Communicating your science

Bodo Stern
Amy Brand
Today’s presentation

Bodo: publishing papers

Amy: post-publication communication
The need for effective communication grows during a scientific career

• being broadly interested and enjoying science writing for the general public can be detrimental or distracting for a graduate student or postdoc.

But the tables turns for a young group leader:

• It is critical to be an effective science communicator to convince non-experts of your research program (program officers at NIH / NSF, editors at high impact journals, faculty colleagues).
Navigating the publication process

• Teach you what a scientific editor is trained to do.

• Translate that information into some do’s and don’ts for writing papers and interacting with editors.
The usual scientists’ view of editors
Editors as gatekeepers

- Whether to review the paper in the first place
- Whether to publish the paper based on the reviewers comments
“Thank you very much for your great submission. We get many submissions, but, regretably, only a limited amount of space is available to fill.”
Editors as mediators
Common interests of Editors and Authors

Both editors and authors - unlike reviewers - profit from publishing breakthrough stories (even if the these stories are incomplete).
Talk to and meet the editors!

• find out what fields the editors of a journal are particularly interested in. Especially new journals are often keen to get submissions and are more risk friendly.

• Identify editors who you work well with.

• Discuss findings with editors at conferences or through pre-submission inquiries.

• If your paper is competitive: can the editor make a fast decision?

• Review papers for the journals you publish in.
Editors look for conceptual advance and general interest

- How significant is the advance? Could the results have been predicted? Do they answer a longstanding question?

- Are the experiments logically designed? Do they directly test an experimental hypothesis or are they merely consistent with it?

Domain of the reviewers: technical quality
How can you help an Editor make the correct assessment of your paper?

- **Cover letter**: convey why the paper is important for the general readership and which fields may find the results of interest. What was known before? What important question does the paper answer? Key results? You can be bolder in the cover letter since it is only seen by the editor. Suggest and exclude reviewers!!

- **Pre-submission Inquiry**: If you are not sure a paper is appropriate, you can ask an editor for advice. But be prepared to accept their advice if you ask for it.
More tips on how to write your paper...

• write the paper so that a science-proficient non-expert, like an editor, can understand the logic and importance of your findings.

• If you put the work in context, the “sexiness” takes care of itself, avoid spinning or over hyping the work.

• Make the figures self-explanatory and easy to understand.

• Bad English is often not the main reason for a badly written paper: it is more often bad logic and a lack of focus!

• Get feedback on the paper from colleagues outside the field. They can flag problems with clarity that insiders may not spot.
A resubmission invitation letter...

“We’re really, really interested. Now take it home and make it sing.”
Responding to Reviews

• A resubmission invitation is a letter that clearly states: “We would be happy to consider a revised manuscript”. The level of editorial enthusiasm can vary dramatically:
  Minor revisions >> One or two additional experiments >> Interesting but too preliminary >> Interesting but significant flaws

• Contact the editor with your plan of action, even if you have decided to go to another journal.

• Your response should provide a detailed point-by-point response to reviewers’ comments outlining how you have addressed them with additional data.
Responding to Rejection

• Wait at least 24 hours with a response!

• If you feel too emotional, ask a colleague you respect to help you assess the reviews.

• Editors make mistakes – they have to make many decisions every day. You may be able to persuade them to reconsider the decision. Don’t be afraid to write an appeal letter or contact the editor directly.
Appealing a decision

- STICK TO THE SCIENCE

- Recognize that there is usually something to learn from every criticism, and act respectful (even if you don’t feel it). It is not productive to insult the editor or reviewers. If they have missed something important make an attempt to make the point more clearly.

- If a reviewer is truly off track, use the literature and scientific reasoning to highlight this fact.
Accepting a decision

• Repeatedly trying to argue or force your work into journals will earn you a bad reputation; it also sets a negative and combative tone in the lab.

• Not all work is of sufficient significance to merit publication in the highest impact journals.

• Learning when to let go and to send the paper to another journal is a good skill to develop.
How to review a paper

• Most important: evaluate technical quality; review significance and context of submitted paper, organization, clarity.

• you can comment on whether you would publish or not either in the comments to authors or in comments to editors. But make sure that comments to editors are not diametrically opposed to what you say to the authors.

• be explicit what revisions are critical; be constructive; no laundry list! “reviewer’s experiments”

• Involve people in your lab in the review process! They learn a lot! But acknowledge who helped you.

• keep your review confidential, even if you are positive!
Summary: You are an active participant in the publishing process

• Often young faculty feel publishing is a process out of their control.

BUT:

• Editors want to connect with you since they know that young produce the next breakthrough stories.

Therefore, as a community you have some control over which journals are going to have the “best” content.
Discussion: Improvements of the publishing process

- pay reviewers?
- Professional versus academic editors?
- Are editors, authors and reviewers too busy?
- Conceptual advance versus technical quality?
I donated a kidney to an editor once.

Really? What happened?

It was rejected.
Increasing access to your publications

OUTLINE

• Harvard’s open access policy & repository

• NIH public access policy

• Managing your own scholarly record
Publishing workflow

Submit manuscript (version = “pre-print”)

Peer review process
  - Reviewers may suggest revisions; revise and resubmit
  - Paper accepted
    - “Author’s Final Peer Reviewed Manuscript”

Copyright Transfer Agreement

Copyediting
  - Correspondence w/ author to implement some changes
  - Manuscript is typeset and page proofs sent to author
  - Major changes are discouraged here (looking mainly for typos or technical errors in the proofs)

Publication
  - Final published version – “version of record”
“Author’s final manuscript”? 

• The last document that you send to the publisher, including edits that result from the peer review process (but before copy editing).

• Might be virtually identical to the published version of your paper, but it is typically treated differently from the published version for purposes of licensing and copyright.
FAS OA policy (voted 2/12/08)

1. **License**: Each Faculty member grants to the President and Fellows of Harvard College permission to make available his or her scholarly articles and to exercise the copyright in those articles.

2. **Opt-out**: The Dean or the Dean's designate will waive application of the policy for a particular article upon written request by a Faculty member explaining the need.

3. **Deposit**: Each Faculty member will provide an electronic copy of the final version of the article at no charge to the appropriate representative of the Provost's Office in an appropriate format ...no later than the date of its publication.
Copyright assigned according to terms prescribed by the publisher ... roughly 63% of whom already grant back to the author the right to self-archive post-refereed manuscript in an institutional repository
After: University as rights holder

University shares in copyright (non exclusive license), but responsibility for self-archiving remains with faculty member; publishers’ author-archiving policies constrain terms of access to repository content.
Not a “mandate”, and not intended to control where you publish your work

• Harvard’s policy is a collective faculty resolution

• Harvard’s license is opt out: makes rights sharing and self-archiving the default, but not mandatory

• Faculty must choose whether or not to waive Harvard’s prior license, and whether to deposit their articles in the repository, and are, in effect, gradually “nudged” towards proactive rights retention and self-archiving…but still free to publish where they like
License scenarios

• If you publish in an open access (PLoS) or OA-friendly journal, then no waiver or addendum is needed

• Otherwise, you must either use Harvard’s addendum to retain self-archiving rights, or obtain a waiver of Harvard’s prior non-exclusive license in your work
Journal policies differ

• **Nature** – Waiver required, but ok to self archive pre-refereed work at any point and post-refereed work six months after publication

• **Cell** – Waiver required, but OK to place post-refereed work on your website, not in Harvard’s repository

• **Science** – Waiver required, but OK to self-archive post-refereed work

• **PNAS** – Waiver required, but OK to self-archive post-refereed work

• **PLoS** – No waiver required
http://www.sherpa.ac.uk/romeo/

Publisher copyright policies & self-archiving

<table>
<thead>
<tr>
<th>Journal:</th>
<th>Proceedings of the National Academy of Sciences (ISSN: 1091-6490)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RoMEO:</td>
<td>This is a RoMEO green journal</td>
</tr>
<tr>
<td>Paid OA:</td>
<td>A paid open access option is available for this journal.</td>
</tr>
</tbody>
</table>

| Author's Pre-print: | ✓ author can archive pre-print (i.e., pre-refereeing)             |
| Author's Post-print: | ✓ author can archive post-print (i.e., final draft post-refereeing) |
| Publisher's Version/PDF: | ✗ author cannot archive publisher's version/PDF                    |

General Conditions:
- Applies to PNAS only
- Personal website, institutional repository or preprint servers only
- Publisher copyright must be acknowledged
- Must link to publisher version
- Publisher's version/PDF cannot be used in repository, but may be used on authors' website
- Authors may have deposit in funding body archive or designated repository for public release 6 months after publication or immediately upon payment of fee
- All PNAS-formatted versions are deposited in PubMed Central for release after 6 months, regardless of funding

Mandated OA: (Awaiting information)

Paid Open Access: PNAS Open Access Option

Copyright: Author License (pdf) - Author FAQ - Prior Publication Policy

Updated: 07-Apr-2011 - Suggest an update for this record

Link to this page: http://www.sherpa.ac.uk/romeo/ssr/1091-6490/
How to comply – OSC website

Office for Scholarly Communication

Open Access Policy Guidelines

Complying with the Policy

In order to comply with Harvard’s Open Access Policy, faculty authors should

- Always deposit each article in DASH.

If possible, you should deposit the author’s final manuscript of your article in the DASH repository whether or not you included the addendum or the publisher accepted it. Even if you had the license waived, you should still deposit the article; it can be made available immediately or after a delay or kept “dark” depending on the publication agreement.

To avoid a conflicting transfer of copyright to the publisher and to protect yourself from breach of contract, we recommend that you

- Use the addendum generator to prepare an "author addendum" to attach to the agreement with a publisher.

If the publisher will not accept the addendum or will not publish the article if it is subject to the Open Access License, you can always

- Request a waiver of the Open Access Policy.

Frequently Asked Questions

Is the university taking the rights to my writing?

suzanne_kriegsman@harvard.edu
Policy compliant publishers

Policy Compliant Publishers

The following journal publishers have formally indicated cooperation with Harvard’s open access policies and have agreed that Harvard faculty who publish in their journals may deposit those articles in Harvard’s DASH repository under the open access policy without modification of their publication agreements, attachment of addenda, or waiver of Harvard’s prior license. We are grateful to these publishers for their full support of access to Harvard faculty’s writings.

We expect to add additional publishers and journals to this list in the near future. Publishers interested in being listed here should contact us for further information.

<table>
<thead>
<tr>
<th>Publisher/Journal</th>
<th>Confirmed as of</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Economic Association</td>
<td>June 5, 2009</td>
<td>[1]</td>
</tr>
<tr>
<td>BioMed Central</td>
<td>June 5, 2009</td>
<td>[1]</td>
</tr>
<tr>
<td>American Physical Society</td>
<td>April 9, 2009</td>
<td>[2]</td>
</tr>
<tr>
<td>Hindawi Publishing Corporation</td>
<td>June 8, 2009</td>
<td>[1]</td>
</tr>
<tr>
<td>Public Library of Science</td>
<td>June 8, 2009</td>
<td>[1]</td>
</tr>
<tr>
<td>Rockefeller University Press</td>
<td>June 29, 2009</td>
<td>[1]</td>
</tr>
<tr>
<td>University of California Press</td>
<td>June 29, 2009</td>
<td>[1]</td>
</tr>
</tbody>
</table>

[1] Creative Commons Attribution License
[2] Applies to DASH deposit of the publisher’s PDF or the author’s final manuscript.
[3] Applies to DASH deposit of the publisher’s PDF or the author’s final manuscript.
Addendum & waiver generators

ADDENDUM TO PUBLICATION AGREEMENT

1. This Addendum modifies and supplements the executed publication agreement (the "Publication Agreement") concerning the article titled 'A Simple Language for Novel Visualizations of Information' (including any supplementary materials, the "Article") in Communications in Computer and Information Science.

2. The parties to the Publication Agreement as modified and supplemented by this Addendum are: Wendy Lucas (corresponding author) and Stuart M. Shieber (individually or, if more than one author, collectively, "Author") and Springer Verlag GmbH ("Publisher").

3. The parties agree that wherever there is any conflict between this Addendum and the Publication Agreement, the provisions of this Addendum will control and the Publication Agreement will be construed accordingly.

4. Notwithstanding any terms in the Publication Agreement to the contrary, Author and Publisher agree as follows:

   a. All of the terms and conditions of the Publication Agreement, including but not limited to all grants, agreements, representations and warranties, are subject to and qualified by a non-exclusive license previously granted by Author to Harvard University. Under that license, Harvard may make the Article available and may exercise all rights under copyright relating to the Article, and may authorize others to do the same, provided that the Article is not sold for a profit.

   b. Where applicable, all of the terms and conditions of the Publication Agreement, including but not limited to all grants, agreements, representations and warranties, are subject to and qualified by any non-exclusive license previously granted, or previously required to be granted, by Author to a funding entity that financially supported the research reflected in the Article as part of an agreement between Author or Author’s employing institution and such funding entity, such as an agency of the United States government, and/or to Author’s employing institution.

   c. Nothing in the Publication Agreement will impose any limitation on the rights and licenses referred to in the paragraphs above or any obligation in connection with their exercise. Neither the existence nor the exercise of those rights and licenses will be deemed to violate any representation or warranty or breach the Publication Agreement.

5. Either publication of the Article or Publisher's signature below will constitute Publisher's acceptance of and agreement to this Addendum.

   AUTHOR

   (corresponding author on behalf of all authors)

   Date

   PUBLISHER

   Date

Office for Scholarly Communication

Waiver Generator

To request a waiver of Harvard’s Open Access Policy for an article, fill in and submit the form below.

If you’re not sure if you need a waiver or have questions about the process, you can get answers here.

Waiver Request

As permitted by the policy adopted by the school indicated below, under which I have granted Harvard a license with respect to my scholarly articles, I hereby request a waiver of the policy for the following article:

Policy

School: *
- Select -

Article Information

Title: *

Please provide the complete and accurate title of the work.

Author(s): *

Serial title: *

The title of the journal, published proceedings, etc.

Publisher: *

Reason for waiver:
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Journal/Journal Entry Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-Genes Reinforce the Phylogeny of Holometabola and Yield Alternate Views on the Phylogenetic Placement of Strepsiptera</td>
<td>McKenna, Duane D; Farrell, Brian Dorsey (PLOS ONE, 2010)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Acritarchs and Microfossils from the Mesoproterozoic Bangemall Group, Northwestern Australia</td>
<td>Buick, Roger; Knoll, Andrew Herbert (Journal of Paleontology, 1999)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Adaptation and Diversification on Islands</td>
<td>Ricklefs, Robert E.; Losos, Jonathan (Nature, 2009)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Adaptive Radiation: Contrasting Theory with Data</td>
<td>Gavrilets, Sergey; Losos, Jonathan (Science, 2009)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Adaptive Variation in Beach Mice Produced by Two Interacting Pigmentation Genes</td>
<td>Hoekstra, Hopi; Weber, Jesse N; Steiner, Cynthia C (PLoS Biology, 2007)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Admixture Determines Genetic Diversity and Population Differentiation in the Biological Invasion of a Lizard Species</td>
<td>Losos, Jonathan; Kolbe, Jason J.; Larson, Allan; de Queiroz, Kevin (Biology Letters, 2008)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>ALLPATHS 2: Small Genomes Assembled Accurately and with High Continuity from Short Paired Reads</td>
<td>MacCallum, Iain; Przybylski, Dariusz; Gnerre, Sante; Burton, Joshua; Gnierke, Andreas; Malek, Joel; McKernan, Kevin et al. (Genome Biology, 2009)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Ambient Pyrite in Precambrian Chert: New Evidence and a Theory</td>
<td>Barghoorn, Eso S.; Knoll, Andrew Herbert (Proceedings of the National Academy of Sciences of the United States of America, 1974)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Analytic Steady-state Space Use Patterns and Rapid Computations in Mechanistic Home Range Analysis</td>
<td>Barnett, Alex H.; Moorcroft, Paul (Journal of Mathematical Biology, 2008)</td>
<td>Link to Published Version</td>
</tr>
<tr>
<td>Analytical Results for Individual and Group Selection of Any Intensity</td>
<td>Traulsen, Arne; Shoresh, Noam; Nowak, Martin A. (Bulletin of Mathematical Biology, 2008)</td>
<td>Link to Published Version</td>
</tr>
</tbody>
</table>
Mediated deposits
- Open Access Fellows program
- Quick submit form:

Quick Submit to the DASH Repository

This form allows you to upload an article for the OSC to deposit on your behalf into the DASH repository. OSC will handle the deposit process for you, and will contact you if any further information is needed to complete the deposit.

Your name: 
Your email: 
Author(s): 
Title: 
Serial (journal, proceedings, etc.): 
Year: 2010
Other information: 
File: 

Submit article
Upload to DASH from FAS faculty activity report tool

<table>
<thead>
<tr>
<th>Type of Work (required):</th>
<th>Journal article</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link to published article (optional):</td>
<td>journal/117997259/abstract <a href="http://dx.doi.org/10.1111/j.1468-0068.2007.00636.x">http://dx.doi.org/10.1111/j.1468-0068.2007.00636.x</a></td>
</tr>
<tr>
<td>Year of Publication (required):</td>
<td>2010</td>
</tr>
<tr>
<td>Notes (optional):</td>
<td></td>
</tr>
<tr>
<td>File Submittal for DASH*:</td>
<td>C:\Documents and Settings\kwyu.FAS_DOMAIN\Desktop\blank.doc</td>
</tr>
</tbody>
</table>
DASH downloads

<table>
<thead>
<tr>
<th>Field</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychology</td>
<td>749</td>
<td>3620</td>
<td>50833</td>
</tr>
<tr>
<td>History</td>
<td>605</td>
<td>2348</td>
<td>36194</td>
</tr>
<tr>
<td>Philosophy</td>
<td>496</td>
<td>2517</td>
<td>25629</td>
</tr>
<tr>
<td>Sociology</td>
<td>460</td>
<td>1691</td>
<td>24706</td>
</tr>
<tr>
<td>African and African American Studies</td>
<td>454</td>
<td>1990</td>
<td>27056</td>
</tr>
<tr>
<td>Government</td>
<td>401</td>
<td>1417</td>
<td>22525</td>
</tr>
<tr>
<td>Anthropology</td>
<td>333</td>
<td>1612</td>
<td>23913</td>
</tr>
<tr>
<td>History of Science</td>
<td>272</td>
<td>1440</td>
<td>26274</td>
</tr>
<tr>
<td>Organismic and Evolutionary Biology</td>
<td>262</td>
<td>1022</td>
<td>18845</td>
</tr>
<tr>
<td>English and American Literature and Language</td>
<td>162</td>
<td>695</td>
<td>11929</td>
</tr>
<tr>
<td>Other Research Unit</td>
<td>157</td>
<td>822</td>
<td>13416</td>
</tr>
<tr>
<td>Earth and Planetary Sciences</td>
<td>139</td>
<td>543</td>
<td>7605</td>
</tr>
<tr>
<td>Mathematics</td>
<td>112</td>
<td>397</td>
<td>8192</td>
</tr>
</tbody>
</table>
Embargoed, dark, and metadata-only deposits

- Create a time-stamped institutional record of your scholarship
- Establish intellectual precedence
- Articles deposited “dark” can be found based on searches that hit not only the title and abstract but also full text of the article
- Preserve your, and the institution’s, record of scholarship
Compact for Open Access Publishing Equity

• The University commits to underwrite article processing fees for (non hybrid) open-access journal publication by its faculty, when other funds are not available, to cover the publisher costs of:
  — Peer review logistics: vetting, filtering, imprimatur
  — Production: copy-editing, typesetting, graphic design, layout
  — Distribution: networked access
NIH Public Access Policy

• If your article arises, in whole or in part, from NIH-funded research and was accepted for publication after April 7, 2008, you must retain sufficient rights to comply with NIH’s Public Access Policy.

• http://publicaccess.nih.gov/index.htm
NIH Public Access Policy

• **PMC deposit** – upon acceptance for publication, submit electronic copy of final peer-reviewed manuscript to PMC, to be made available no later than 12 months post publication; most publishers now assist in this process

• **Identifying and using the PMCID** – always use PMCID when citing an article that falls under the policy

• **Copyright management** – communicate NIH requirement to your publisher do not sign a CTA which prevents you from depositing to PMC; understand how the publisher will comply
Publishers with different PMC submission policies

**Science**: Default policy allows author to upload manuscript to PMC with six month embargo

**Cell (Elsevier)**: Author must disclose on CTA that manuscript supported by NIH Funds; Only publisher may deposit to PMC, with a 12 month embargo ("Please note that consistent with Elsevier’s author agreement, authors should not post manuscripts directly to PMC or other third party sites.")

**Nature**: If author “Opt-in” to Nature’s PMC deposit service, then NPG will submit author manuscript version to PMC with 6 month embargo; failure to Opt-in does not bar the author from submitting the author-manuscript into PMC on their own.
Scott Lapinski (P_Lapinski@hms.harvard.edu)
Post to your own website

• Even if you are prevented by the publisher from making your work OA in DASH, you can usually post the manuscript to your own website (and link from DASH)

• Always list your publications and link to the published manuscript, ideally using the DOI


Many reference managers...

• Mendeley: http://www.mendeley.com/
• Papers: http://www.mekentosj.com/papers/
• ReadCube: http://www.readcube.com/
• Endnote: http://www.endnote.com
• Zotero: http://www.zotero.com
• ColWiz: http://colwiz.com
...have become socio-academic networks:

Promoting yourself and publishing research

Making your mark in your field is an important part of being a researcher. Mendeley tracks your readership and lets you share your profile with the larger community.

1. Build your researcher profile
   Create a profile on Mendeley and index your publications so that more people can find, read and cite your work.

2. Embed your profile elsewhere
   Add links to your Mendeley profile on personal web pages, blogs and e-mail signatures.

3. Track your readership
   Mendeley shows you how many readers and downloads your publications get over time.

Wolf Harmening
PostDoc, School of Optometry
Berkeley, California, United States
Research field: Biological Sciences
Visual Psychophysics in Humans and
Tools to...

• Track your citations and other measures of impact:
  – *Google Scholar Citations*
  – *Microsoft Academic Search*
  – *PubMed*
  – *Scopus*
  – *Web of Science*
  – *Klout*
  – *Citedin*
  – *Altmetric (and PLoS Impact Explorer)*
  – *Total-impact*
  – *ScienceCard*
Google Scholar Citations


Таннер, Хокстра (2008) Causes and
PLoS Impact Explorer

Showing 3 PLoS articles matching 'hopi hoeckstra' in the altmetric.com database. Hover over a score for more information, click it for details.

<table>
<thead>
<tr>
<th>Buzz</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Adaptive Variation in Beach Mice Produced by Two Interacting Pigmentation Genes &lt;br&gt; PLoS Biology</td>
</tr>
<tr>
<td>8</td>
<td>A Novel Role for Mc1r in the Parallel Evolution of Depigmentation in Independent Populations of the Cavefish Astyanax mexicanus &lt;br&gt; PLoS Genetics</td>
</tr>
<tr>
<td>8</td>
<td>A Simple Genetic Architecture Underlies Morphological Variation in Dogs &lt;br&gt; PLoS Biology</td>
</tr>
</tbody>
</table>

Search for articles:

hopi hoeckstra

Examples:
- speech development
- chimpanzees
- ocean temperature
- dinosaurs

OR

Browse articles with mentions in the past:
- 1d, 3d, 1w, 1m, 3m or all time

In these journals (all by default):
- PLoS One
- Genetics
- Computational Biology
- Pathogens
- Medicine
- Biology
- Neglected Tropical Diseases

About this site

Why wait for citations? See which articles in your field are getting the most buzz online and read what your peers &
Complex evolutionary events at a tandem cluster of Arabidopsis thaliana genes resulting in a single-locus genetic incompatibility.

Smith LJ, Bomblies K, Weiss D.

Department of Molecular Biology, Max Planck Institute for Developmental Biology, Tubingen, Germany.

Abstract

Non-additive interactions between genomes have important implications, not only for practical applications such as breeding, but also for understanding evolution. In extreme cases, genes from different genomic backgrounds may be incompatible and compromise normal development or physiology. Of particular interest are non-additive interactions of alleles at the same locus. For example, overdominant behavior of alleles, with respect to plant fitness, may be an important component of hybrid vigor. While underdominance may lead to reproductive isolation. Despite their importance, only a few cases of genetic over- or underdominance affecting plant growth or fitness are understood at the level of individual genes. Moreover, the relationship between biochemical and fitness effects may be complex: genetic overdominance, that is, increased or novel activity of a gene may lead to evolutionary underdominance expressed as hybrid weakness. Here, we describe a non-additive interaction between alleles of the Arabidopsis thaliana OAK (Outgrowth-associated Protein Kinase) gene. OAK alleles from two different accessions introgressed in F1 hybrids caused a variety of aberrant growth phenotypes that depend on a recently acquired promoter with a novel expression pattern. The OAK gene, which is located in a highly variable tandem array encoding closely related receptor-like kinases, is found in one third of A. thaliana accessions, but not in the reference accession Col-0. Besides recruitment of exons from nearby genes as promoter sequences, key events in OAK evolution include gene duplication and divergence of a potential ligand-binding domain. OAK kinase activity is required for the aberrant phenotypes, indicating it is not recognition of an aberrant protein, but rather a true gain of function, or overdominance for gene activity, that leads to this underdominance for fitness. Our work provides insights into how tandem arrays, which are particularly prone to frequent, complex rearrangements, can produce genetic novelty.
Faculty

To find contact information for Harvard faculty, use the public Harvard directory. The links below provide information and resources for faculty. More information can be found on the websites of each School.

Search the Public Harvard Directory

First Name
Last Name
Find People

University-wide Faculty Resources

The following links provide resources for all Harvard University faculty. Additional faculty resources may be found at Faculty Development and Diversity. See also Open Faculty Positions.

Academic Calendar by School
Admissions and Registrar Contact Information by School
Commencement
Directions and Parking
Harvard Faculty Club
Harvard Mobile Apps
Harvard University Health Services
Harvard University Police Department

Forces beyond nations
Sociology professor Jason Beckfield envisions a regionalized future for countries with mutual, overriding interests.

Read More →
Getting the word out

• If you have a newsworthy publication forthcoming, get the word out – the earlier the better -- to:
  – Peter Reuell
  – Communications Officer
  – Faculty of Arts and Sciences
  – 617-496-8070
  – preuell@fas.harvard.edu

• This office handles, Gazette, other media, press releases, blogs, etc.
faculty

diversity