

E-View Letter

Antioxidants and Redox Signaling: Internet Resources

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THE RISE OF THE INTERNET has affected scientists as much as anyone. It is now hard to imagine embarking on any aspect of research—whether it be experimental work, searching the literature, identifying upcoming meetings, or writing a manuscript—without the help of on-line information. The sheer magnitude of available resources, however, poses a severe challenge to the scientist whose time is already limited. Accordingly, the following brief survey is offered as a starting point for those readers who recognize what the internet can potentially do for them but who have been daunted by the learning curve that must be traversed before the benefits can be seen.

The resources are grouped into four categories. General resources of substantial interest to all biologists are listed first; these include literature databases and organizations that host wide-ranging conference series. The other three categories cover specific areas of biology that are of interest to readers of this Journal. It is striking that, while the most important Web sites for the long-established field of free radicals are those of societies and journals, the younger fields of gene expression and signal transduction are dominated by databases. The description of each database is taken directly from the site.

The foremost literature database for the biological sciences—not, in practice, limited to biomedical literature. Many users prefer an older interface, which is obtainable from the above page by clicking on the link labeled “Old PubMed”.

Web of Science (ISI)

UK: <http://wos.mimas.ac.uk/>

US: <http://www.isinet.com/isi/products/citation/wos>

The Institute for Scientific Information publishes *Current Contents* and the *Science Citation Index*. The Web interface to the citation index is widely available under institutional subscriptions and is very well-designed.

Gordon Research Conferences

<http://www.grc.uri.edu/>

FASEB

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

The two major sites for organizing one's scientific recreation. The GRC site deserves special praise: it is a superlative piece of work, which anyone new to Web page design is strongly recommended to explore for good design principles.

LITERATURE SEARCHING AND CONFERENCE SERIES

PubMed (NCBI)

<http://www3.ncbi.nlm.nih.gov/PubMed/>

RESOURCES RELATED TO FREE RADICALS

Societies

The Oxygen Society

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

Oxygen Club of California
<http://www.oxyclubcalifornia.org/>
 Oxygen Club of Greater Washington
<http://rsb.info.nih.gov/o2-club/>
 Society for Free Radical Research
<http://www.sfrr.org/>
 Society for Free Radical Research-Europe
<http://imoax1.unimo.it/~sfrr/>
 Society for Free Radical Research-Asia
<http://koto8.kpu-m.ac.jp/~firstmed/SFRR/SFRR-Asia.htm>.
 Society for Free Radical Research-Australasia
<http://www.med.su.oz.au/path/society2.htm>.
 Nitric Oxide Society
<http://www.apnet.com/no/>
 Coenzyme Q10 Association
<http://wwwcsi.unian.it/coenzymeQ/index.html>
 Mitochondrion Research Society
<http://www.mitoresearch.org/>

The various scientific societies related to free radical research are well represented online, and are particularly well interlinked, so that in practice it would have sufficed to list only a couple of the above. They are replete with conference and journal information and are a pleasure to browse.

Journals

Biological Journals and Abbreviations
<http://arachne.prl.msu.edu/journams/>
 This is a remarkably comprehensive list of biological journals with links to their home pages. It has not been updated for over a year, so an increasing number of links are missing or incorrect, but it is still useful. A selection of home pages of highly relevant journals (including some young journals not included in the above list) is as follows:

Antioxidants & Redox Signaling
<http://www.liebertpub.com/ARS/default1.asp>
Free Radical Biology and Medicine
<http://www.elsevier.nl/locate/freeradbiomed>
Free Radical Research

<http://www.gbhap-us.com/journals/336/336-top.htm>
Redox Report
<http://www.maney.co.uk/redox.html>
Archives of Biochemistry and Biophysics
<http://www.apnet.com/www/journal/bb.htm>
Nitric Oxide
<http://www.apnet.com/www/journal/no.htm>
Mitochondrion
<http://www.mitoresearch.org/journal.htm>

RESOURCES RELATED TO SIGNAL TRANSDUCTION

Society

STS: Signal Transduction Society
<http://www.sigtrans.de/start.shtml>
 A society devoted to scientific exchange between investigators concerned with cellular signal transduction.

Databases

The CaBP Data Library
http://structbio.vanderbilt.edu/cabp_database/
 Structural Information about EF-hand calcium-binding proteins.

CSNDB: The Cell Signaling Networks Database
<http://geo.nihs.go.jp/csndb/>
 A database for signaling pathways of human cells; includes information on biological molecules, sequences, structures, functions, and biological reactions that transfer the cellular signals.

KEGG: Kyoto Encyclopedia of Genes and Genomes
<http://www.genome.ad.jp/kegg/>
 Graphical and hypertext-based information on biochemical pathways, including metabolic and regulatory pathways (for instance, cell cycle and growth factor signaling).

Science STKE: Signal Transduction Knowledge Environment

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

Resources and information on signal transduction; an electronic journal with perspectives and reviews (from Science and Stanford University Libraries).

Signaling Pathway Database

<http://www.grt.kyushu-u.ac.jp/spad/index.html>

Database with diagrams of signaling pathways.

COPE: Cytokines Online Pathfinder Encyclopaedia

<http://www.copewithcytokines.de/>

Over 6,650 Web pages devoted to cytokine research and related subjects.

Cytokines Web

<http://www.psynix.co.uk/cytweb/>

Information about cytokines and their receptors, including three-dimensional structural information and topological and evolutionary relationships.

GCRDb: G-protein-coupled receptors database

<http://www.gcrdb.uthscsa.edu/>

"A veritable tour-de-force organization of virtually every G protein-coupled receptor, the other members of each branch of its super family, its physiological properties, and its transductive mechanisms." (Floyd Bloom)

GRAP: GCR mutants database

<http://tinyGRAP.uit.no/GRAP/grapuse.html>

Database of mutants of family A G-protein-coupled receptors.

NRR: The Nuclear Receptor Resource

<http://nrr.georgetown.edu/NRR/NRR1.html>

A collection of individual databases on members of the steroid and thyroid hormone receptor superfamily.

ORDB Olfactory Receptor DataBase

<http://ycmi.med.yale.edu/senselab/ordb/>

A database of sequences of olfactory receptor proteins.

PKR: The Protein Kinase Resource

http://www.sdsc.edu/projects/Kinases/pk_home.html

Enzymology, genetics, molecular, and structural properties of protein kinases.

RESOURCES RELATED TO GENE EXPRESSION

Interdisciplinary databases

GEO: Gene Expression Omnibus

<http://www.ncbi.nlm.nih.gov/geo/>

A gene expression data repository and online resource for the retrieval of gene expression data from any organism or artificial source.

CGAP: The Cancer Genome Anatomy Project

<http://www.ncbi.nlm.nih.gov/ncicgap/>

An interdisciplinary program established and administered by the National Cancer Institute to generate the information and technological tools needed to decipher the molecular anatomy of the cancer cell.

Techniques and tools

The ArrayExpress Database

<http://www.ebi.ac.uk/arrayexpress/>

A public repository for microarray based gene expression data

MGED: a series of international meetings on Microarray Gene Expression Databases

<http://www.ebi.ac.uk/microarray/MGED/index.html>

The goal of these meetings is to create a framework for developing standards for storing and communicating microarray based gene expression data.

Expression Profiler

<http://ep.ebi.ac.uk/>

A set of tools for the analysis and clustering of gene expression and sequence data.

Stanford MicroArray Forum

<http://cmgm.stanford.edu/cgi-bin/cgiwrap/taebshin/dcforum/dcboard.cgi>

A set of four bulletin boards for discussion of various aspects of microarray-based research.

GridIt: Resources for Microarray Technology

<http://www.bsi.vt.edu/ralscher/gridit/>

A collaborative project led by Virginia Tech and the Forest Biotechnology Group at North Carolina State University.

microarrays.org

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

A public source for microarraying information, tools, and protocols.

Specific protein families, pathways, species

Transpath

<http://transpath.gbf.de/>

Information system on gene-regulatory pathways. Focuses on pathways involved in the regulation of transcription factors in different species, mainly human, mouse, and rat.

TRRD: Transcription Regulatory Regions Database

<http://www.bionet.nsc.ru/trrd/>

A curated database designed for accumulation of experimental data on extended regulatory regions of eukaryotic genes, the regulatory el-

ements they contain, *i.e.*, transcription factor binding sites, promoters, enhancers, silencers, *etc.*, and expression patterns of the genes.

Histone Acetyltransferase Page

<http://www.mdanderson.org/~genedev/Bone/hathome.html>

A source of information regarding proteins that acetylate the core histones.

GXD: Gene Expression Database

<http://www.informatics.jax.org/mgihome/GXD/aboutGXD.shtml>

Stores and integrates the many types of gene expression data on the laboratory mouse; makes these data freely and widely available in formats appropriate for thorough analysis; and provides links to other relevant resources placing this expression information within a larger biological and analytical context.

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