Daily Tech Tools

Key players in embedding the culture of good Research Data Management (RDM) practice in student’s environment

Daniele Vicari, Helena Lynn, Adele Haythornthwaite and Gareth Denyer
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Key players in embedding the culture of good RDM practice in student’s environment

Presented by
Dr. Daniele Vicari
Digital Research Support Officer
DVC-Research- University of Sydney
The challenge

— Changing the culture around RDM
— Motivating researchers
— Better connection researcher and administration services
  — Facilitating the process
  — Supporting technology
— Training students
Research Student experience

RDM

– Inexperience
– No responsibility
– Short projects
– Minimum exposure
Research Student experience

RDM
– Lack of consensus syllabus
– Literature review
– Methodology concept
– Random mentoring
Research Student legacy

- No supervision
- Shadow a senior researchers
- Documentation ?
- Learning from old habits

2.1 Recreating the transcripational memory effect

Summary

I wanted to reproduce the transcripational memory effect and confirm that it works with our specific set-up (WCl, solution, adiopocytes, incubation times etc.).

I did a basic memory effect experiment with four different treatments: untreated cells, 2 hour MCM stimulation, 2 hour MCM + 24 hour washout and 2 hour MCM + 24 washout + 2 hour MCM stimulation.

RNA results: The memory effect was reproduced as expected. Expression for LIL and RO5 was induced during the primary stimulation, dropped to basal levels during the washout, and was much greater during the secondary stimulation. GATA3 was induced in the primary stimulation, was retained constant during the washout, and was induced even further during the secondary stimulation.

Protein results: Changes in ROS levels could not be detected due to problems with the antibody.

Aims

1. To reproduce the transcripational memory effect

2. To determine if the transcripational memory effect results in changes in the protein level.

Methods

Cell Culture

373-L1 cells (Rba) were grown, seeded and differentiated according to protocol.

<table>
<thead>
<tr>
<th>Stimulate Cells (373-L1 + 14/15)</th>
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<tbody>
<tr>
<td>1. Prepare 1/10 MCM culture (2 mL MCM + 18 mL normal media -&gt; 20 mL total)</td>
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<tr>
<td>2. Split into 2 x 5 mL and 1 x 10 mL aliquots</td>
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<tr>
<td>3. Mix a 2 x 10 mL aliquots normal media</td>
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<tr>
<td>4. Warm 5 mL MCM and 30 mL normal media</td>
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<tr>
<td>5. Experimental plan</td>
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<table>
<thead>
<tr>
<th>Plate 1</th>
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<th>Plate 3</th>
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eNotebook – students introduction to crucial features

Context and narration
2.1 Recreating the transcriptional memory effect

Summary

I wanted to reproduce the transcriptional memory effect and confirm that it works with our specific set-up (MCM, solution, adipocytes, incubation times etc.).

I did a basic memory effect experiment with four different treatments: untreated cells, 2 hour MCM stimulation, 2 hour MCM + 24 hour washout and 2 hour MCM + 24 washout + 2 hour MCM stimulation.

RNA results: The memory effect was reproduced as expected. Expression for L.4 and NOS was induced during the primary stimulation, dropped to basal levels during the washout, and was much greater during the secondary stimulation. SAA2 was induced in the primary stimulation, level remained constant during the washout, and was induced even further during the secondary stimulation.

Protein results: changes in NOS level could not be detected due to problems with the antibody.

Aims

1. To reproduce the transcriptional memory effect
2. To determine if the transcriptional memory effect results in changes in protein levels

Methods

Cell Culture

3T3-L1 cells (Mouse) were grown, seeded and differentiated according to protocol.

Stimulate Cells (3T3/L1 + 14/15)

1. Prepare 1:10 MCM diluted (2 ml MCM, 18 ml normal media -> 20 ml total)
2. Split into 2 x 5 ml, and 1 x 10 ml aliquots.
3. Make a 2 x 15 ml aliquots normal media.
4. Warm 5 ml MCM and 20 ml normal media.
5. Experimental plan:

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eNotebook – students introduction to crucial features

- **Raw data**
- **Graphed data**
### Notebook Navigator

- Isabella Tilla - 2015
  - Expt 4: Optimizing Actinomycin
  - Expt 5: mRNA Half-Lives
  - Expt 6: Protein phosphorylation
  - Expt 7: Protein expression
  - Expt 8: Troubles with WB
  - New...
  - Ideas for future experiments
  - Templates
  - Lab Meeting Notes
  - Paper Outlines
  - Project Proposal
  - Lit review
  - Progress Presentation
  - Thesis
  - WHS
  - New...
  - Deleted items

### Complete!

#### Add Entry
- Rich Text
- Attachment
- Office document
- More

#### Page Tools
- 

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**The effect of macrophage secretions on the stability of pro-inflammatory mRNAs in adipocytes**

Isabella Tilla

**Inflammation in obesity**

Obesity is associated with elevated levels of circulating pro-inflammatory cytokines. These are secreted by adipocytes and macrophages that infiltrate adipose tissue (indeed[1]). This mild but chronic inflammatory
The effect of macrophage secretions on the stability of pro-inflammatory mRNAs in adipocytes

Isabella Tilia

1. Inflammation in obesity

Obesity is associated with elevated levels of circulating pro-inflammatory cytokines. These are secreted by adipocytes and macrophages which infiltrate adipose tissue (indeed[1]). This mild, but chronic, inflammatory...
### eNotebook – students introduction to crucial features

![Image of eNotebook interface](image)

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The effect of macrophage secretions on the stability of pro-inflammatory mRNAs in adipocytes

Isabella Tilia

**Inflammation in obesity**

Obesity is associated with elevated levels of circulating pro-inflammatory cytokines. These are secreted by hypertrophic adipocytes and macrophages which infiltrate adipose tissue (1). This mild, but chronic, inflammatory
eNotebook – students introduction to crucial features

The effect of macrophage secretions on the stability of pro-inflammatory mRNAs in adipocytes

Isabella Tilia
eNotebook – students introduction to crucial features

- 24/7 accessibility
- IP standards
- Student/supervisor communication
- Consolidation
- Security
Undergraduate Students – CE edition

- ~100 courses
- 6,500 students
- Exposure start very early
  - Practical classes
- 1st year students
- Course 1,500 students
eNotebook –

- Continuous
- several units
- Data added real-time
- Genuine experience
- Literature discussion
- Group activity
eNotebook –

- Continuous
- several units
- Data added real-time
- Genuine experience
- Literature discussion
- Group activity
Research Students – HDR

– Compliant research data handling (e.g. eNotebooks)
– Lobby with Program coordinators
– Presentations, workshops
– “at the elbow” support
– Creating momentum for good RDM culture
  – Communication, organisation, documentation, compliance, etc
Research Students - Honour

- Compliant research data handling (e.g. eNotebooks)
- Lobby with Program coordinators
- Presentations, workshops
- Creating momentum for good RDM culture
  - Communication, organisation, documentation, compliance, etc
- Information/training easily available – online tutorials
- Introduction to feasible research planning forms
Honours - Online tutorials

On-line Tutorials

Introduction
Listed below are three separate on-line tutorials to help you understand the importance of good data management in Honours. The links should take you directly to the lessons which are run in the adaptive learning platform, Smart Sparrow. You should not have to login to the latter.

The first tutorial describes the fundamental principles of RDM and some of the key expectations that the Uni has of its researchers.

The second tells you more about the tools that are available at Sydney University to assist with the management of your project and collaborative communications.

The third tutorial is mainly relevant to researchers working on projects that involve personal or sensitive information.

IMPORTANT: None of these tutorials encompasses ALL the important issues. They are for general information only. If you have specific questions about RDM matters and, especially if you need guidance or advice, you should contact University experts at digital.research@sydney.edu.au or by going to https://library.sydney.edu.au/research/data-management/

Introduction to RDM
This lesson describes the fundamentals of Research Data Management.

Tools and Platforms
This lesson gives examples of how the tools that we provide at the University will assist you with your project.

Handling Sensitive Data
Even if you will not deal with sensitive data in your Honours project this year, this lesson will raise your awareness and may help protect you personally.
Online tutorials – Smart Sparrow

Lessons can be:

- Interactive
- Adaptive
- Customised
Online tutorials – Smart Sparrow

Protecting sensitive data

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<th>B</th>
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<th>E</th>
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<td>4</td>
<td>Incognito</td>
<td>Guy</td>
<td>31/10/70</td>
<td>34, May St, Earlwood</td>
<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
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<td>5</td>
<td>Nim</td>
<td>Suda</td>
<td>11/12/82</td>
<td>10/13-15, Tea St, Homebush</td>
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<td>Positive</td>
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Re-identifiable Selected

CONDITION:
Moq selectedChoice is 2

Any ALL CONDITIONS NEED TO BE FULFILLED TO TRIGGER THE ACTION

ACTION:
Edit feedback
Identifiers have not been separated from this data, so the data would not be considered re-identifiable.
Online tutorials – Smart Sparrow

Protecting sensitive data

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Online tutorials – Smart Sparrow

Scenario - Where should you store your data?

As the project goes on, you’re generating quite a lot of data. You need to think about how you’re going to store all this data for future reference.

Your research group has a shared hard drive for data storage, and you know that the University of Sydney has a similar university-wide platform that is accessible only by unkey: the Research Data Store.

Online platforms such as electronic notebooks are also available.

Where will you store your data? (Select ALL answers you think are applicable)

- On your personal computer
- On an external hard drive
- On the university’s Research Data Store
- Using electronic notebooks (Wikibooks)
Online tutorials – Smart Sparrow

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- On the university's Research Data Store
- Using electronic notebooks

Next

Scenario - What data should you record?

You're at the beginning of your honours project.

You have planned out the project with your supervisor, you've done some background reading and you're ready to start collecting data.

You begin conducting your first studies and start recording your results.

What information do you record? (Select all answers you think are appropriate)

- The results of your studies
- The methods used to gather your data
- Extra material explaining the reasoning behind the study
- Information about who collected and analysed the data and when

Next
Online tutorials – Smart Sparrow
Online tutorials – Smart Sparrow

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Online tutorials – Smart Sparrow

Analytics

– Attempts
– Time spent
– Path taken
Online tutorials – Smart Sparrow

Analytics
  – Attempts
  – Time spent
  – Path taken

[Diagram of student interaction data]
Honours declaration

- Introduction to RDMP
- Awareness of regulations
  - HREC, sensitive data, IP
Honours declaration

- Introduction to RDMP
- Awareness of regulations
  - HREC, sensitive data, IP
- Channel – ”where to get help”
- Integrity (documentation)
Honours declaration

Online survey (REDCap)
- Collect rapidly - how data will be handled
- Identify problematic areas
- Monitor answers by
  - Faculty /school
- Constructive Feedback
Future work

Elective courses (Open Learning Environment)

Research Data Management:
THE Generic Skill of the 21st Century
• Interdisciplinary and integrated
• Open data and re-use
Innovative approach

– Introduction to an eNotebook at undergraduate level
– Online tutorial and courses
– RDMP engagement (Honours Research project declaration)
– Reinforcement of eNotebook use
  – Honours
  – HDR