social impacts of genomics and proteomics? Would you like to receive more copies and distribute it to colleagues and friends?

Drop us a line c/o Genome Canada.

GE³LS

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Supreme Court Made “Fundamental Errors” in Schmeiser Decision, Says IP Expert

It's no secret that genomics and biotechnology are befuddling the formerly well-settled area of patent law. After all, the set of statutes and regulations was designed to protect inventions of a mechanical nature — the proverbial ‘mousetrap’ — but now strains to extend its reach to biological inventions like the ‘Harvard Mouse’, the infamous rodent developed for research purposes.

So far, parliament has remained silent on the matter of patenting higher life forms, leaving the courts to sort out the issues in several divisive cases.

Three years ago, Utah-based Myriad Genetics threatened legal action against the Ontario health ministry in a bid to protect its patents on two breast cancer gene sequences and a screening process. Ontario has since ignored the company's warning to pay royalties and no law suit has materialized to date.

In *Harvard College vs. Canada*, a battle that reached the Supreme Court in 2002, Harvard sought a patent on its ‘oncogene’ development process, which renders mice highly cancer-susceptible and therefore useful to cancer researchers. Even more controversial was its request to extend the patent to cover the mouse itself — and, by default, all non-human mammals who carry the gene. That application was denied by the Supreme Court, which stated that decisions about patenting higher life forms were best left to parliament.

instead of having to go to court to fight them — which is extremely costly and time-consuming.”

GE³LS Newsletter reached Gold at his McGill University office.

What was your reaction to the Monsanto vs. Schmeiser decision?

Disappointment. My first reaction was more of an institutional concern. Two members of the Supreme Court, who had participated in the Harvard College decision, had since retired and been replaced. The reasoning in Monsanto was inconsistent with the reasoning in Harvard College, so it seemed that the Court had changed course not because they were elucidating the law, but because they had a change of composition.

I was also concerned with the court's attitude — that biotechnology is somehow magic. The technology that went into the Monsanto gene, while innovative, has now become fairly routine. The Supreme Court doesn't seem to appreciate that biotechnology is just another technology, albeit with important uses and consequences, and that it doesn't need to be handled with kid gloves.

What is your legal opinion of the decision?

The court made some fundamental errors in law. They misinterpreted an important UK



Richard Gold

argumentation, which has thrown a significant amount of uncertainty into patent law.

What exactly has become uncertain?

patent act as it currently exists doesn't cover the patenting of higher life forms, and that the issue is a question for the legislature.

Does the Schmeiser ruling have any effect on the Harvard decision?

Right now the effect of the Schmeiser decision is that the Harvard College decision is irrelevant. You can't patent a whole plant, but, who cares, because essentially if you have a patent on the DNA sequence that's inserted into a plant, you get protection of the whole plant anyway. Therefore, for all practical purposes, the plant is patented even though legally it's not.

So there's no pressure on government to do anything and nobody is pushing for CBAC's previous recommendations that try and achieve a balance. At least, the industry is not pushing for them, because they got what they wanted.

What did industry want?

They wanted a patent on a single gene to be extended to include the whole plant or the whole animal. They won on that. What they lost on is the uncertainty. If the lower courts try and figure out what this decision means, then it creates uncertainty within patent law in general, and will make other industries suffer for the win of the AgBiotech industry. ❖

For more information, contact Richard Gold at richard.gold2@mcgill.ca or 514-398-6636.

The general feeling has been that patent holders were being given too many rights, which was impeding researchers. That doesn't mean no patent rights should be given, but there has to be careful consideration of how much you give to the original patent holder and how much you leave for other people. The Supreme Court ignored that jurisprudence.

In May 2004, the Supreme Court decided the *Monsanto vs. Percy Schmeiser* case, in which the AgBiotech giant successfully argued that farmer Percy Schmeiser used its pesticide resistant canola seed without a license. Along with turning the 73-year-old Schmeiser into a global *cause celebre* for food security issues, the case raises important questions about the gene patenting of higher life forms, unintentional infringement, and farmers' rights to save seed.

As the Schmeiser decision was handed down, someone paying particular attention was intellectual property expert and McGill law professor **Richard Gold**.

Gold holds the McGill-Law Bell Chair in e-Governance and was recently appointed director of McGill's Centre for Intellectual Property Policy.

Gold has long pushed for government to amend the Patent Act, rather than let the courts decide the issues. He was a former senior advisor to the Canadian Biotechnology Advisory Committee (CBAC), the independent body whose mandate includes giving biotech-related policy advice to parliament, and assisted in the crafting of its June 2002 report, “Patenting of Higher Life Forms and Related Issues.” Although he admits to disagreeing with some of the report's thirteen recommendations, he does believe that had parliament amended the Patent Act to include suggested provisions on farmers' privilege and innocent bystanders, the Supreme Court “would likely not have found the Schmeiser case to be an interesting issue”.

Gold has more than just a keen academic interest in *Monsanto vs. Schmeiser* — he also advised the government of Ontario, which, worried over the effect of gene patents on healthcare costs, obtained intervener status in the case. “Patent law is only one part of the innovation system,” Gold argues. “Canada needs a process to challenge patents early on in their life,

precedent dealing with the human EPO gene and dismissed it on incorrect reasons. They also misunderstood where the rest of the world is going — which is to a narrowing of claims surrounding DNA sequencing and patenting.

The general feeling has been that patent holders were being given too many rights, which was impeding researchers. That doesn't mean no patent rights should be given, but there has to be careful consideration of how much you give to the original patent holder and how much you leave for other people. The Supreme Court ignored that jurisprudence.

The court also seemed to be driven by results rather than process. They seemed to want Monsanto to win, but Percy Schmeiser not to pay money. That led them to some weird legal

Specifically the law around what constitutes ‘use’ of a patent by an alleged infringer. When I have a patent, I get a certain package of rights that I can use to prevent other people from making, using or selling the invention.

The big question here was about ‘use’. They said that it has to do with furthering a commercial interest, but that traditionally is not the test. We had thought it meant simply putting the invention into application — the common notion of use — but the court didn't fully define it.

What are the implications of that lack of clarity?

The introduction of these new concepts [related to use] is foreign to patent law and was not required to decide this case. It may cause

“DEFENSIVE” PATENTS?

Most people associate patents with the profit motive: an inventor's right to profit from his or her discovery. However, while most patent holders want control over their invention for purposes of commercial exploitation, some patents are sought for more altruistic reasons.

After the SARS outbreak, researchers in the United States, Canada and Hong Kong applied for patents on the coronavirus and its gene sequence, a move that attracted worldwide criticism.

However, both the US Center for Disease Control and the British Columbia Cancer Agency maintained publicly that theirs were “defensive” patents, a preemptive step to prevent private companies from seeking similar patents and perhaps using their licensing rights to impede research.

WHO has stated that “the ‘defensive’ use of patents can be a legitimate part of researchers' efforts to make their discoveries widely available to other researchers, in the best collaborative traditions of biomedical science”.

The organization plans to monitor the effects of the patents and patent applications, specifically on how fast tests, treatments and vaccines are developed and made available, and how prices are set for the new technologies. ❖

Sources: www.who.int/ethics/topics/sars_patents/en/ and www.ama-assn.org/amednews/

'Battle of the Bands' Puts Research Methods to the Test

WARNING: In the name of democracy, DO NOT READ THIS ARTICLE until you've completed a survey at www.yourviews.ubc.ca. We know it's tempting to read on, but trust us, it'll ruin the experience — kind of like finding out the end of a movie before you get a chance to see it.

It's the ultimate Battle of the Bands and the competition's heating up. Vying for top super-group status are "Commando Consultation", "Def Deliberative" and "Precious Modeling".

Okay, you guessed it, those aren't real band names, but at UBC's W. Maurice Young Centre for Applied Ethics (CAE), there is a 'battle of the bands' or sorts brewing between three different methods of ethical analysis: consultation, deliberative democracy, and computer modeling.

The friendly rivalry is part of the GE³LS-funded interdisciplinary project, "Democracy, Ethics and Genomics" (DEG), whose objective is to devise and evaluate methods of ethical analysis for developing genomics public policy.

Because different methods of analysis exist, all of which have the potential to make genomics policy discussions more democratic, the competition was set up within the CAE research group. To compare results, each group will discuss the same topics — a genetic disease and salmon genomics.

The first team, led by CAE bioethics chair Michael Burgess, is using a consultation approach. Through a series of focus groups, the researchers open up a space for people to discuss their underlying concerns, hopes and fears. Less information is given, as researchers don't want to bias or influence participants.

The second follows a deliberative democratic process where a representational sample of the population is gathered to discuss the issues. Experts can be called upon by the group as they raise questions and make decisions. That group is headed by Wayne Norman, until recently the chair in business ethics at UBC and now with the University of Montreal's philosophy department.

Last, but not least, is the computer modeling group led by Peter Danielson, who also doubles as the CAE's director.

"Our primary interest in the DEG project is how to make ethics — which is really the regulatory or governing structure of genomics and biotechnology — more democratic," explains Danielson, who holds the Mary and Maurice Young professorship in applied ethics. "If you just ask me as the expert — the ethics guy — and I give you the ethics answer, how is that democratic?"

Danielson's group of computational sociologists has used the Internet to set up an interactive survey (www.yourviews.ubc.ca), which was launched last July. As you move through the survey, you're presented with a set of ethical questions and can consult online with a series of expert opinions.

Granted, there are some things the Internet has yet to perfect. Take the 'band name generator' that was used to come up with the fictitious pop groups at the beginning of this article. (If you thought those names were bad, try "Consultation Smurf", "Risky Deliberative and the Libido Trail" and "Vague Modeling and the Skintight Disco" — all possibilities for band names generated by www.afm.org/public/musicbiz/band_namegenerator.php that will undoubtedly remain in obscurity.) But, according to Danielson, the Internet is

as close as you can get to a "straight line" for finding out what people really think about ethics.

"The survey's on the web," notes Danielson. "You can google on the different topics all you want. You can answer the questions in your own home. You're not being rushed. There's nobody on the other end of the phone with

"Our survey cuts through the canned responses, the bias, the expectations, to find out what people would really say — if they were as informed as they would like to be — in a non-threatening, open and educational environment."

The showdown between the three different tools will take place in February 2005, when each



expectations. There are five advisors at hand, whose opinions you can read interactively." You've probably guessed by now that Danielson is no fan of "shallow" polling methods.

"No wonder Ipsos-Reid got the [last federal election in Canada] wrong, because shallow polling is worthless", he says. "People will tell you what you'd like to hear, what they're thinking in that moment, even if what you're talking about doesn't exist or they don't know anything about it."

group will run their method on the same population.

Who will ultimately decide the winner? The CAE plans to bring in international critical experts and have them "tear each method apart". Of course, if you ask Danielson for a prediction, he says, tongue firmly in cheek, that the "computer nerds are way cooler."

Of course, as policy making becomes more democratic, the real winner is... all of us. ♦

Misconceptions about Genomics Widespread: *Canada-US Survey*

Second comparison of Canada-US attitudes on biotech reveals overall support is at an all-time high, but both countries report confusion about genomics, and rising concerns with GM foods and privacy issues.

People are mistakenly swapping the terms 'genomics' and 'biotechnology', according to recent public opinion research comparing Canadian and American attitudes on biotech. Commissioned by the federal government's Canadian Biotechnology Secretariat (CBSec), the research reveals that residents of both countries tend to believe biotechnology is the basic science, while genomics is the application of that science, when the opposite is actually true. However, when offered clear definitions, both Canadians and Americans showed broad support for genomics — 70% in Canada and 74% in the US.

Where Canadians differ slightly is in their level of support: more say they "somewhat support" genomics (54% in Canada vs. 52% in the US) than "strongly support" it (16% vs. 22%).

The survey marks the second time CBSec has tracked opinion on biotech and related issues in both countries. On the whole, opinions have shifted only slightly since the first benchmark research wave in March 2003. Overall support in both countries has increased to 63% in Canada and 73% in the US — both all-time highs. And yet Americans continue to report more familiarity and awareness of biotechnology than Canadians.

Another notable difference between the two countries is Canada's strong and increasing

opposition to GM food compared to the US. According to the report, a clear majority in Canada feels uncomfortable buying GM foods and supports a labeling program.

"One reason why Canadians indicate more caution towards biotechnology may be that they do not see Canada as a world leader in the field of biotechnology research," the report states. "This perceived lack of involvement and subsequent lack of familiarity could explain why Canadians are more cautious than the Americans."

In another departure, Canadians tend to be more cautious about the perceived risks associated with biotechnology than Americans, especially risks to human health and the environment.

"One reason why Canadians indicate more caution towards biotechnology may be that they do not see Canada as a world leader in the field of biotechnology research," the report states.

"This perceived lack of involvement and subsequent lack of familiarity could explain why Canadians are more cautious than the Americans."

The survey also tackled two new hot-button issues: molecular farming (both plants and animals) and genetic information. Molecular farming involves genetically modifying plants

and animals so they can produce proteins or metabolites. Examples used in the survey include plants used to produce enzymes for health treatments, fast-growth plants for yielding biodegradable plastic products, and transgenic goats whose milk could contain spider silk for making things like bulletproof vests or surgical thread.

Both countries professed strong support for

plant-related applications and those with health benefits. Support fell sharply however, especially among Canadians, for animal-related applications and those benefiting only industry.

When it comes to genetic information, residents of both countries value its potential, but seem less willing to share their own. This is particularly true of Canadians, whose willingness to contribute genetic information decreased significantly from 56% to 37% since the first Canada-US survey. Americans, by contrast, are more willing to share their information and more interested in knowing about their own genetic make-up. However, a majority of both Canadians and Americans increasingly feel their governments should put more emphasis on privacy than on R&D.

"While this [emphasis on privacy] has not affected views about the role and importance of this [genetic] information to the future of health care, it may over time begin to affect views about how health research is done and how peoples' personal genetic information is used in that research," states the report.

Conducted by Decima Research, the research comprised a telephone survey of a random sample of 1559 respondents. In all, 778 Canadians and 781 Americans were interviewed, yielding a margin of error of 3.46% in each of the two countries.

For a full report, see www.bioportal.gc.ca. Under the Index of Topics, click "Public Opinion Research". ♦