

Biotechnology, development, and the Web

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For the developing countries of the world, the advent of the Web and the bioinformatics revolution could not have happened at a more opportune time. Biotechnologists in Mexico, Brazil, Argentina, Chile, Venezuela, Thailand, Malaysia, and South Africa, for example, are already making good use of their access to the resources of ExPASy, and ways to use the Web to provide training courses to further enlarge the range of scientists who benefit from this democratization of information, as well as to incorporate laboratories from these countries into large-scale sequencing projects, are being pursued by a number of international organizations.

At a more general level, the Web offers an

assortment of sites, useful to scholars, practitioners, and students, that provide information about, and pointers to, various aspects of biotechnology in the service of international development. A sample of these are given in the table below, the first entry in which is a new site that has a special relationship with this journal and is described in more detail below.

In January of this year, the Institute of Biotechnology of the National University of Mexico began a project to organize a variety of initiatives in biotechnology distance education and international scientific network building, and with the encouragement of *Nature Biotechnology*, I accepted the opportu-

nity to coordinate that project, which we refer to as The Virtual Center of Biotechnology for the Americas. One of the goals of the center is to create an interactive website with forums, archives, and evolving databases of organizations, commercial biotechnology concerns, and other types of information and services relevant to biotechnology development in Latin America. The first edition of this site is now online at <http://www.ibt.unam.mx/virtual.cgi>. Although its overall form and structure are not expected to alter significantly, the contents of its pages will change continuously, reflecting both new data and, we hope, vigorous input from the Pan American and worldwide biotechnology communities.

A sampler of websites related to biotechnology and development

The Virtual Center of Biotechnology for the Americas

<http://www.ibt.unam.mx>

Some of the features of this site are noted in the text. In addition, it contains a description of the other activities of the center, a library page with an extensive, simple-to-interpret, frequently updated, annotated listing of online journals and pointers to the important, free, bibliographic database services, a page devoted to NAFTA and biotechnology, a searchable, self-updating database of international and national meetings and it hosts the homepage of the Pan American Biochemistry and Molecular Biology Association (PABMB).

International Center for Genetic Engineering and Biotechnology (ICGEB)

<http://www.icgeb.trieste.it>

The homepage provides access to descriptions of the center's mission and organization, information about its member states, research, training and collaborative programs, and links to its scientific services, which include consultations for program development, distribution of polynucleotides and polypeptides, and of particular note, access to a bioinformatics network and biosafety harmonization information service.

United Nations Education, Scientific and Cultural Organization (UNESCO)

Programmes in Life Sciences and Biotechnology

<http://www.unesco.org/general/eng/programmes/science/life/index.htm>

This page offers information about UNESCO-sponsored projects in biotechnology. Of particular note are the links to the fellowship opportunities and other activities of the Biotechnology Action Council and the Microbial Resources Centers (MIRCENS). The parent site, <http://www.unesco.org>, has an especially useful search capability that allows retrieval of a great many documents in Word and pdf formats.

Food and Agricultural Organization of the United Nations

<http://www.fao.org>

This homepage, an information center for world agriculture, links to statistical databases, regional offices, publications, documentation services, calendars of events, news highlights, and pages devoted to technical cooperation, employment opportunities, and sustainable development. It also features an excellent search engine.

Consultative Group on International Agricultural Research (CGIAR)

<http://www.cgiar.org>

Like the page above, this is an indispensable URL for anyone interested in biotechnology and world agriculture. It features links to all the participating CG centers.

The Western Hemisphere Project

<http://www.aaas.org/international/wh/wh.htm>

The homepage of the American Association for the Advancement of Science (AAAS) project to promote collaboration among the scientific communities of Latin America, the Caribbean, the United States and Canada with particular emphasis on issues concerning biodiversity and the public understanding of science.

Regional Program of Biotechnology UNDP/UNESCO/ONUDI for Latin America & the Caribbean (PRD)

<http://prbau.biol.unlp.edu.ar/index-in.htm>

This is the homepage of the Latinoamerican Net of Biological Sciences (RELAB) and features their announcements, monthly biotechnology news report, and contact information for national representation.

Large Scale Cooperative Research Program in the Field of Biotechnology (Southeast Asian Countries)

<http://www.icb.osaka-u.ac.jp/large-scale.html>

Memoranda and project details for FY 1996–1998 of an ambitious and interesting joint undertaking of Osaka University (Japan), Mahidol University (Thailand), the National Institute of Biotechnology and Applied Microbiology (the Philippines), the R&D Center for Biotechnology, LIPI (Indonesia), and the University of Agriculture Malaysia.