

RNA for everyone! The RNA World Website at IMB Jena

Over the last few years, an overwhelming amount of new information about the diversity in structure and cellular function of RNA molecules has been obtained. In particular, the discovery of RNA interference (RNAi), small RNAs and their epigenetic implications, which *Science* recognised as the "Breakthrough of the year" 2002,^[1] has attracted considerable attention in both basic and applied research. A concise compilation of internet resources for these, but also for many other RNA-related topics can be found at, "The RNA World Website," (see references for URLs), which was set up and is maintained by Jürgen Sühnel at the Institute of Molecular Biotechnology in Jena, Germany^[2]. The site provides valuable information and links for both RNA researchers and beginners in the field, but also for interested students who wish to obtain up-to-date information of RNA-related topics.

The site is partitioned into six segments and its design is limited to the necessary, clearly a good decision that helps the user to keep the overview. Updates are carried out regularly; only a few of the links on this web site do not appear to be functional—this may be a minor drawback of the site.

In the first segment, the "Database and Web Tools" section, links to some fifty databases can be found, ranging from the Nucleic Acid Data Base (NDB)^[3] to more specialised ones, such as the Subviral RNA Database^[4] or the Pseudobase,^[5] which collects RNA pseudoknots. Further, there is a series of links to programs for RNA structure analysis and prediction, such as

Mfold^[6] or PatScan,^[7] that allow the databases to be searched for a given pattern. Helpful gadgets for everyday laboratory work are also listed, such as the Biopolymer Calculator^[8] for the determination of chemical concentrations from absorbance measurements or the calculation of melting temperatures for DNA or RNA oligonucleotides.

A particularly nice feature of this part of the RNA World Website is the "Image Library of Biological Macromolecules,"^[9] which allows the inspection of 3D models of RNA entries from both the Protein Data Bank^[10] and the NDB^[2] simply through any standard web browser and thus bypasses the need for sophisticated molecular graphics packages. This tool makes RNA structure readily accessible for everyone interested and brings it to light for those outside the niche inhabited by structural biologists.

A variety of software tools are also featured in the second segment of the site and can be readily downloaded, be it software for RNA secondary structure prediction (for example, ESSA^[11]) or a package for generating animations of a switching RNA secondary structure (RNA Movies^[12]), among many others.

The third segment, the "Online Books and Tutorials" section, is designed mainly for nonspecialists and provides introductory information on a variety of subjects, ranging from the ribosome to catalytic RNA and a variety of RNA viruses. Further, there are several links to academic and commercial web sites about RNAi. Not only is this one of the most exciting and timely topics of current RNA research, the

large number of protocols found on this site should also be great for anyone who comes from a non-RNA background but wishes to apply RNAi. Also, the link to the "RNA Methods forum"^[13] should be helpful for beginners in the field, as this discussion forum offers advice for all kinds of problems that can occur while working with RNA—and who hasn't lost the RNA prep in a DNase treatment?

Among the remaining sections of the web site, there are links to the RNA society and some more general references for information retrieval. Further, an almost comprehensive section lists upcoming RNA meetings with specialised and more general topics. This part of the site also provides an excellent overview and, just like the rest of the web site, does a great job in promoting RNA research for everyone.

- [1] J. Couzin, *Science* **2002**, *298*, 2296–2297.
- [2] <http://www.imb-jena.de/RNA.html>
- [3] <http://ndbserver.rutgers.edu/>
- [4] <http://penelope.med.usherb.ca/subviral/>
- [5] <http://www.bio.leidenuniv.nl/%7EBatenburg/PKB.html>
- [6] <http://www.bioinfo.rpi.edu/applications/mfold/old/rna/form1.cgi>
- [7] <http://www-unix.mcs.anl.gov/compbio/PatScan/HTML/patscan.html>
- [8] <http://paris.chem.yale.edu/extinct.html>
- [9] <http://www.imb-jena.de/IMAGE.html>
- [10] <http://www.rcsb.org/pdb/>
- [11] http://www.inra.fr/bia/T/essa/Doc/essa_home.html
- [12] <http://bibiserv.techfak.uni-bielefeld.de/rna-movies/>
- [13] <http://micro.nwfsc.noaa.gov/forums/viewforum.php?f=3>

Christian Hammann
AG Molecular Interactions
Department of Genetics
University Kassel (Germany)