

Preface

This curriculum has been prepared by committed and thoughtful colleagues in the Canadian Council of Churches' Biotechnology Reference Group (BRG). Individuals in the BRG represent their respective denominations and bring a variety of skills and gifts as scientists, health care professionals, theologians, and ethicists.

The various applications of biotechnology, including crops and food, genetics, molecular biology, nanotechnology, synthetic biology to name a few, have global dimensions. Canada is a significant player in biotechnology and much of the research and development in Canada is publicly funded. In addition, the federal government and a number of provincial governments offer generous tax incentives to encourage the development of biotechnology companies.

Canada – A Major Player in Biotechnology

Here are some examples of recent developments in Canada.

- An international team of scientists from Canada, China, Japan, the U.K. and the U.S. has been collaborating since 2002 on what is known as the HapMap Project. Research published in 2007 allows scientists to detect minute fractions of genetic materials that vary among individuals – these variations could explain the differences in disease susceptibility and drug response. As the lead Canadian scientist, based at McGill University explained: This (HapMap) is really a map to study the genetics of common diseases. (www.genomecanada.ca). As a result of this research, scientists have identified the genes involved in Type 2 diabetes and colon cancer.
- AquaBounty Technology, a company established as a result of research at Memorial University in St. John's, has genetically modified a salmon that grows twice as fast as its wild counterpart. The corporation is seeking approval by the U.S. Federal Drug Administration to market its AquaAdvantage salmon. The company is in the early stages of seeking approval by the Canadian Food Inspection Agency. ("A drug with gills? U.S. agency reshapes debate on biotech fish" by Jessica Leeder, *The Globe and Mail*, Sept. 4, 2010).
- The so-called "Enviropig™" could soon be the first genetically modified (GM) (also called genetically engineered or GE) food animal on the market. Enviropig™ is the trademarked industry name for a pig that has been genetically engineered to excrete less phosphorous in its feces. Enviropig™ was developed by researchers at the University of Guelph in Ontario.

Sixteen Canadian universities are part of a network of more than 100 teaching hospitals and research institutions involved in biotechnology and its application to human health. Departments in a number of universities carry out research in biotechnology and agriculture. Over 530 Canadian biotechnology companies are involved in research and development in a number of areas including: human health, agriculture and food processing, and the environment. This represents the second highest number of such companies in the world; of these, 58% are involved in human health and 24% in agriculture and food processing. (Industry Canada Life Sciences Gateway – Canada’s Biotechnology Industry see www.ic.gc.ca. See also BioCanada www.biotech.gc.ca). Most of us learn about major breakthroughs through the media. The use of a vocabulary and of concepts that are not familiar to us can be frustrating. More importantly, the lack of understanding of genetics may make it difficult for many of us to make appropriate choices for our own health or that of a loved one when these technologies become available.

Federal Government Involvement in Biotechnology

In 2007, the federal government launched Science and Technology Strategy – Mobilizing Science and Technology for Canada’s Advantage. This set out the government’s priorities and is intended to “improve the quality of life of Canadians and strengthen the economy.” (See Industry Canada, “Mobilizing Science and Technology to Canada’s Advantage: Progress Report 2009,” www.ic.gc.ca) The federal government views biotechnology as an important platform in the economy of the 21st century. This is consistent with previous governments. The lead government ministry responsible for biotechnology is Industry Canada. It’s the hub - other government departments are the spokes.

The Federal Government’s Role in Public Oversight

Ultimate oversight rests with Parliament, which has the responsibility to provide the mandate and the regulatory framework to ensure that the laws and regulations governing biotechnologies are followed. This includes approving new drugs and other products. A number of government departments, such Agriculture Canada, Environment Canada, Health Canada and the Department of Justice, have specific oversight responsibilities. There are a number of Standing Committees in the House of Commons and the Senate that might conceivably deal with biotechnology. For example, the House of Commons Standing Committee on Health tabled a report on November 23, 2010 that included a number of recommendations, one of which directed Health Canada to develop a program to ensure that Canadians have the appropriate information to make informed decisions about the safety and efficacy of stem cell treatments, especially

those not available in Canada or in countries where there is strong regulatory oversight. (Standing Committee on Health – Ninth Report – November 23, 2010. www2.parl.gc.ca/HousePublications/Publication).

Standing Committees provide an important access point for organizations and citizens to participate in discussions about biotechnology and public policy. The Canadian Biotechnology Advisory Committee (CBAC) was created by the Liberal Government in September, 1999, to advise the government of the day and to engage Canadians regarding the development and regulation of biotechnologies for the benefit and protection of the public. CBAC had its sceptics who felt that CBAC accepted biotechnology too uncritically, but at least it sought to be consultative. The Conservative Government closed CBAC in 2007 and replaced it with an advisory body of scientists that reports to Industry Canada.

What do Canadians Think?

Several years ago, the Department of Justice commissioned a survey to learn about citizens' expectations of genetic privacy. One important finding was that Canadians



expect government to have laws and policies in place to protect the privacy of individuals' genetic information. ("Genetic Information and Privacy", Valerie Howe, Senior Research Officer, JustResearch No. 10, Department of Justice, www.justice.gc.ca)

There is a paucity of recent surveys of Canadians' attitudes on biotechnology. This doesn't necessarily mean that Canadians don't care or don't think about biotechnology and what impact it might have on their lives. We

tend to be more attuned to biotechnology when there is an issue that grabs our attention – like Dolly the sheep or an announcement about a cure for a disease thought to be incurable.

Unfortunately, there are currently few opportunities for citizens to participate in public conversations about biotechnologies that are changing the way we live. Some research institutes provide opportunities for the public to attend lectures and to learn about the issues through their web sites. This is commendable but inadequate to meet the need to learn more so that all citizens have a better understanding of how the commercialization of biotechnologies will affect their lives. (See Ontario Genomics Institute www.ontariogenomics.ca and Genome Canada www.genome.canada)

The Church: A Place for Moral Discernment

The Church is one community that has a mandate (as taught in Scripture) to think deeply about issues that touch our lives. For those of us who are Christian (as with society in general), keeping up with the many developments in biotechnology is impossible. This risks uncritically welcoming new developments in genetic technologies. On the other hand, we should not view every new development with suspicion or reject a new development without thoughtful reflection. We need tools to critically assess the opportunities and the risks of biotechnology. This curriculum is intended to be such a tool to assist us in learning about and grappling with genetic technologies that are changing our lives. You will find words like DNA, gene, genome, nanotechnology and synthetic biology in this curriculum, words that you won't find in the Holy Bible.



But in the Holy Bible, you will find words like compassion, creation, God, hope, humility, Jesus, Holy Spirit, love, mystery, prudence, sacrifice, suffering and wisdom. What better foundation as we discuss and discern the theological and ethical implications of biotechnology and its many applications in the 21st century!

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