

Useful Web sites for researchers studying proteins

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Introduction

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The development of high performance computers both at hardware and software levels associated with the exponential growth of the Internet has opened new sources of information in all areas of knowledge (1). For biologists, the World Wide Web (WWW) today offers alternative information sources which are much easier to reach and unthinkable only a few years ago (2,3). In this Web, it is possible, for instance, to access libraries and databases, to engage in courses and discussion groups, and to use programs online (4), far beyond the electronic mail (e-mail), file transference protocol (ftp) and document retrieval system of the old days. Presently, technologies are explosively being developed that will enable direct visual contact world wide, both personal and in conference, and online discussion of files and data. Programs already exist whose better performance still depends on the development of the Internet itself.

In the present minireview we list the many Uniform Resource Locators (URLs) organized in different areas such as Immunology, Chemistry, Biochemistry, Molecular Biology and Crystallography, all of common interest to researchers dealing with protein-related subjects. Similar lists were compiled for cell and tissue culture (5), human genetics (6), molecular biology (7), thermocycling (8) and biotechnology companies (9).

We organized the Web pages by subjects related to protein research (Table 1), tools for online protein analysis (Table 2), organizations with useful references (Table 3), pages with announcements of meetings and related courses (Table 4), scientific journals (Table 5), and some biotechnology companies commonly consulted by the community (Table 6).

As the Web continually expands, this directory does not intend by any means to be complete. We hope, however, that it will be helpful as a starting point to look for and find useful protein-related information in the Web.

Key words

- Protein analysis
- WWW
- Resource

Table 1 - Protein-related sites.

	URL
Biochemistry	
Links to bioinformatics center-related servers	http://www.biochem.ucl.ac.uk/bsm/dbbrowser/sites.html
Related protein structure links	http://www.yorvic.york.ac.uk/computing/links.html
Web resources for protein scientists	http://www.prosci.uci.edu/ProSciDocs/WWWResources.html
WWW Virtual library: Biochemistry and molecular biology	http://golgi.harvard.edu/biopages/biochem.html
WWW Virtual library: Biomolecules	http://golgi.harvard.edu/sequences.html
Biotechnology	
BioTech Science resources	http://biotech.chem.indiana.edu/pages/scitools.html
Pedro's biomolecular research tools	http://www.public.iastate.edu/~pedro/research_tools.html
Useful links from Darst lab	http://darst-sgi2.rockefeller.edu/
WWW Virtual library: Biotechnology	http://www.cato.com/interweb/cato/biotech/
Chemistry	
Chemistry databases and data collections	http://www.rpi.edu/dept/chem/cheminfo/chemres/chemres_03.html
Chemistry Today - Jobs, news and meetings	http://chemistry.mond.org/
Internet chemistry index	http://www.chemie.fu-berlin.de/chemistry/index/
Internet chemistry resources	http://www.rpi.edu/dept/chem/cheminfo/chemres.html
Latinamerican Web of chemistry	http://latina.chem.cinvestav.mx/
Molecular simulation on the Web	http://ganter.chemie.uni-dortmund.de/comp_chem.html
Silicon Grafics - Chemistry and biological sciences	http://www.sgi.com/ChemBio/
WWW Chemistry resources, jobs and academic and commercial sites	http://www-chem.harvard.edu/webchemistry/webchem.html
WWW Computational chemistry resources	http://www.chem.swin.edu.au/chem_ref.html
Immunology	
Antibody resources	http://www-chem.ucsd.edu/Faculty/goodman/antibody.html/abpage.html
Antibody structure and sequence information	http://www.biochem.ucl.ac.uk/~martin/antibodies.html
Links to cytokine-related sites	http://www.lmb.uni-muenchen.de/groups/ibelgaufts/links.html
Kabat database - Sequences of proteins of immunological interest	http://immuno.bme.nwu.edu/
WWW Virtual library: Immunology	http://golgi.harvard.edu/biopages/immuno.html
Molecular Biology	
Biologists's control panel	http://gc.bcm.tmc.edu:8088/bio/bio_home.html
DNA vaccine Web	http://www.genweb.com/Dnavax/dnavax.html
Compilation of resources in Internet for the molecular biologist	http://www.ifrn.bbsrc.ac.uk/gm/lab/docs/ifmb.html
Molecular biology information servers	http://research.nwfsc.noaa.gov/bioinformatics.html
Molecular biology protocols	http://grimwade.biochem.unimelb.edu.au/sigtrans.htm http://research.nwfsc.noaa.gov/protocols.html
Molecular biology related WWW sites	http://www.oxmol.co.uk/oth_link.html
Molecular biology servers, databases and Web sites	http://pdb.pdb.bnl.gov/mole.html
The Biocatalog in molecular biology and genetics	http://www.ebi.ac.uk/biocat/

Table 2 - Analysis and search online.

Institution	Service	Mnemonic	URL
BMERC	Protein sequence analysis		http://bmerc-www.bu.edu/protein-seq/
BCM	Protein secondary structure prediction		http://dot.im.gen.bcm.tmc.edu:9331/pssp/pssp.html
Center for Molecular Modeling - NIH	Protein database and analyzed sequences		http://cmm.info.nih.gov/modeling/net_services.html
CBS	O-glycosylation sites in mammalian proteins	NetOglyc	http://www.cbs.dtu.dk/netOglyc/cbsnetOglyc.html
	Signal peptide cleavage sites in amino acid sequences	Signalp	http://www.cbs.dtu.dk/signalp/cbssignalp.html
CNRS	Assistance with the analysis of domain arrangement in proteins	ProDom	http://protein.toulouse.inra.fr/prodom/form.html
CNUSC	Immunogenetic database	IMGT	http://imgt.cnusc.fr:8104
Cohen Group	Protein secondary structure prediction	NNPREDICT	http://www.empharm.ucsf.edu/~nomi/nnpredict.html
CSBS	Structural classification of proteins	SCOP	http://scop.mrc-lmb.cam.ac.uk/scop/
EBI	Protein database search	BLITZ	http://www.ebi.ac.uk/searches/blitz_input.html
	Nucleotide to protein translation	The Protein Machine	http://www.ebi.ac.uk/contrib/tommaso/translate.html
EMBL	Protein secondary structure prediction from a single sequence or from a set of sequences	PREDATOR	http://www.embl-heidelberg.de/argos/predator/predator_form.html
	Search for multiple sequence alignments, prediction of secondary structure, solvent accessibility, transmembrane helices, topology for transmembrane protein, fold recognition by prediction-based threading, evaluation of secondary structure prediction accuracy	PredictProtein	http://www.embl-heidelberg.de/predictprotein/predictprotein.html
	Search for structural similarity	PROPSEARCH	http://www.embl-heidelberg.de/prs.html
	Database of secondary structure assignments	DSSP	http://www.embl-heidelberg.de:80/srs/srsc?-info+DSSP
	Secondary structure prediction of proteins	SSPRED	http://www.embl-heidelberg.de/sspred/sspred_info.html
	Transmembrane segments prediction	TMAP	http://www.embl-heidelberg.de/tmap/tmap_sin.html
ExpASY	Theoretical pI and MW for a protein sequence	pI/MW	http://expasy.hcuge.ch/ch2d/pi_tool.html
	Enzyme nomenclature database		http://expasy.hcuge.ch/sprot/enzyme.html
	Physical and chemical parameters of protein sequences	ProtParam	http://expasy.hcuge.ch/sprot/protparam.html
	Compute and represent the profile produced by any amino acid sequence (hydrophobicity, polarity, MW, secondary structure prediction, etc)	ProtScale	http://expasy.hcuge.ch/cgi-bin/protscale.pl
	Automated knowledge-based protein modeling server	Swiss-Model	http://expasy.hcuge.ch/swissmod/SWISS-MODEL.html
FU Berlin	Amino acid structure		http://www.chemie.fu-berlin.de/chemistry/bio/aminoacids.html
IBCP	Sequence analysis, secondary structure prediction and pattern search in protein database		http://www.ibcp.fr/mailserver.html
ISREC	Statistical Analysis of Protein Sequence	SAPS	http://ulrec3.unil.ch/software/SAPS_form.html
	Prediction of transmembrane regions and orientation	TMpred	http://ulrec3.unil.ch/software/TMPRED_form.html
Johns Hopkins University Bioinformatics Web Server	Searching for software and data for biology and general, available on the Internet		http://www.gdb.org/Dan/softsearch/softsearch.html
MRC/HGMP	Protein sequence databases menu - A collection of protein sequence databases, motifs and protein families and some information on 3D structures		http://www.hgmp.mrc.ac.uk/Public/protein-seq-db.html
NCBI	GenBank database		http://www.ncbi.nlm.nih.gov/genbank/query_form.html
NIH	Three-dimensional drug structure databank		http://cmm.info.nih.gov/modeling/drugbank.html

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Table 2 - Analysis and search online (continued).

Institution	Service	Mnemonic	URL
NIBB	Analysis and prediction of protein sorting signals coded in amino acid sequence	PSORT	http://psort.nibb.ac.jp/
SBDS	Secondary structure prediction	GOR	http://molbiol.soton.ac.uk/compute/GOR.html
Skirball Institute of Biomolecular Medicine	Amino acid images		ftp://128.122.10.5/pub/pmsa/images
	Amino acid properties		http://128.122.10.5/aainfo/contents.htm
University of North Carolina at Chapel Hill	Biosequence analysis	BioSCAN	http://genome.cs.unc.edu/online.html

Table 3 - Reference organizations.

Organization	Abbreviation	URL
American Association for the Advancement of Science	AAAS	http://www.aaas.org/
American Chemical Society	ACS	http://www.acs.org/
American Type Culture Collection	ATCC	http://www.atcc.org/atcc.html
Argos Group		http://www.embl-heidelberg.de/ExternalInfo/argos/argos-group.html
Baylor College of Medicine	BCM	http://www.bcm.tmc.edu/
BioMolecular Engineering Research Center	BMERC	http://bmerc-www.bu.edu/bmerc-main.html
Birkbeck College - Department of Crystallography		http://www.cryst.bbk.ac.uk/
Brookhaven National Laboratory	BNL	http://www.bnl.gov/
Cambridge School of Biological Sciences	CSBS	http://www.bio.cam.ac.uk/
Cambridge University Chemical Laboratory		http://www.ch.cam.ac.uk/
Center for Biological Sequence Analyses	CBS	http://www.cbs.dtu.dk/
Centre de Recherche en Biochimie Macromoléculaire		http://xerxes.crblm.cnrs-mop.fr/
Centre National de la Recherche Scientifique	CNRS	http://www.cnrs.fr/
Centre National Universitaire Sud de Calcul	CNUSC	http://www.cnusc.fr/
Cohen Group		http://www.cmpharm.ucsf.edu/cohen/
European Bioinformatics Institute	EBI	http://www.ebi.ac.uk/ebi_home.html
European Collection of Animal Cell Cultures	ECACC	http://www.gdb.org/annex/ecacc/HTML/ecacc1.html
European Molecular Biology Laboratory	EMBL	http://www.embl-heidelberg.de/
European Molecular Biology Network	EMBnet	http://beta.embnet.unibas.ch/embnet/info.html
ExPasy - Molecular Biology Server	ExPASy	http://expasy.hcuge.ch/
Free University Berlin - Department of Chemistry	FU Berlin	http://www.chemie.fu-berlin.de/index_e.html
Food and Drug Administration	FDA	http://www.fda.gov/
Harvard Biological Laboratories - Genome Research		http://golgi.harvard.edu/
Institute of Biology and Chemistry of Proteins	IBCP	http://www.ibcp.fr/
Medical Research Council	MRC	http://www.mrc.ac.uk/MRC/
National Academy of Sciences	NAS	http://www.nas.edu/
National Center for Biotechnology Information	NCBI	http://www.ncbi.nlm.nih.gov/
National Institute for Basic Biology	NIBB	http://www.nibb.ac.jp/
National Institutes of Health	NIH	http://www.nih.gov/
National Science Foundation	NSF	http://www.nsf.gov/
Northwest Fisheries Science Center	NWFSC	http://research.nwfsc.noaa.gov/
Oxford Molecular Group		http://www.oxmol.co.uk/
Protein Data Bank	PDB	http://www.pdb.bnl.gov/
Shouthampton Bioinformatics Data Server		http://molbiol.soton.ac.uk/sbds.html
Skirball Institute of Biomolecular Medicine		http://www.med.nyu.edu/Skirball/HomePage.html
Swiss Institute for Experimental Cancer Research	ISREC	http://www-isrec.unil.ch/isrec.htm
Weizmann Institute		http://www.weizmann.ac.il/

Table 4 - Meetings, courses and workshops on protein and related areas.

Announcer	Comments	URL
American Chemistry Society Meetings	A list of meetings in chemistry by geographical areas in USA	http://www.acs.org/meetings/welcome.htm
Bioinformatics Courses	A list of bioinformatics courses in USA, UK and Europe	http://www.biochem.ucl.ac.uk/bsm/dbbrowser/courses.html
Bioinformatics Practical	A practical guide on protein sequence and structure analysis on line	http://www.biochem.ucl.ac.uk/bsm/dbbrowser/jj
Cato Research's List of Meetings	A list of meetings in biotechnology and pharmaceutical development around the world	http://www.catosource.com/fyi
Calendar of Events - Center for Molecular Modeling/NIH	Events in chemistry, biology and related subjects	http://cmm.info.nih.gov/modeling/events.html
Chemical Conferences	Conferences on the various disciplines of chemistry	http://hackberry.chem.niu.edu:70/0/ConferenceListings/SpecialistMeetings/index.html http://ccl.osc.edu/ccl/crc.html
Educational Courses on the Web	Courses on the WWW	http://lenti.med.umn.edu/~mwd/courses.html
Meetings, Courses and Workshops in Bioscience and Medicine	A list of scientific events	http://www.informatik.uni-rostock.de/HUM-MOLGEN/anno/meetings.html
Structure-based Drug Design	A short course on structural drug design	http://www.cryst.bbk.ac.uk/SBDD/course.html
The Principles of Protein Structure Using the Internet	Internet course on protein structure	http://www.cryst.bbk.ac.uk/PPS/index.html

Table 5 - Publishers and scientific journals.

Publisher or Journal	URL
Academic Press Journals	http://www.apnet.com/www/journal/journals.htm
American Chemistry Society Publications	http://pubs.acs.org/
Biochemistry and Molecular Biology Journals	http://www.princeton.edu/~beasley/journals.html
Blackwell Science	http://www.blacksci.co.uk/
Cambridge University Press	http://www.cup.cam.ac.uk/
Cell	http://www.cell.com/
Cold Spring Harbor Laboratory Press	http://www.cshl.org/admin/press.html
CRC Press, Inc.	http://www.crcpress.com/
CW Henderson	http://www.homepage.holowww.com/
Elsevier Science	http://www.elsevier.nl:80/
Gene	http://www.elsevier.com:80/catalogue/SAH/185/05450/05450/506033/506033.html
John Wiley & Sons, Inc. Publishers	http://www.wiley.com/
Journal of Molecular Biology	http://www.hbuk.co.uk/jmb/
Macmillan Publishers	http://www.mcp.com/
Nature	http://www.america.nature.com/
New Scientist	http://www.newscientist.com/
On-line Journals for Immunologists	http://glamdring.ucsd.edu/others/aai/journals.html
Oxford University Press	http://www.oup.co.uk/
Proceedings of the National Academy of Sciences, USA	http://journals.at-home.com/PNAS/
Protein Science	http://www.prosci.uci.edu/
Science	http://www.sciencemag.org/
Springer-Verlag	http://www.springer.de/

Table 6 - Companies and suppliers.

Company	URL
Amersham Life Science	http://www.amersham.co.uk/life/
Amicon	http://www.amicon.com/
Beckman Instruments	http://www.beckman.com/
BDH	http://www.bucc.co.uk/vbp/bdn/index.html
Clontech	http://www.clontech.com/
Dako Corporation	http://www.dakousa.com/
Endogen, Inc.	http://www.endogen.com/
Eppendorf	http://www.eppendorf.com/
Fluka	http://www.sigma.sial.com/Fluka/
Glaxo Wellcome	http://www.glaxowellcome.co.uk/
Invitrogen	http://www.invitrogen.com/
Life Technologies, Inc	http://www.lifetech.com/
Merck & Co., Inc	http://www.merck.com/
Millipore	http://www.millipore.com/
New England Biolabs	http://www.neb.com/
Novagen	http://www.novagen.com/
Perstorp Corporation	http://www.perstorp.se/Welcome.html
PerSeptive Biosystems	http://www.pbio.com/
Perkin-Elmer	http://www.perkin-elmer.com/
Pharmacia Biotech	http://www.biotech.pharmacia.se/
Poretics	http://www.semiweb.com/poretics/
Promega	http://www.promega.com/
R&D Systems	http://www.rndsystems.com/
Sandoz	http://www.sandoz.com/
Scienceware	http://www.bel-art.com/
Sigma-Aldrich Corporation	http://www.sigma.sial.com/
Takara Biomedicals	http://www.foodsci.purdue.edu/egc/trade/takara/tak0e.htm
Transduction Laboratories	http://translab.com/index.html
VWR Scientific Products	http://www.vwrsp.com/
WWW Chemicals - Chemical manufacturers and distributors	http://www.chem.com/
WWW Virtual Library: Biotechnology - Companies	http://www.cato.com/interweb/cato/biotech/bio-co.html

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