

Addressing the Discontinuity Between Doing Research and Disseminating Research

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<http://www.sdsc.edu/pb>

Scientist vs. Publisher



uzar.wordpress.com

- There is a high wall separating a scientist and a publisher
- Perhaps a consequence of the analog world
- There is no need for this in a digital world
- Perhaps it is time to climb the wall?

Stated Another Way...



- As a scientist I want an interaction with the publisher that does not begin when the scientific process ends, but begins at the beginning of the scientific process itself

What I want from a Publisher of the Future
PLoS Comp Biol 2010 6(5): e1000787

In the dream world I am
creating here what would
the end product of that
relationship look like?

Yes I Want the Beauty of an Original Research Article with Semantic Tagging and Visual Embeds etc .. but

App Integration in Science Direct

Result list | previous < 4 of 12 > next Font Size: - +

PDF (339 K) Export Citation E-mail Article

Article

Journal of Molecular Biology
Volume 356, Issue 4, 3 March 2006, Page

doi:10.1016/j.jmb.2005.11.094 | How to
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Structural Insights in HIV-1 Protease NL4-3

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Abstract

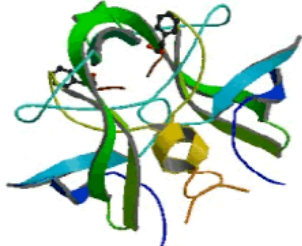
The development of resistance problem in the treatment of HIV of the virus after treatment with inhibitors. Therefore, it is imperative in particular HIV-1 protease, de structure of HIV-1 protease NL4 resolution. We have also obtained the crystal structures of three mutant forms of NL4-3 protease containing [one \(V82A\)](#), [three \(V82A, M46I, F53L\)](#) and [six \(V82A, M46I, F53L, V77I, L24I, L63P\)](#) point mutations in complex with TL-3. The three protease mutants arose sequentially under ex vivo selective pressure in the presence of TL-3, and exhibit fourfold, 11-fold, and 30-fold resistance to TL-3, respectively. This series of protease crystal structures offers insights into the biochemical and structural mechanisms by which the enzyme can overcome inhibition by TL-3 while recovering some of its native catalytic activity.

Keywords: HIV-1 protease; drug resistance; viral evolution; crystal structure; mutation

Abbreviations: HIV-1, human immunodeficiency virus type 1

Article Outline

PDB Structure Viewer



HIV-1 Protease NL4-3 in complex with inhibitor, TL-3

Release Date: 28-Feb-2006
Exp. Method: X-RAY DIFFRACTION
Hydrolase/hydrolase Inhibitor

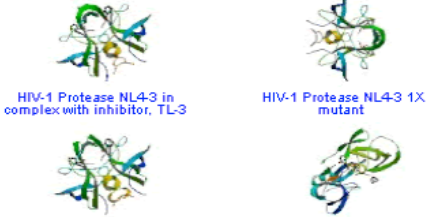
Molecule: PROTEASE RETROPEPSIN
Polymer: 1 Type: polypeptide(L)
Chains: A
EC#: 3.4.23.16

Molecule: TL-3 [[PHENYLMETHYLOXY-CARBONYL]-ALANINYL]-VALINYL-{PHENYL-1-HYDROXYPROP-2-YL}-AMINE
Polymer: 2 Type: polypeptide(L)
Chains: I
Fragment: Half of TL-3 molecule in the asymmetric unit

My Applications

+ Add Show all apps ?

PDB Structure Viewer



HIV-1 Protease NL4-3 in complex with inhibitor, TL-3
HIV-1 Protease NL4-3 1X mutant
HIV-1 Protease NL4-3 3X mutant in complex with inhibitor, TL-3
HIV-1 Protease NL4-3 6X mutant

About PDB Structure Viewer

Microsoft Author Network Visualizer

Holly Heaslet	John H. Elder
Victoria Kutilek	Bruce E. Torbett
Garrett M. Morris	C. David Stout
Ying-Chuan Lin	

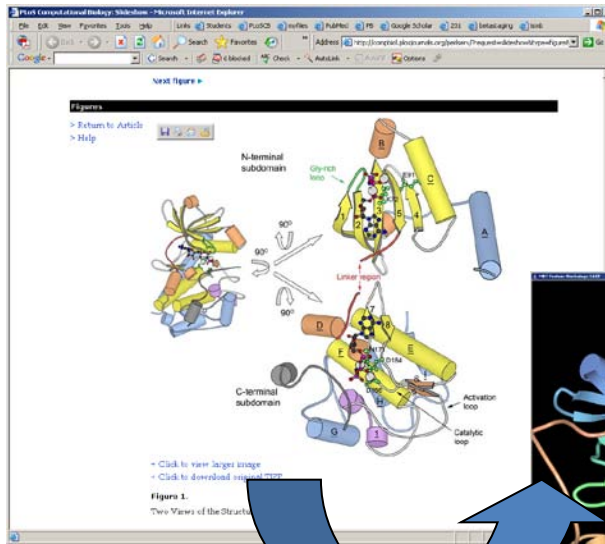
About Microsoft Author Network Visualizer

Net Base Analyzer

Related Articles

- Can extra-dimensional effects replace dark matter?
Physics Letters B
- A generic test of modified gravity models which emulate...
Physics Letters B
- Dark matter as a geometric effect in f(R) gravity
Astroparticle Physics
- Planet-bound dark matter and the internal heat of Uranus...
Physics Letters B
- The influence of dark matter on the motion of planets a...
Physics Letters A

I Want Interoperability with the Data and Applications that Understand That Data



User annotates view

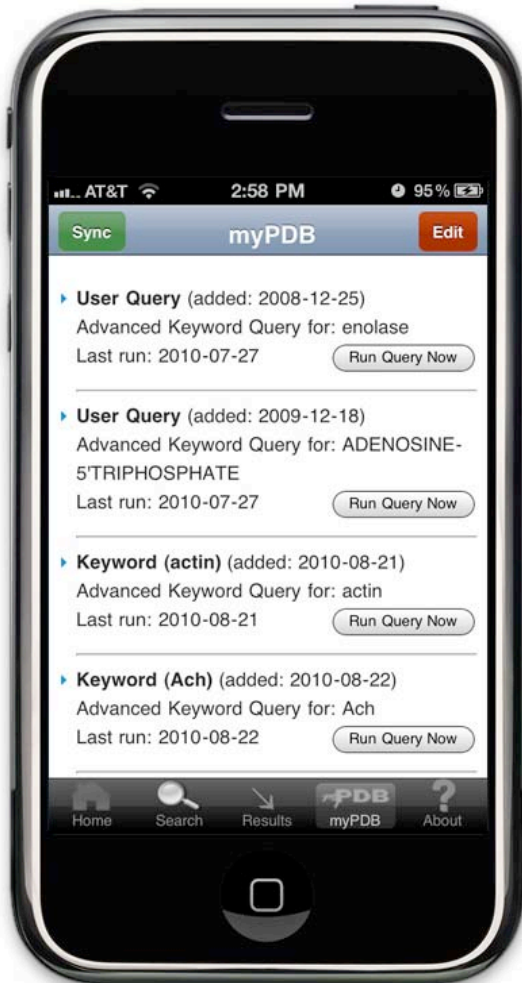
- What is needed?
 - Standard set of apps for data exploration
 - Standard calling interfaces
- Who manages the data?
 - Publisher
 - Author
 - Database
 - 3rd party

Metadata stored with the article
Fetches the data and provides a
Starting point for interactive enquiry

Already Being Done by Databases and on Mobile

Tight Integration with MyPDB

- Access to saved queries
- Add/delete queries
- Flag interesting entries
- Add personal structure annotations



MyPDB Welcome greg!

- Saved Queries
- Personal Annotations
- Display Settings
- Account
- Logout

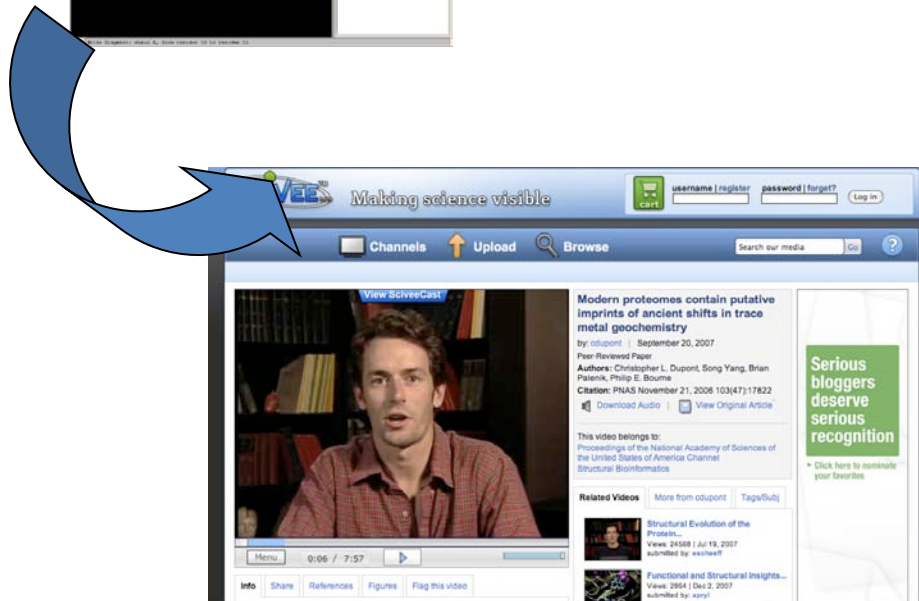
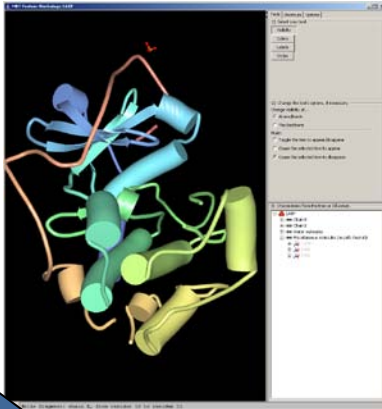
Personal Annotations

Below are links to PDB entries that have been annotated and/or flagged by you using the PDB

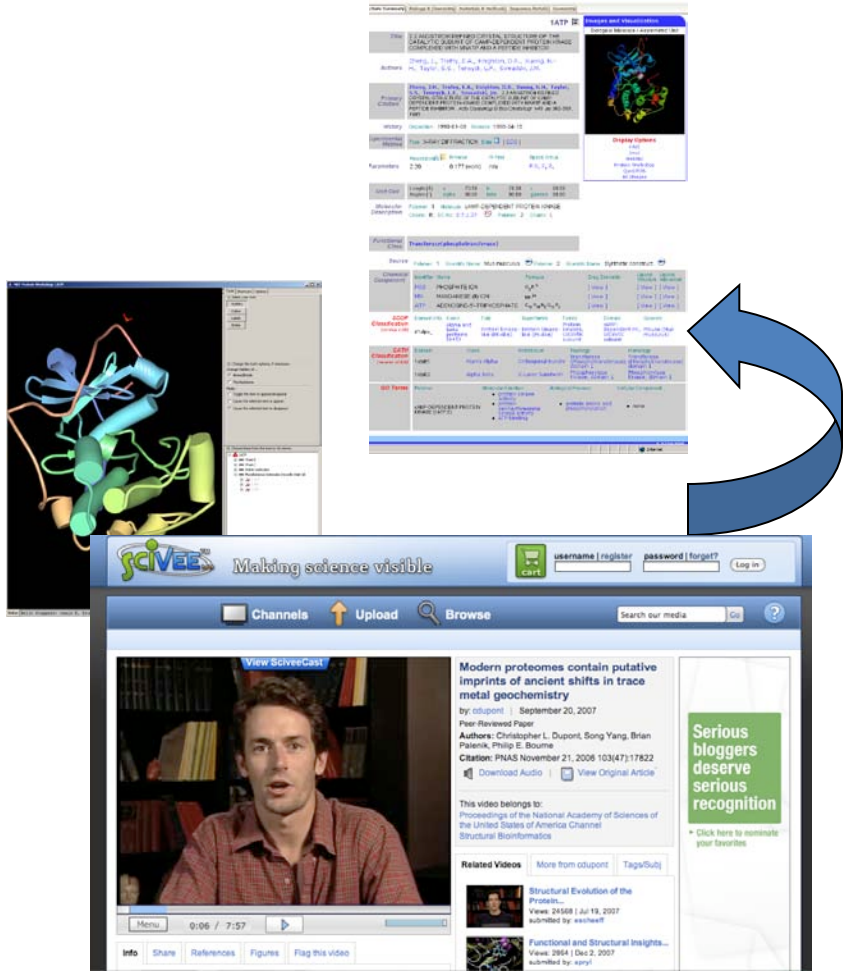
1. **2HHB**
This looks like a potentially interesting variant
2. **1CQ4** ★

Integrated Rich Media

- Already happening but post publication not Prepublication
- Lab discussions, presentations of the work etc. are part of the new discourse

A screenshot of the Scivue website interface. The top navigation bar includes the Scivue logo, the tagline "Making science visible", and a search bar. Below the navigation bar, there are tabs for "Channels", "Upload", and "Browse". The main content area features a video player on the left, a video player with a play button and a progress bar. To the right of the video player, there is a text area containing the title "Modern proteomes contain putative imprints of ancient shifts in trace metal geochemistry", the author "odupont", the date "September 20, 2007", and a list of authors: "Christopher L. Dupont, Song Yang, Brian Palanis, Philip E. Bourne". Below the text, there are links for "Download Audio" and "View Original Article". On the far right, there is a green box with the text "Serious bloggers deserve serious recognition" and a link "Click here to nominate your favorite".

Mashup with Content from Other Articles / Data



- Doable?
- Sure its happening already, but at the level of the article not the nano publication
- **Nano implies being part of the research process**

Example of Nano Integration: The Database View

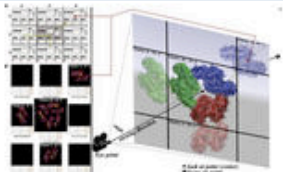
www.rcsb.org/pdb/explore/literature.do?structureId=1TIM

Related Citations in PDB Entry (REMARK 1)

Show

Information provided by **BioLit**:

PubMedCentral articles found to contain 1TIM ?



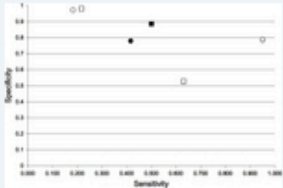
PMG: online generation of high-quality molecular pictures and storyboarded animations

Ludovic Autin, Pierre Tufféry

Nucleic Acids Research 2007; 35(Web Server issue):W483-W488ff.

PubMedCentral: [1933120](#) PubMed: [17478496](#) DOI: [10.1093/nar/gkm277](#)

[Abstract](#) [Copyright](#)



Computer-Based Screening of Functional Conformers of Proteins

Héctor Marlosti Montiel Molina, César Millán-Pacheco, Nina Pastor, Gabriel del Rio

PLoS Computational Biology 2008; 4(2):e1000009ff.

PubMedCentral: [2265533](#) PubMed: [17478496](#) DOI: [10.1371/journal.pcbi.1000009](#)

[Abstract](#) [Copyright](#)

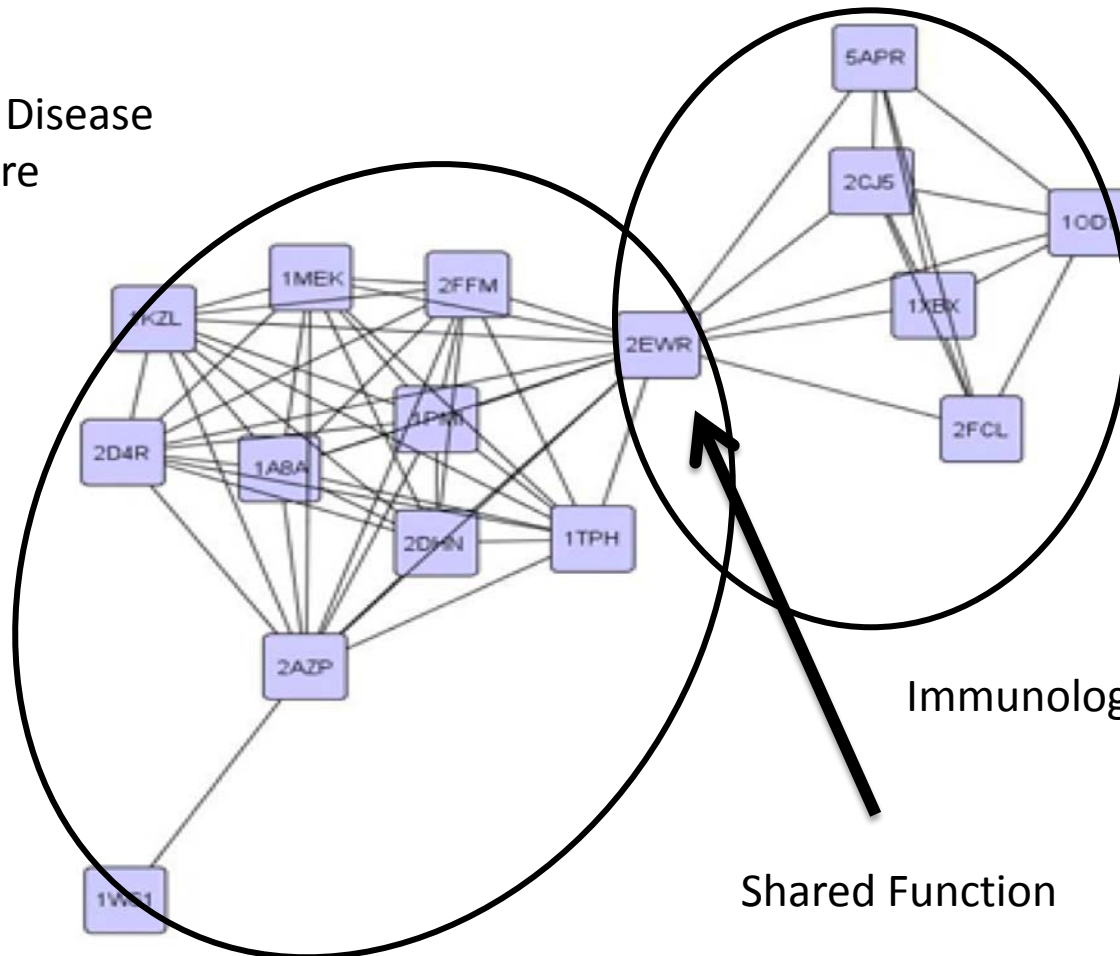
Other PDB IDs found in the above articles ?

Image	PDB ID	Structure Title	Sequence Similarity
	1AON	CRYSTAL STRUCTURE OF THE ASYMMETRIC CHAPERONIN COMPLEX GROEL/GROES/(ADP)7	-
	1CRN	WATER STRUCTURE OF A HYDROPHOBIC PROTEIN AT ATOMIC RESOLUTION. PENTAGON RINGS OF WATER MOLECULES IN CRYSTALS OF CRAMBIN	-
	1A30	HIV-1 PROTEASE COMPLEXED WITH A TRIPEPTIDE INHIBITOR	-

I Also Want To Learn from the Corpus

At this point the research article itself becomes a nano publication

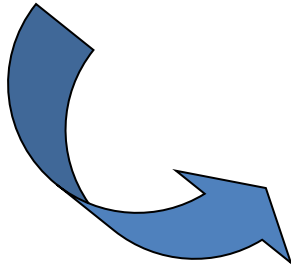
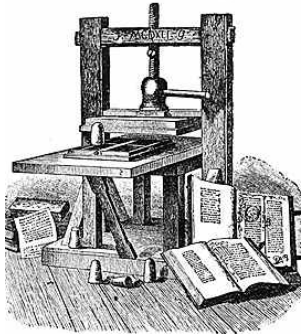
Cardiac Disease
Literature



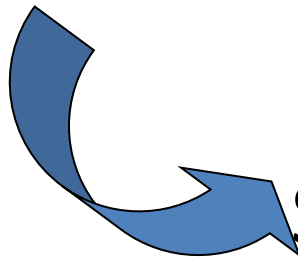
Immunology Literature

Shared Function

A Consequence ...



- Tools
- Annotation and new formats
- Use cases and examples
- Business rights and IP
- Attribution/evaluation/archiving



Beyond the PDF
San Diego
Jan 19-21



Crowd Sourcing the Electronic Printing Press (aka Workshop: Beyond the PDF)

- Aims:
 - Define user requirements
 - Establish a specification document
 - Open source the development effort
 - Have a commitment from a publisher to publish a research object using the system
 - Act as an exemplar for what can be done

Wait a Minute There is More..

So That Is the End Product What is
the Beginning Product?

We as scientists have an interaction with the publisher that does not begin when the scientific process ends, but begins at the beginning of the scientific process itself

Consider the Scientific Workflow

Maybe The Line is Somewhere Else?



Laboratory

Experiment

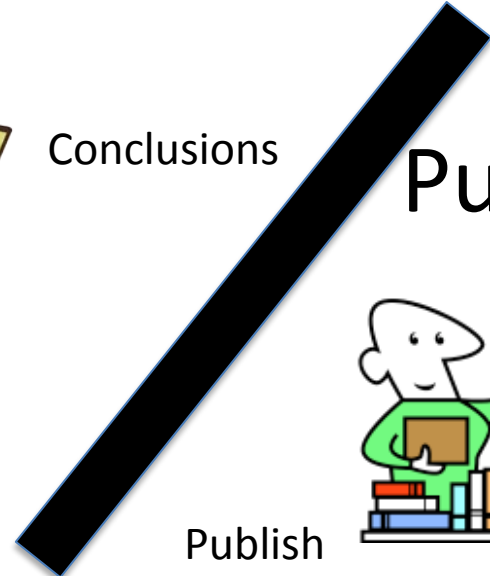
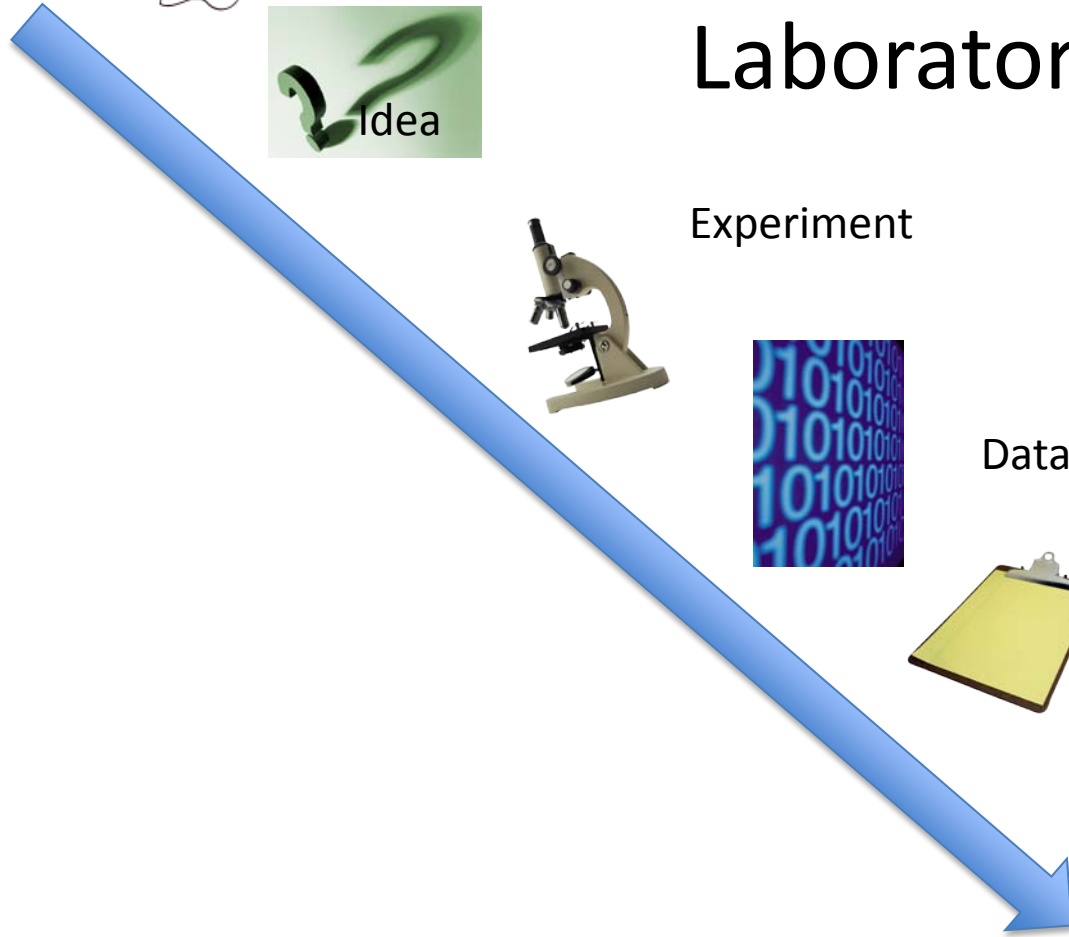


Data



Conclusions

Publisher



We need to publish workflows

Maybe The Line is Somewhere Else?



Laboratory



Institution

Publisher



Lab Notebook

Publish

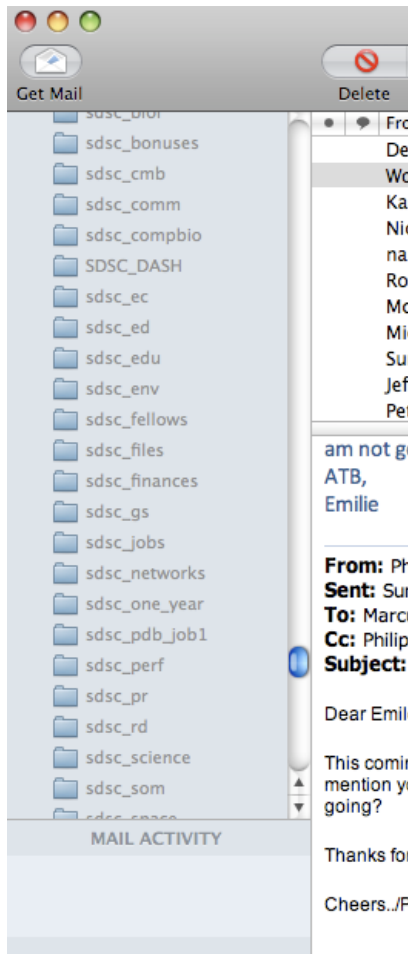
We need to publish workflows

We Need to Publish Workflows

What Would Drive This?

- Preservation of the digital record
- Reproducibility
- The need for the library to reinvent itself
- Digital chaos in the long tail

The Truth About the Scientific eLaboratory



- I have ?? mail folders!
- The intellectual memory of my laboratory is in those folders
- This is an unhealthy hub and spoke mentality

The Truth About the Scientific eLaboratory

- I generate way more negative than positive data, but where is it?
- Content management is a mess
 - Slides, posters.....
 - Data, lab notebooks
 - Collaborations, Journal clubs ...
- Software is open but where is it?
- Farewell is for the data too



Computational Biology Resources Lack
Persistence and Usability. *PLoS Comp. Biol.*
4(7): e1000136

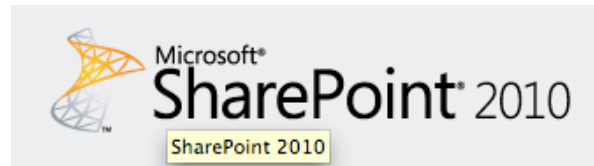
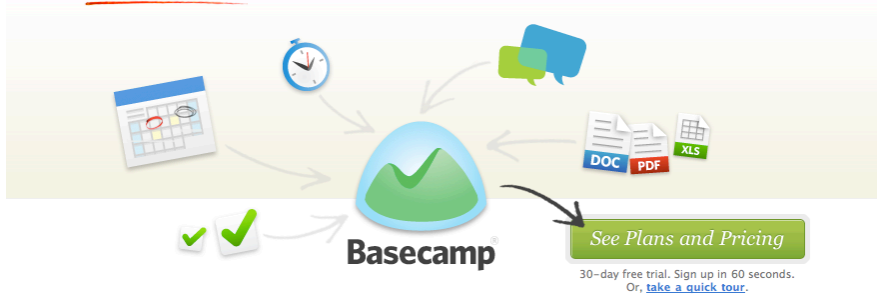
Many Great Tools Out There



Taverna

Manage Projects Better with Basecamp.

Millions of people use Basecamp to collaborate and manage projects online.



Where I See the Problems

- The long tail is confused
- Lack of interoperability between the options
- The reward (publishing) is still removed from the available tools

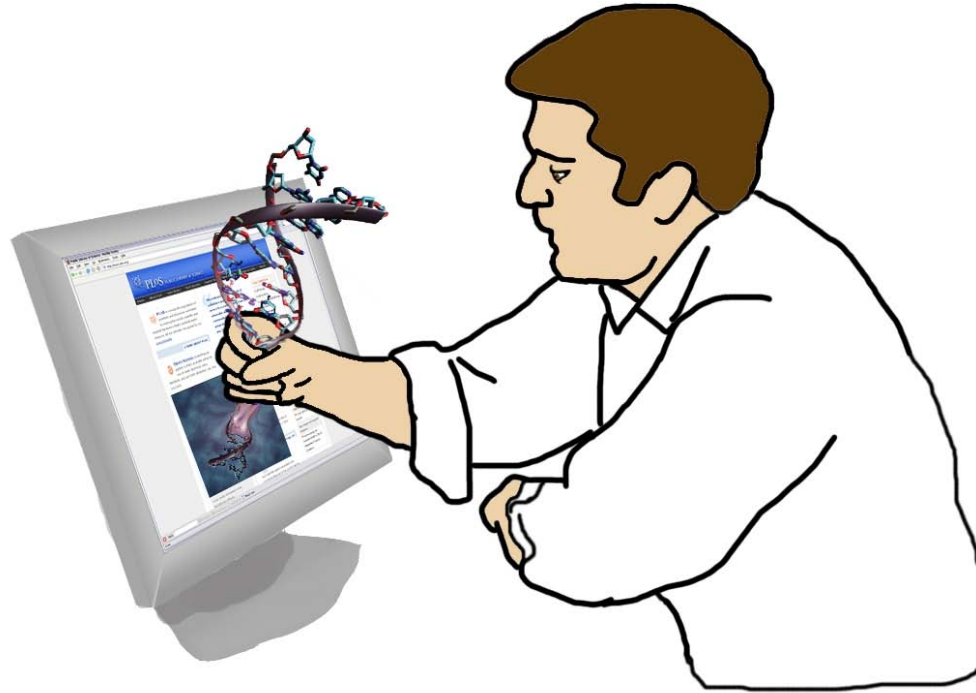


- As a scientist I want a different kind relationship with the publisher of the future
- Is anyone interested?

Acknowledgements

- Beyond the PDF Workshop
 - Funded by DDCF, Microsoft, NCI, Sage Bionetworks
- The SciVee Team
 - Marc Friedmann, J. Lynn Fink, Alex Gramos, Willy Suwanto
- The PDB Team

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Discussion