Science Online: Bridging scientific disciplines

Monica M. Bradford, Executive Editor
ACS Fall 2005, Herman Skolnik Award Symposium
Outline of Presentation

- Background information about *Science*
- Electronic workflow for peer review
- History and details related to *Science* Online
- STKE as an example of tech tools
- If time permits:
  - Community Building
  - Zinio
Science Online

Part journal, part news magazine

- Broad content base: interdisciplinary, primarily biological, physical, earth and planetary sciences
- Editorial page budget of ~5300 pages, 51 issues a year
- Content includes peer-reviewed research papers, news articles by journalists, and commentaries written by scientists
- International in terms of authors, readers, content
Science Peer Review Process

- 23 Editors (Ph.D. w/ Post-doc); avg. 8 years of experience.
- >100 Scientific advisors worldwide.
- Rapid Publication (<10 days to 3-4 mo avg.). Fully electronic submission, review, and publication process.
2004 Statistics

- Over 11,000 research papers submitted
- 75% rejected after initial screening
- 7% accepted for publication
- 54% of submitted papers from outside of USA
- 39% of published papers from outside of USA
- 60% of published papers are in the biological sciences
BV + RE + RA submissions since Jan 1997

Data are smoothed w/ an 8 pt running avg
Total Electronic Work Flow

- Electronic submission via WWW site (95%) since February 2000.
- All Manuscripts automatically or manually converted to PDF
- Electronic review of PDFs via secure WWW sites and internally by editors distributed globally.
- Electronic return of revisions; click through for license and conflict of interest forms (new)
- Electronic delivery of galley proofs
- Self-developed database (Access/Sequel Server) linked to WWW sites.
- Electronic copyediting of manuscripts (in Word)—in place since 1997
- Working with eXtyle to automate some functions.
Editorial Times, Science

Electronic processing begins

To Publish

To Accept
Advantages

- Reduced Fedex and mail costs by > $200,000/year
- Allowed 50% increase in submissions to be managed.
- Reduced processing times by about 2-3 weeks
- Allowed expansion of our Board of Reviewing Editors by 30%
- Allowed consolidation of an assistant position and expansion of responsibilities of staff—nearly eliminated data entry while requiring more file processing.
Online offerings

- Online in 1995 w/TOC and abstracts
- Full-text HTML and PDFs added in 1996
- Careers and Next Wave
- Started a daily news service: Science NOW
- KEs developed 1998 through 2001
- Total back-file digitized by J-Stor
- Implemented online before print: Science Express
- Multi-media supplements and content collections
Links to related information

- **This article has been cited by other articles:**
  


- **Related articles in Science:**
  
  Biology by the Numbers
  
  Gilbert Chin, Robert Coontz, and Laura Helmuth
  
  Science 2004 303: 781. (in Introduction to special issue) [Summary]

- **Links from references**
  
  Pubmed, ISI, Crossref, Full-text in other HighWire journals
Recent user research: two user types

- Researchers tied to the print product
  - Read the front of the magazine, use online for the research papers
  - Expect online to reflect the look and feel of the print
    - Tend to start with the Table of Contents
- Researchers that don’t want/need print
  - Use search platforms to find content
  - Depend on e-mail alerts
Some common behaviors

- All like and use PDFs
- Not interested in and don’t have the time to learn or set up customization or personalization
  - even if doing so would allow them to mimic behaviors such as storing papers in files
- All found access control online to be confusing and an unacceptable barrier
- Science brand most important attribute
- Think need print to attract authors, but don’t read papers in the print copy
Strategy: integrate and differentiate?

- Think creatively – experiment
- Play to the strengths of each medium
- Integrate print and online to raise awareness of all content offerings
- Maximize the effectiveness of the print magazine for sharing knowledge across disciplines
- Maximize the effectiveness of the online product as a research tool
- Embrace multiple delivery platforms
Standard Practice: marketing content

- Push content to users:
  - Science Roundup
  - E-mail alerts: TOC, author, or keyword searches
  - RSS feeds

- Increase synergy between print and online
  - Combined special issues with jump pages and multi-media enhancements online
  - More call outs to additional online material in the print
  - Science Online TOC in print
Knowledge Environments: Our online sandbox

- My KE: Saved searches, customized views, file folders
- Different content formats
  - Virtual Journal
  - Connections Map
  - Knowledge Map
  - Teaching Resources: animations primarily
  - Blogs
**What's New**

Issue 230: 27 April 2004

**Reviews**
Carbon Monoxide: To Boldly Go Where NO Has Gone Before
Stefan W. Ryter, Danielle Morse, and Augustine M. K. Choi
[Abstract] [Full Text]

**Resources**
Glossary
New terms help guide users in the plethora of signaling acronyms and abbreviations
[Glossary]

**This Week in Signal Transduction**
Issue 230: 27 April 2004

Editor's Choice (Free)
Deacetylating Microtubules at the Immune Synapse

Full List of This Week's Summaries
Featured in *Science Magazine*
ONLINE JOURNAL ASPECTS

- **Weekly Electronic Journal**
  - Reviews, Protocols, Perspectives, Editorial Guides
- **Weekly Highlights**
  - Editor-written summaries of current, exciting research
- **Alerting Service**
  - ETOC alerts, keyword and author alerts, CiteTrack alerts

KE FEATURES

- **Knowledge Management and Information Discovery Tools**
  - Folders, Display Settings, Saved Searches, Related Resources, Section browsing
- **Teaching and Learning Tools**
  - Teaching Resources, Glossary
- **Signal Transduction Database**
  - Connections Maps
- **Community**
  - Comments, Discussion Forums, Directory
- **Virtual Library**
  - Full-text access to signal transduction-related articles in 50 journals from participating HighWire publishers
Searching Tools

- Quick Search and Advanced Search
- Saved Searches
- Display Settings
  - Limit results to a subset of your favorite journals in the Virtual Journal
  - Limit results to those that are new since your last visit

Browsing Tools

- Issue Archives
- Section-specific indices and archives
- Discipline, organism, and component type menus for Connections Maps resources
- Related Resources
- Editorial Guides
Issue Archive

Home > Issue Archive

28 Sep 1999 - 11 May 2004

Current Issue: 11 May 2004
Vol. 2004, Num. 232

Recent Issues:
4 May 2004
Vol. 2004, Num. 231

27 April 2004
Vol. 2004, Num. 230


2000s 2001 2002 2003 2004 - - - - - - - -
1990s - - - - - - - - 1999
• Sorted searches are slow. Fast searches are essential. Allow relevancy ranking or date order results options.

• Search results need a common citation style. Challenges exist for non-literature resources.

• Search limiters (My Display Settings) are underutilized either because of user confusion or because they are not popular.

• Saved Searches is a popular customization tool.
Customizable Tools: MY KE

- **My Folders**
  - Users have an online personal filing cabinet to organize the KE content for easy reference

- **My Saved Searches**
  - Users can save search parameters that provide results of interest to execute on demand

- **My Display Settings**
  - Users can limit search results at the KE to expedite finding the most relevant information

- **My Alerts**
  - Users choose to receive email notification when information of interest is added to the KE
ST on the Web

Educator Sites

EBID-Biological Biochemical Image Database
The Biological Biochemical Image Database is a searchable database of images (mostly figures from published papers) of putative biological pathways, macromolecular structures, gene families, and cellular relationships. The images have PubMed links to the citations from which they are derived. The figures themselves are of limited use to a signal transduction aficionado, but may help a novice see the different views in the field. An educator may find these images useful in lecture preparation. (Free Site)

BioSciEdNet (BEN)
BEN is a portal to peer-reviewed teaching resources available in the digital libraries of partnering professional societies. The portal allows educators to search the information about the resources or to browse the resources that have been cataloged. The user is then sent to the societies' digital libraries to access the resources. Many of the indexed resources in BEN cover topics in microbiology, physiology, and ecology. With new partners building and cataloging their collections, BEN should become a leading search engine for finding biological science teaching resources. Selected STKE resources will be indexed with BEN. (Free Site)

Cytokines Online Pathfinder Encyclopedia
The Cytokines Online Pathfinder Encyclopedia (COPE) is part of a site designed at help users "Cope with Cytokines."
Lesson Learned: Which Tools are Most Popular with STKE Users?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Folders</td>
<td>560 accesses*</td>
</tr>
<tr>
<td>My Saved Searches</td>
<td>379 accesses*</td>
</tr>
<tr>
<td>My Alerts</td>
<td>610 eTOC alerts,</td>
</tr>
<tr>
<td></td>
<td>23,333 keyword,</td>
</tr>
<tr>
<td></td>
<td>author,</td>
</tr>
<tr>
<td></td>
<td>CiteTrack alerts**</td>
</tr>
</tbody>
</table>

*average unfiltered data Jan-Mar 2004
**1 May 2004
Teaching Resources

Andrew Chan (15 February 2005)

Ras–MAPK Pathways
Sci. STKE 2005 (271), tr5. [DOI: 10.1126/stke.2712005tr5]
[Abstract] [Full Text] [PDF] [Slides]

Ravi Iyengar (8 February 2005)

Introduction: Overview of Pathways and Networks and GPCR Signaling
[Abstract] [Full Text] [PDF] [Slides]

Ravi Iyengar, Maria Diverse-Pierluissi, Daniel Weinstein, and Lakshmi A. Devi (1 February 2005)

Cell Signaling Systems: A Course for Graduate Students
Sci. STKE 2005 (269), tr3. [DOI: 10.1126/stke.2692005tr3]
[Abstract] [Syllabus]

Thierry Galli and Volker Haucke (18 January 2005)

A Model for Fast-Track Exocytosis of Synaptic Vesicles
Sci. STKE 2005 (267), tr2. [DOI: 10.1126/stke.2672005tr2]
[Abstract] [Resource Details]

Thierry Galli and Volker Haucke (18 January 2005)

Calcium-Triggered Exocytosis and Clathrin-Mediated Endocytosis of
Synaptic Vesicles
Sci. STKE 2005 (267), tr1. [DOI: 10.1126/stke.2672005tr1]
[Abstract] [Resource Details]

Jennifer L. Santos and Kazuhiro Shiozaki (7 December 2004)

Phosphorelay Signaling in Yeast in Response to Changes in Osmolarity
Sci. STKE 2004 (262), tr12. [DOI: 10.1126/stke.2622004tr12]
[Abstract] [Resource Details]

Amy M. Fowler and Elaine T. Alarid (7 December 2004)

Molecular Sensing and Transcriptional Control
Ras-MAPK Pathways (PowerPoint Slides)

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Description

These PowerPoint slides were designed for a lecture covering three kinase-mediated signaling pathways. This lecture is part of the course “Cell Signaling Systems: A Course for Graduate Students.” The focus of the lecture is three major signaling cascades that are implicated in cell proliferation, survival, and stress response. They are, respectively, the mitogen-activated protein kinase (MAPK), phosphatidylinositol 3-kinase (PI3K), and Jun N-terminal kinase (JNK) cascades. The aim of this lecture is to review the major players of these intracellular signaling cascades in mammalian cells. In addition, emphasis is placed on understanding the dynamic, rather than linear, nature of signal transduction in determining cellular responses to external stimuli.

[Access slides]

Educational Details

Learning Resource Type: PowerPoint slides

Context: Undergraduate upper division, graduate, professional (degree program)

Intended Users: Teacher, learner

Intended Educational Use: Teach, learn

Discipline: Cell biology, molecular biology

Keywords: signal transduction, MAPK cascade, tumour-associated genes, Ras, B-Raf, ERK
Connections Maps: Database of Cell Signaling

- Sybase relational database
- 69 authoritative pathways
- Dynamically generated graphical interface
- Constantly updated
Dynamic graphical interface to the Connections Maps cell signaling database: Click on any symbol or shape to get detailed information.
Pathway-centric information and general component information are at your fingertips.
**Pathway-Independent Component Information**

<table>
<thead>
<tr>
<th>Component</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitogen-activated protein kinase 2 (Mkk2)</td>
<td>Canonical</td>
</tr>
</tbody>
</table>

**Type:** protein kinase: protein kinase: dual specificity protein kinase

**Synonyms:** MAP2K2, MAPK/ERK KINASE 2, MAPK2 stecm; MK2, PRKMK2, protein kinase, mitogen-activated, kinase 2, p45 (MAP kinase kinase 2)

**Citations:** Literature

**Authority:** Gary L Johnson

**Description**

This record contains general information about the Mitogen-activated protein kinase kinase 2 (Mkk2) component independent of any pathway in which it appears.

Mitogen-activated protein kinase (MAPK) kinase 2 (Mkk2) is part of the MAPK cascade, phosphorylating and activating extracellular signal-regulated kinase (ERK) 1 and ERK2. The downstream effectors of MAPK cascades include transcription factors that regulate genes involved in inflammation, cell growth, survival, and differentiation. The ERK1/2 pathway, of which Mkk2 is a component, is regulated by cell surface receptors such as G protein-coupled receptors (GPCRs), growth factor receptor tyrosine kinases, and Src family tyrosine kinases. Small guanosine triphosphatases (GTPases) such as Ras and Rap1 regulate Raf kinases that phosphorylate and activate Mkk1 and Mkk2. Phosphorylated ERK1/2 activates transcription in a cascade where other kinases, such as p90-Rsk, mitogen- and stress-activated protein kinase (MSK) 1 and MSK2, and MAPK-interacting kinase (MKI) 1 and Mkk2, and transcription factors such as Elk-1, are substrates for phosphorylation. The Bacillus anthracis LF acts as a protease that cleaves Mkk1 and Mkk2, inhibiting activation of the ERK1/2 pathway.

**Canonical pathways in which Mitogen-activated protein kinase kinase 2 (Mkk2) occurs**

<table>
<thead>
<tr>
<th>Pathway-Dependent Component Information</th>
<th>In Canonical Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitogen-activated protein kinase kinase 2 (Mkk2)</td>
<td>ERK1/ERK2 MAPK Pathway</td>
</tr>
<tr>
<td>Mitogen-activated protein kinase kinase 2 (Mkk2)</td>
<td>B Cell Antigen Receptor</td>
</tr>
<tr>
<td>Mitogen-activated protein kinase kinase 2 (Mkk2)</td>
<td>MAP Kinase Pathway</td>
</tr>
<tr>
<td>Mitogen-activated protein kinase kinase 2 (Mkk2)</td>
<td>Toll-Like Receptor Pathway</td>
</tr>
</tbody>
</table>

**Authority**

Corresponding Authority: Gary L Johnson (gary.johnson@ucdavis.edu)
David Vaudry, Philip Stork, Philip Lazarovici, Lee Eiden, **Differentiation Pathway in PC12 Cells.** *Sci.STKE* (Connections Map, as seen October 2004), http://stke.sciencemag.org/cgi/cm/stkecm;CMP_8038.
Defining Elements of a Virtual Community

- Distinctive focus
- Capacity to integrate content and community
- Appreciation of member-generated content
- Access to competing publishers and vendors
- Commercial Orientation

(from *Net Gain* by Hagel and Armstrong, as described in *Hosting Web Communities* by Cliff Figallo)
Real Communities Have Social Dynamics

- Member feels part of a larger social whole
- Interwoven web of relationships between members
- Ongoing exchange between members of commonly valued things
- Relationships between members last through time: shared histories

(Figallo, C. *Hosting Web Communities*, p. 15)
What we didn’t do

- Commit to bringing the user’s voice to the project
- Hire staff to build/nourish the community
- Determine if the mission of the community matched ours
- Be proactive with the community
- Define the community narrowly or identify subgroups
Based on Sage Advice

- Engaged the community from the very beginning
- Very active Scientific Advisory Board
  - Assistants Program funds 0.5 FTE Postdoc per member
    - Ass’t. spends 15 hours a week on site related activities
  - Seeking funding to expand program
- Test, create buzz, and actively build links between content and community
“Most online community sites are not economically viable and never will be”

“Top Ten Trends for Online Communities”
-Jim Cashell, Online Community Report
July 2001
Experiment: Digital version

- Zinio: PDF-based version of the entire magazine
- Subscriber downloads the Zinio Reader (10Mb)
- Receives e-mail notifying that the issue is ready
- Downloads issue to display the content, ads, and images just as they appear in print
  - Compressed files: 10 – 12 Mb in size
  - Download happens in background
  - Reader imitates the look and feel of page turning
Digital version continued

- Special features
  - Highlight text
  - Jump directly from TOC to article
  - Make notes: saved in an annotated lists sections
  - URLs and links are hot when connected to internet

- Benefits for AAAS
  - Subscriptions count as part of audited circulation
  - Faster and cheaper for non-US subscribers
  - Appeals to those who believe less paper is good