

Cell signalling on the Web

Cell signalling has been high on the Biochemical Society's radar recently, with the Annual Symposium highlighting the cell biology of inositol lipids and phosphates. It is therefore timely for Cyberbiochemist to take another look at some resources on the web for making sense of this extremely complex field.

And there is no shortage of resources to choose from. Googling the phrase 'cell signaling' brought up almost 5 million entries, with close to a million for the UK spelling. This article, however, focuses on only three prominent and useful sites: *Nature's* Signaling Gateway, a site from the US-based reagent company, BioCarta, and Portland Press's contribution to the field, an innovative resource by Professor Sir Michael Berridge of the Babraham Institute, Cambridge. Each of these sites does some things superbly well and each has a different 'take' on the economics of electronic publication.

Nature's comprehensive signalling site, www.signaling-gateway.org, is co-sponsored by the US-based (and generously funded) Alliance for Cell Signaling. It is one of a number of specialist websites available through the *Nature* portal; others that Biochemical Society members may be familiar with include the 'Omics and Cell Migration gateways'. Each of these is structured along similar lines, providing access to original data, a selection of papers from the *Nature* stable with concise, accessible summaries and announcements of conferences and jobs. Registration is required for access to some parts of each site, but this is free.

One of the most innovative sections of the signalling site is its 'Molecule Pages'. This is a database

of proteins involved in cell signalling. It is organized in a similar manner to the UniProt database with SwissProt and TrEMBL; most of its entries (there are over 3700 of them) contain information that has been generated automatically, but a few (currently just over 200) are much more comprehensive resources that are curated and peer-reviewed by experts in the field and which have full reference lists. Some signalling maps are provided, but these are relatively limited and are best viewed using a scalable graphics viewer (SVG) plugin.

Signalling maps, however, are one of the best features of the BioCarta site. The strapline on BioCarta's website is 'Charting Pathways of Life', and it has taken this to heart by offering an enormous number of interactive graphics showing interactions between genes and proteins, which are free to the scientific community. The pathways, available from www.biocarta.com/genes/index.asp, are divided into very general functional categories, including apoptosis, developmental biology and neuroscience. Clicking on 'Cell Signalling' produces an enormous alphabetical list, ranging from 'Activation of cAMP-dependent protein kinase' to 'Y branching of actin filaments'. The complete collection may also be searched by keyword and by gene name.

The pathway maps themselves are attractive, colourful and accurate 'block diagrams' that indicate sub-cellular locations and the nature of second messengers, and link to other pathways where appropriate. In many cases, both human and mouse

maps are available. The only indication here that this is a service offered by a commercial company — which wants your custom, after all — is that fairly unobtrusive arrows next to some components on the maps link not to database entries but to catalogue entries for the proteins concerned. But, very importantly, the pathways themselves can be reproduced free of charge for any non-profit use as long as they are acknowledged. Busy lecturers with no time to prepare PowerPoint slides of every signalling pathway in their lecture courses should take note.

Lecturers and students of cell signalling will also be interested in Professor Sir Michael Berridge's online resource, which will be published in full by Portland Press in July. The demo version at www.cellsignalingbiology.com was made available in time for the Annual Symposium. It appears to combine some of the best features of both the *Nature* and BioCarta sites, with the demonstration material available being authoritative and fully and attractively illustrated. Subscriptions will cost £150 for institutions and £95 for individuals, with a further £20 discount for Biochemical Society members.

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CYBERBIOCHEMIST

The scope of this resource is quite outstandingly comprehensive, with 12 substantial sections including ion channels, signalling in development and signalling defects. Most of the demo material, however, concerns signalling pathways, including a section on phosphoinositide signalling. Some wider links are live, including one to the module on disease that explains the link between phosphoinositide lipid signalling and manic depression. The material is offered

on-screen in an innovative HTML-based format called EESI-View, offering tables and clear, colourful figures (each of which links to a high-resolution version) alongside text. However, it will also be made available in PDF format, crucially subscribers will be able to use these for any not-for-profit educational or research purpose.

Given the amount of painstaking work that Professor Sir Michael Berridge, rightly described as 'one

of the world's leading experts' in cell signalling, has put into this comprehensive reference work, it is near impossible to see how the resource could have been made available using any other publication model. It offers more than even the best free resources, and I would recommend you to give it a serious look.

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Best of the Web

Are you going on holiday soon? How much money are you taking with you? None of my business, of course. But there was a time when the Government made it its business. In the 1950s, you could only take £5 abroad. The Central Office of Information made a film about it, imaginatively titled *Five Pounds in Notes*, and it is one of the many public information films you can now watch for free from the comfort of your computer.

The National Archive has placed an assortment of complete public information films from 1945 to 1951 on its website. These are the films so ably parodied by Jon Glover and Harry Enfield as Mr Cholmondley-Warner and his assistant Mr Grayson respectively. Except that the originals are beyond parody and occasionally reach heights of surrealism.

The selection includes the real classic, *Coughs and Sneezes* and some rare gems such as *Journey by a London Bus*. The latter portrays two African students observing the "spirit of co-operation" between passengers and bus crews, helping to make "daily travelling more comfortable". For those of us who remember when there were not only queues, but separate ones for upstairs and

downstairs, this is a poignant reminder of a time that now seems as remote as the Middle Ages.

Even 50 years ago, the Government's natural reaction to some natural disaster or blunder of its own was to bully the public. In 1947, a bitter winter coincided with harsh food rationing and a shortage of coal. A film of that year, *Read Any Good Meters Lately (Watch your Meters)*, exhorts the cold and hungry populace to save energy by watching their electricity and gas meters.

Technology is covered well; *The Wonder Jet* follows Sir Frank Whittle (who plays himself) as he struggles to realize his dream of the jet engine. The obstructionism of the Air Ministry is downplayed, as is the fact that the Germans were more interested in Whittle's idea than the British. That's why the Heinkel He 178 had a jet engine in 1939 while the Gloster Meteor G.40 didn't fly until 1941.

The films and their sound tracks have been digitized and cleaned up. They are downloadable at two speeds: 34.3 Mb for broadband and 6.85 Mb for modems. They play on Windows Media Player.

Mark Burgess (Executive Editor)

