

## Web alert

# Membranes and sorting Membrane permeability

Tomas Kirchhausen\*, Jonathon Pines†, Luca Toldo‡ and Frank Lafont§

### Addresses

\*Department of Cell Biology, Harvard Medical School,  
200 Longwood Avenue, Boston, MA 02115, USA;  
e-mail: kirchhausen@cbr.med.harvard.edu

†Wellcome/CRC Institute, Tennis Court Road, Cambridge, CB2 1QR,  
UK; e-mail: JP103@mole.bio.cam.ac.uk

‡MERCK KGaA, Bio- and Cheminformatics, 64271 Darmstadt,  
Germany; e-mail: luca.toldo@merck.de

§Cell Biology Programme, European Molecular Biology  
Laboratory, Meyerhofstrasse 1, Heidelberg 69012, Germany;  
e-mail: lafont@EMBL-heidelberg.de.

### A selection of World Wide Web sites relevant to papers published in this issue of *Current Opinion in Cell Biology*.

For this issue, we selected the following keywords to guide our search for useful sites: amino acid transporters, exchangers or pumps; protein channels or pores; vesicle transport; membrane dynamics or fusion; protein or lipid sorting; secretion or exocytosis; and caveolae or endocytosis. We ended our Web-crawling procedure on June 15th 1997. Below, we list worthwhile sites that we found after scanning the Web daily for a period of one month. Sites that were too simplistic (such as some homepages) or which emphasized clinical/social aspects (for example, some of those found related to cystic fibrosis) were discarded as not sufficiently relevant to cell biology.

### General information

#### 'Come In, You're Surrounded'

[http://sasws1.dl.ac.uk/pr/AN\\_REPORT/REP93\\_94/entcell.html](http://sasws1.dl.ac.uk/pr/AN_REPORT/REP93_94/entcell.html)

The members of the Daresbury laboratory provide a short description of the use of fast-flow small-angle X-ray scattering experiments to follow the assembly of clathrin cages in solution. This page is from the 1993–1994 annual report of this laboratory.

#### 'Receptor-Mediated Endocytosis'

<http://cellbio.utmb.edu/cellbio/recend.htm>

A well-built page that introduces the topic of receptor-mediated endocytosis. It contains good diagrams and a few useful electron micrographs and light microscopic images. This page is part of a cell biology course directed by Dr Gregg Nagle with help from Dr Gwen Childs – see the e-mail addresses at the end of their site. It presents the basic steps that are involved in endocytosis (e.g. internalization events, patching and capping, membrane recycling) and some of the major players that are implicated in vesicle formation (e.g. clathrin and adaptin). It does not provide any links to other related web pages.

#### 'Endoplasmic Reticulum'

<http://cellbio.utmb.edu/cellbio/rer1.htm>

This page is part of the same cell biology course as the previous site. Here one can find a nice introduction to the structure and function of the endoplasmic reticulum. This page includes numerous links to other web pages with information (text, schemes and pictures) on the Golgi complex, lysosomes, peroxisomes, chaperone proteins, signal recognition particles for the rough endoplasmic reticulum and rough endoplasmic reticulum biogenesis.

#### 'Exocytosis in Sea Urchin Eggs'

<http://www2.uchc.edu/~terasaki/index.html>

This site is from M Terasaki's homepage and gives some nice examples (with movies) of, for instance, how to use fluorescent probes to follow exocytosis events in sea urchin eggs (URL <http://www2.uchc.edu/~terasaki/exo.html>) or calcium-induced fusion of intracellular membranes (URL <http://www2.uchc.edu/~terasaki/seawater.html>).

#### 'Heme and Iron'

<http://www.hahnemann.edu/heme-iron/hi.htm> or

<http://biomed.nus.sg/biochem/pbl/hi.html>

This site is maintained by J Baggott. It includes information, with comprehensive graphics, about the metabolism, adsorption and regulation of uptake of iron.

#### 'Protein Sequence Analysis'

<http://www.hgmp.mrc.ac.uk/Public/protein-sequence-anal.html>

This site is maintained by the UK Human Genome Mapping Program which offers a platform for programs related to the analysis of proteins. It is a good place to start analyzing your protein of interest, with, for example, tools that help to predict the existence and orientation of transmembrane regions or the signal peptides of secretory proteins.

### Databases

#### 'Cystic Fibrosis Transmembrane Conductance Regulator'

<http://genome.eerie.fr/bioscience/knockout/cfr.html>

This page from a gene-knockout database provides information about the symptoms of, and molecular biology underlying, cystic fibrosis. Details of the amino acid sequence and domain structure of the cystic fibrosis transmembrane conductance regulator are also provided. Links to some key papers are included. This site is not completely up to date.

#### 'The Interactive Fly'

<http://sdb.bio.purdue.edu/fly/aimain/1aahome.htm>

This very useful site, assembled by Thomas B Brody, combines information on all aspects of *Drosophila* development. For example, it includes information on proteins such as syntaxin that are implicated in exocytosis. This is already the 10th edition (updated 21.05.97) of this valuable service which allows users to navigate, by simple mouse clicks, the genetic information (i.e. the positions and structures of genes) and find out the roles of the encoded proteins. This site is highly rich in links to several databases (reference and mapping) such as Flybase and Medline. This site is of great information power and provides a very useful resource for anyone who is interested in obtaining both a detailed understanding of *Drosophila* life and an overview of *Drosophila* developmental stages and morphogenesis. A great place to find out what all those exotic-sounding genes really do!

#### 'The PSORT WWW Server'

<http://psort.nibb.ac.jp/index.html>

Kenta Nakai has been well-known in the 'protein field' for a long time and his excellent amino acid database of the early 1980s has been an extremely well-known and appreciated resource. This site, PSORT (prediction of protein sorting signals and localization sites in amino acid sequences), is a WWW server that is used for analyzing and predicting protein sorting signals that are found in amino acid sequences. The service found in this URL was one of the very first computational active services that took advantage of the WWW technology and indeed got appointed the 'Magellan 4 stars' evaluation. It consists of a WWW interface to the peer-reviewed PSORT program (URL <http://psort.nibb.ac.jp/biblio.html>) and relies on an underlying algorithm to perform the service. The only unfortunate aspect of this precious and highly specialized service is its geographic location which hinders its use by European or remote users who use network services that are not connected at high speed with Japan (mirror sites would be appreciated).

#### 'The UniGene Database'

<http://www.ncbi.nlm.nih.gov/Schuler/UniGene/>

This is a database of unique sequence transcripts (complete mRNAs and expressed sequence tags [ESTs]) and is searchable by chromosome position or by keyword. It provides a Web interface to the valuable published work by MS Boguski and GD Schuler, ESTablishing a Human Transcript Map, *Nat Genet* 1995, 10:369–371. Links to other databases (GenBank, EST and Bibliographic) are included. This site is useful for finding out what maps close to your locus, and as a way of analyzing gene families. A query on ATPases produced a result of 61 records, including, for example, the complete sequence of the human H<sup>+</sup>K<sup>+</sup>-ATPase  $\beta$  subunit mRNA. Unfortunately, the site is not up to date as it reflects contents of Genbank version 96 (Genbank version 100 is currently available).

#### 'The USC Medical Image Bank'

<http://www.usc.edu/hsc/med-sch/images/images.html>

This site provides a series of links to various images (electron and light microscopic images) obtained mostly from kidney samples (the site contains numerous pictures of pathological cysts from different parts of the kidney). It also includes images of different cell types; for example, transmission electron micrographs of secretory epithelial cells are provided.