



WHAT IS BIOTECHNOLOGY?

Biotechnology touches almost every aspect of our lives today. Many of the products that we eat, wear or use have some connection to biotechnology, and this number is only increasing as our knowledge of science and technology continues to grow.

Biotechnology is a scientific field that has existed for around 10,000 years, ever since our early ancestors starting cultivating the land they lived on. The world's first biotechnologists were our first farmers, who discovered how to grow their own food supply by domesticating crops and animals. Later, discoveries that cereal crops could be fermented into beer, and that the juice from harvested fruit could be fermented into wine, added to their uses of biotechnology. When the world's earliest bakers discovered that the addition of yeast would make soft and fluffy bread, they were using a process of biotechnology. And, when humans started intentionally breeding animals and plants, they uncovered that certain traits could be altered through selective mating, they were "doing" biotechnology!

Today, biotechnology is used in a number of different fields, for a number of different reasons. In simplest terms, **Biotechnology is defined as a scientific discipline and a business sector that uses living organisms or their products in industrial processes.**

But "Modern" Biotechnology is different! Certainly many of the traditional processes of biotechnology are still in existence, but they may employ a host of new technologies, like bioreactors to produce large quantities of microbes and cells, automated DNA sequencers, as well as a huge variety of specialized imaging technologies to view processes and track molecules.

Since the mid-1970s, scientific discoveries and an increasing understanding of how organisms operate at the molecular level, within their DNA and RNA, has given scientists the ability to manipulate different functions of an organism or actually combine elements from two or more living cells together. These recombinations, created using **Recombinant DNA Technology**, have allowed the introduction of crops of corn that resist corn borer, rice that contains extra beta carotene, fish that can grow faster, and the development of new vaccines and medicines, like the Human Papillomavirus vaccine (HPV), antibiotics and synthetic insulin.

Today there are a multitude of applications of biotechnology in the following areas of science and industry:

Resource Industries	Product Industries	Bioscience & Human Health
Agriculture	Food Processing	Genomics
Aquaculture	Industrial Chemicals	Bioinformatics
Bioenergy	Nutraceuticals	Life Sciences
Environment	Pharmaceuticals	Human Health
Forestry	Textiles	Medical Devices
Mining		Nanotechnology

Source: BioTalent Canada. (2010) Making Sense of Biotechnology: An Introduction to the Science and Techniques of Biotechnology. Toronto District School Board.

Biotechnology today has many applications, provides a number of advantages and opportunities, and like most science and technology, presents some specific concerns and issues for society.