



Open Notebook Science

Perspectives from a newbie

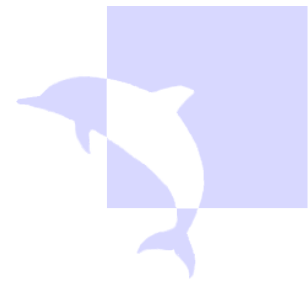
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&

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Open notebook science



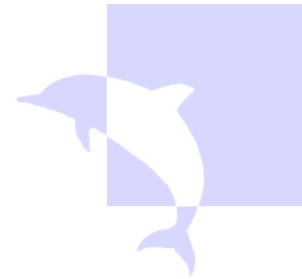
- Provide access to the experimenter's lab book to any viewer (with internet access) as soon as is practicable
- Must include fully open data
- Requires an electronic lab notebook
- *'No insider information'*

Motivations – why ONS?



- Started as an interest in having a better record of lab work, both my own and that of my students
- Funded by UK research council to develop an electronic lab notebook system with colleagues at Southampton University
- Made my student's lab book open for my ease of use (because I work on two sites)
- Was inspired by other groups (UsefulChem, OpenWetWare) to take this further

Implementation of e-lab book



Nature Precedings : doi:10.1038/npre.2007.1130.1 : Posted 26 Sep 2007

- Blog based format
- Purpose built engine
- Fully flexible system with arbitrary metadata
- Full record of changes (not currently easily accessible)

Ligation 4880/99
13th September 2007 @ 12:05

Post Type: Ligation

Reaction	Insert	μL	DNA gel of	μL	Buffer	μL	Water	μL	Enzyme	μL	Product
1	Digestion product for round mutagenesis	4	p042 digestion 4880/90	1	T4 Ligase Buffer NEW 03.07.07	4	Molecular biology grade	1	T4 DNA Ligase NEW 03.07.07	3	Ligation 4880/99 product 1
2	Digestion product for round mutagenesis	4	DNA gel of p042 digestion 4880/90	1	T4 DNA Ligase Buffer NEW 03.07.07	4	Molecular biology grade	1	T4 DNA Ligase NEW 03.07.07	3	Ligation 4880/99 product 2

Ligations were set up as listed in 200 μL tubes and incubated at room temperature for 2 hours to give the products listed.
This Post is Linked By: Ligation 4880/99 product 1;Ligation 4880/99 product 2;

Jennifer Hale | Procedure | Comments (1)

DNA gel of mutagenesis product and p042 digestions
11th September 2007 @ 14:14

Post Type: DNA_gel_product

Gel properties

Reagent	Property
Agarose	0.5 g
TAE buffer	50 mL
Gel %	1
Voltage	100 V
Time	42 mins

An agarose gel was made prepared by dissolving the agarose in the TAE and set in the mould accordingly.

Samples

Lane	Sample	μL
1	Round 4 digestion product	42
2		
3	p042 digestion product	105
4	p042 digestion product	105

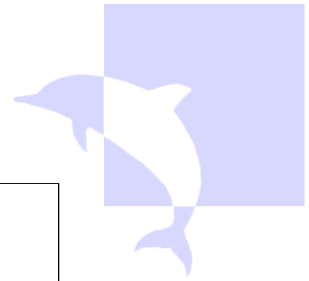
The gel was run as listed, stained in ethidium bromide and destained in water. The gel was

http://chemtools.chem.soton.ac.uk/projects/blog/blogs.php/bit_id/1970

<http://chemtools.chem.soton.ac.uk/projects/blog/> "Bio Blogs"

<http://blogs.openwetware.org/scienceintheopen> Discussion

Implementation of e-lab book



Nature Precedings : doi:10.1038/npre.2007.1130.1 : Posted 26 Sep 2007

- One post, one item approach
- Procedures can be tracked back to starting materials (or forwards to products) by clicking through
- Aim to ultimately be interpretable by machine and human

Primer PET-2
14th August 2007 @ 16:47

Post Type: Oligonucleotide

Property	Data
Name	PET-2
Number	
Sequence	CTTTCGGGCTTTTGTAGC
Length	18
Melting temp.	
Supplier	
Stock concentration	4

PCR of product of pull down experiment
16th August 2007 @ 09:05

Post Type: PCR

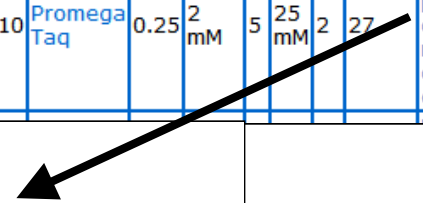
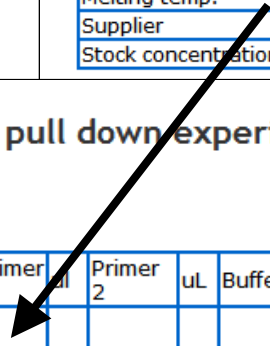
Reaction	Template	uL	Primer 1	uL	Primer 2	uL	Buffer	uL	Enzyme	uL	dNTP	uL	Mg	uL	Water (uL)	Product
1	Product of repeat of binding of protein-pcr to beads	1	Primer PET-2	2.5	Primer SOT015	2.5	Promega Taq buffer	10	Promega Taq	0.25	2 mM	5	25 mM	2	27	Product 1 of PCR of repeat of pull down
2	Product of repeat of binding of protein-pcr to beads	1	Primer PET-2	2.5	Primer SOT015	2.5	Promega Taq buffer	10	Promega Taq	0.25	2 mM	5	25 mM	2	27	PCR 2 of product of repeat of pull down

PCR 2 of product of repeat of pull down
16th August 2007 @ 09:05

Post Type: DNA_PCR_product
This is the product of Reaction 2 of [PCR Template](#)

This Post is Linked By: [PCR Template](#); [Electrophoresis of PCR of repeat pull down experiment](#);

David Neylon | [Edit Post](#) | [Product](#) | [Comments \(0\)](#)



ONS - The good

Fairly safe and accessible storage of data and notes

Finding a community

Doing better science

- Scrutiny and advice
- Both inside and outside of the research group

Doing more effective science

- Collaborations that can compete with the 'big boys'

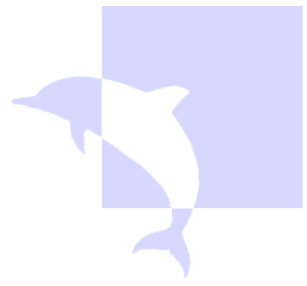


A screenshot of a web browser displaying a page titled "Sortase Cloning". The page features a horizontal DNA gel electrophoresis template with 15 lanes. The lanes are labeled: 1. 1 kb DNA marker, 2. PCR product template, 3. Product 2 of PCR reaction w/..., 4. Product 3 of PCR reaction w/..., 5. Product 4 of PCR reaction w/..., 6. Product 5 of PCR reaction w/..., 7. Product 6 of PCR reaction w/..., 8. Product 7 of PCR reaction w/..., 9. Product 8 of PCR reaction w/..., 10. Product 9 of PCR reaction w/..., 11. Product 10 of PCR reaction w/..., 12. Product 11 of PCR reaction w/..., 13. Product 12 of PCR reaction w/..., 14. Product 13 of PCR reaction w/..., 15. Product 14 of PCR reaction w/... The gel image shows bands in each lane, with the marker lane showing a ladder of bands.

A screenshot of the OpenWetWare main page. The page features a large "OPEN WETWARE" logo at the top. Below the logo, there is a section titled "Main Page" with a description of the project: "OpenWetWare is an effort to promote the sharing of information, know-how, and wisdom among researchers and groups who are working in biology & biological engineering. Learn more about us here. If you would like edit access, would be interested in helping out, or want your lab website hosted on OpenWetWare, please join us." The page also includes navigation tabs for "article", "discussion", "view source", and "history". Below the main content, there are sections for "About Us", "Help", "Resources", "Community", "Labs", "Protocols", "Courses", and "Groups". A "News Highlights" section lists recent events, including "We're hiring! Relunched", "IGEM 2007 Under way", and "Course Highlight MIT 20 109". A "Media Spotlight" section features a video thumbnail and a "What's New" section with a list of updates, including "917: Make OpenWetWare better!", "85: OpenWetWare welcomes its 3000th contributor!", "82: Steering committee meeting", "718: New Feature List", and "67: New username policy".

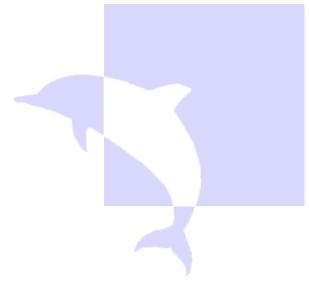
A screenshot of the Useful Chemistry website. The page features a search bar at the top with the text "Useful Chemistry" and a search button. Below the search bar, there is a section titled "Video in Science SFLO transcript" with a date of "TUESDAY, SEPTEMBER 11, 2007". The transcript text reads: "We had 3 talks yesterday at the Sept 10, Sci@Bio Lives On session on Video in Science. There were about 16 people and the discussion was lively with a lot of Q&A about the major services provided: BioProcess, Science and YouTube. I was also pleased to see Lal, the researcher I met over the weekend who put up the first poster in the Chem@Bio area. She has blossomed about her experience entering Second Life as a scientist and trying to understand what can be done there that is meaningful to her interests." Below the transcript, there is a section titled "Also see other reports of this session:" with a link to "BEGM Science@Bio". A "Contributors" list includes names like Guido, Beth Bitter-Goth, Trader_Jimin, Jeremy Frey, Matt Todd, Timo, Yana, Sean Gardner, David J. Strumfels, Brett, Jan Claudio Bradley, Khalid Mirza, Mike Anytso, David Bradley, James G, and David Berke-Schlesel. A "Links" section includes links to "Drexel CoAS E-Learning Blog", "Drexel CoAS E-Learning Podcast", "Drexel CoAS E-L Transcript", "ORNL", "Grep-11", "Snp3-11", "Atom Pusher", "BEGM", "Chem@Bio", "Chem@Bio-10", "Chemical Bioscience (blog)", "Chemical Bioscience", "Chem@Bio", and "Curly Arrow".

ONS – The good



The fun of talking about what you are actually doing right now and not what you were doing two years ago...

ONS – The bad



- ‘ Being scooped’
 - The biggest fear and probably not actually a serious problem
- Being embarrassed
 - I believe this is actually the biggest issue
- Requires effort, discipline, and a bit of persistence
- Legal issues...safety and ethics?

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Investigations into neutral drift

Bradford assay risk assessment

20th September 2007 @ 17:09

Post Type: Safety
Procedure: Bradford assay

Substance	Quantity	Hazard	Uncontrolled release	Extinguishing media	Disposal
Coomassie Blue G250	100 mg	R36/37/38: Irritating to eyes, respiratory system and skin	solidsweep up, place in bag and hold for disposal. wipe up and wash surface with plenty of water	CO ₂ , foam or powder	Aqueous solutions Dilute with plenty of water and drain in sink.
Ethanol 96%	50 mL	R11-36/37/38 Highly flammable. Irritating to eyes, respiratory system and skin	Wipe up and wash surface with plenty of water	Water, CO ₂ or foam powder	Aqueous solutions Dilute with plenty of water and drain in sink. Pure ethanol to be disposed as non-chlorinated waste
Orthophosphoric acid 90%	100 mL	R34 Causes burns	Render harmless neutralising with diluted NaOH. wipe up and wash surface with plenty of water.	Water, CO ₂ or foam powder	Aqueous solutions Neutralise with dilute NaOH, dilute with plenty of water and drain in sink.
Risk assessment	Risk level low. GLP applies. Use orthophosphoric acid in fume cupboard	Assessor	Jennifer Hale		

Search

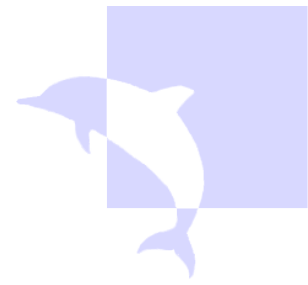
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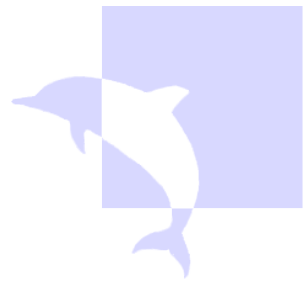
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[DNA_ge_L](#) (41)
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Things to improve on...



- Presentation and readability (need to provide good visualisation tools)
- Need people to be able to comment (problems with spam)
- How much of what information should there be and where should it be?
 - Safety information, papers, grant proposals
- Building communities to enhance the benefits of being more open

Acknowledgements



- Lab Blog development and implementation
Andrew Milsted, Professor Jeremy Frey
- Lab work and blog use
Jennifer Hale, Wendy Smith, Joseph She
- Funding
BBSRC grant BBD00652X1, UK E-science
programme through platform grant to JGF

Links



- Our lab blogs (pick one of the “ Bio Blogs”)
<http://chemtools.chem.soton.ac.uk/projects/blog/>
- Timeline view of one of the Lab Blogs
<http://chemtools.chem.soton.ac.uk/projects/timeline/blogs.php?id=13>
- Discussion of related issues with the Lab Blog including technical and ‘ social’ issues
<http://blog.openwetware.org/scienceintheopen>