

What Types of Educational Efforts on Biotechnology are Available for Students and Consumers?¹

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“Agricultural Biotechnology” “genetic engineering” “genetically modified or transgenic organisms” – these are terms that the general public is hearing more often these days. There is also a plethora of information available on the subject, from a variety of both credible and non-credible sources, especially on the Internet. But how do consumers find information and education that is relevant, credible and focused on the specific issues in which they are interested?

Well, short of attending actual classes on the subject, it is possible to find much of the information you are looking for by knowing where to look online. The University of Florida Department of Agricultural Education and Communication maintains a link to The Educational Initiative on Agricultural Biotechnology for Florida Educators and Consumers, at <http://agbiotech.ifas.ufl.edu/index.html>, a Web site created by a working group of UF-based scientists committed to objectively educating the public on agricultural biotechnology and genetically-modified foods.” The web site is a clearinghouse of carefully researched information and links to other sources for educators and consumers wanting to know more

about biotechnology. Here's a list of some of the most useful links from the site, with a short evaluative description of each.

Top 5 Recommended Sites

Harvest of Fear

This PBS website is an excellent introduction to the issues surrounding biotechnology. An interactive poll presents the pros and cons of key arguments as you decide on your personal position towards biotechnology.

An online activity allows you to use the latest biotechnology techniques to virtually modify your own plants. The viewpoints and interview sections included a broad cross-section of stakeholders, including farmers, scientists, critics, regulators, and industry.

<http://www.pbs.org/wgbh/harvest/>

University of Kentucky: Biotechnology Research and Education Initiative

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BREI is made up of a team of researchers, Extension, and teachers from the University of Kentucky College of Agriculture that provides science-based information in agricultural biotechnology. Their website has downloadable publications and presentations, teaching ideas for Extension and classrooms, and discussions on bioethics, farm impacts and environment and health issues.

<http://www.ca.uky.edu/brei/>

Virginia Tech: Information Systems for Biotechnology.

This useful site includes databases of biotech companies, research centers, field tests, and crop releases. They also have a good news link and information on regulation and risk assessment. ISB is funded through a USDA grant to Virginia Tech.

<http://www.nbiap.vt.edu/indexmain.cfm>

Biotechnology and Development Monitor

An independent journal published by the University of the Netherlands, available free of charge on the internet. Its mission is “to support and improve policy and decision making in the field of research, development, regulation, and applications related to biotechnology relevant to developing countries” and to provide a “forum for discussion on the positive and/or negative impact of biotechnological innovations and international regulations”

Food Future

Food Future “aims to improve public understanding of genetic modification” through “discussion of the technology – the perceived benefits and disadvantages as well as the ethical and moral concerns.” Sponsored by the UK Food and Drink Federation, the site does aim to improve consumer confidence in biotechnology. However, the presentation of risks and benefits is fairly objective and is presented in a simple and attractive format for the biotech novice. The section on regulation describes the current UK process and criticisms.

<http://www.foodfuture.org.uk>

General Information Sites

Ag BioTech InfoNet

According to their web site, “Ag BioTech InfoNet hopes to emerge as a valuable resource for anyone trying to better understand the implications of agricultural biotechnology. Our goal is to facilitate access to critical, original documents and information, and recognized experts.” Most of their information is links to other articles and sites.

<http://www.biotech-info.net/>

Ag Care

This is a Canadian site on biotechnology for consumers. It has sections on labeling issues, safety concerns, social and environmental concerns and regulatory issues.

<http://www.agcare.org/>

Biotechnology Australia

A site by the Australian government aiming to provide balanced and factual information to consumers. It gives arguments for and against biotechnology.

<http://www.biotechnology.gov.au/>

CAST Biotechnology Communications

A non-profit organization that provides science-based information on agricultural biotechnology. Has a good introductory paper on the “Benefits and Risks of Biotechnology in Crops.”

<http://www.biotech-cast-science.org>

Environmental News Network: Genetically Modified Food

This is a really nice interactive site with a quiz, poll and chance to tell them what you think. They have a good article giving background and issues on genetically- modified food. Some related sites and articles are also available.

http://enn.com/features/2000/09/09062000/gmfood_30998.asp

National Agricultural Biotechnology Council

The NABC is a non-profit consortium of over 30 agricultural research and teaching universities in the U.S. and Canada. It provides all stakeholders the opportunity to participate in the issues surrounding agricultural biotechnology. The language is quite scientific.

<http://www.cals.cornell.edu/extension/nabc/>

Nuffield Council on Bioethics

The Nuffield Council is an independent body that examines and reports on ethical questions raised by scientific advances. See their report on "Genetically Modified Crops: The ethical and social issues."

<http://www.nuffieldfoundation.org/bioethics/index.html>

SCOPE Controversy Forum: Biotechnology

The Science Controversies On-line: Partnerships in Education website offers a balanced view of the issues surrounding biotechnology. The on-site material is suitable for the general public and educators.

<http://scope.educ.washington.edu/gmfood/>

Academic Sites

Colorado State: Introduction and Resource Guide to Transgenic Crops

Colorado's excellent site includes a history of plant breeding, risks and concerns, a quiz, and information on evaluation and regulation of transgenic crops. It also has frequently asked questions in English and Spanish.

<http://www.colostate.edu/programs/lifesciences/TransgenicCrops/>

Kansas State University

KSU aims to provide unbiased, scientific information about agricultural biotechnology. Their

site has general biotech information in the form of fact sheets, FAQs, news, and a glossary.

http://www.oznet.ksu.edu/pr_biotech/

Purdue University: Biotech Backgrounders

Information on biotech research at Purdue, as well as introductory material on biotechnology. Has a self-study course, as well as a quiz on GMOs.

http://persephone.agcom.purdue.edu/AgCom/news/backgrd/biotech_home.htm

University of California Biotech

This website provides science-based information to the public on issues relating to agricultural biotechnology. It has a comprehensive information section written for the general public on the main issues. For scientists there are educational materials and an extensive database of scientific literature. The education section provides curricula and teaching aids.

<http://www.ucbiotech.org/>

University of Reading

This site is dedicated to educating the public about biotechnology. University of Reading is in the United Kingdom.

<http://www.ncbe.reading.ac.uk/NCBE/GMFOOD/menu.html>

US Government Sites

Biotechnology Information Resource of the National Agricultural Library, USDA

Links to sources, services, and publications about agricultural biotechnology.

<http://www.nal.usda.gov/bic/>

US Food and Drug Administration (FDA)

The official website provides information on FDA regulatory activities and news. Biotechnology is regulated under their Center for Food Safety and Applied Nutrition.

<http://www.fda.gov/>

US Department of State International Information Programs: Biotechnology

Up-to-date information on policy and events.

<http://usinfo.state.gov/topical/global/biotech/homepage.htm>

Anti-GMO Sites

The Campaign to Label Genetically Engineered Food

<http://www.thecampaign.org/>

The Center for Food Safety

Aims to ensure testing and regulation of genetically modified foods.

<http://www.centerforfoodsafety.org/>

Physicians and Scientists for Responsible Application of Science & Technology

The PSRAST say that they are not opposed to genetic engineering, just to the irresponsible use of it, especially without testing. There is a lot of information, all marked according to elementary, intermediate, and advanced levels.

<http://www.psrast.org>

Union of Concerned Scientists

This is a good site with frequently asked questions, fact sheets, news, views, case studies and an interactive feature.

<http://www.ucsusa.org>

Pro-GMO Sites

The Alliance for Better Foods

This US site presents biotechnology as a resource for increasing agricultural productivity and the world food supply.

<http://www.betterfoods.org/>

CheckBiotech.Org

Checkbiotech is a privately owned, non-profit website that offers up-to-date news, events and information surrounding alternative energy through agriculture, agricultural genetics, orphan and rare diseases and BioValley life sciences. Checkbiotech is operated in conjunction with the ACCESS! program at the University of Basel, which is designed to help participants prepare themselves for their future career.

<http://www.checkbiotech.org/root/index.cfm>

The Council for Biotechnology Information

Founded in April 2000 by leading biotechnology companies to create a comprehensive communication campaign about biotechnology. The council is committed to providing objective, balanced information to help you better understand and appreciate the benefits biotechnology offers, as well as to encourage informed debate about the issues it raises.”

<http://www.whybiotech.com/>

Monsanto

Monsanto has a site on biotech basics, including a timeline, frequently asked questions and the benefits of biotechnology.

<http://www.biotechbasics.com/index.html>

ProBiotech

An independent, self-funded website from the UK.

<http://www.probiotech.fsnet.co.uk/>

Educational Curriculum Materials

Access Excellence

Access Excellence is a national educational program for high school biology and life science. Their biotech section includes downloadable materials, including graphics, for teachers.

<http://www.accessexcellence.org/>

Bio-Link

Bio-Link is a National Advanced Technological Education Center for Biotechnology funded by the National Science Foundation. Bio-Link aims to improve biotechnology education programs by providing professional development for instructors, improving curriculum and sharing information.

Their site includes a curriculum clearinghouse, online courses, state lists of biotech centers, and a good news link.

<http://www.bio-link.org/>

The European Initiative for Biotechnology Education

The EIBE seeks to promote understanding and debate on biotechnology in Europe. A group of multidisciplinary experts on biotechnology have produced educational units for 16-19 year olds to use in the classroom.

<http://www.rdg.ac.uk/EIBE/ENGLISH/INTRO.HTM>

Iowa State Biotechnology Outreach Education Center: Educational Resources

The center provides educational materials for grades 4-12, including classroom lab activities, curriculum units and case studies.

http://www.biotech.iastate.edu/Educational_resources.html

University of Kentucky: Publications and Visual Resources

The Biotechnology Research and Education Initiative have educational materials that can be downloaded from their site. Because the materials are for educational purposes, no fees are charged.

<http://www.ca.uky.edu/brei/>

Wisconsin's Biotechnology and Food Handbook

The handbook has eight modules that can be used to teach children or adults. They also have a biotechnology and food resource directory, including

biotechnology education handbooks, curriculum guides and videos, biotechnology and related newsletters and biotechnology trade journals.

<http://www.agen.ufl.edu/~foodsaf/wihome.html>

Courses, Conferences and Workshops**Iowa State Biotechnology Outreach Education Center**

See this site for some workshops that take place in Ames, Iowa.

http://www.biotech.iastate.edu/publications/ed_resources/Workshops.html