Promoting effective research data management practices through integration of digital research tools

Helena Lynn, Daniele Vicari, Gareth Denyer, Megan South, Joe Zhou and Justin Chang
Promoting effective research data management (RDM) practices through integration of digital research tools

Dr Helena Lynn
Digital Research Support Officer
Complex policy environment
Complex University environment

- Research office
- ICT
- Academic peers
- Ethics and Integrity
- Faculty
- Vendors
- Library
- School
- Local health districts
Multiple Digital Platforms
Why is this a problem?

– Total confusion and frustration among researchers
  – Valuable time wasted!
– Poor retention of research data
  – By individual researchers/groups
  – By the University
– Difficulty managing complex collaborations
– Non-compliance with Australian Code for the Responsible Conduct of Research
The solution – simplify policy

– Ensuring research data management (RDM) policy is clear, complete and enables researchers to effectively conduct research

– Distilling core responsibilities as outlined by policy to communicate to researchers
The solution – simplify the support environment

– Actively engaging researchers to understand their needs
– Providing advice and at elbow support for all RDM issues
– Liaising with other professional service units to fix problems for researchers
The solution – simplify digital research tools

– Ensuring tools meet researcher and policy requirements
– Empowering researchers in the use of the right digital research tools for the right purpose
– Delivering training and support materials
Figure 4.1: Radioactivity in RNA extracted from adipocytes incubated with radioactive uridine. 3T3-L1 adipocytes at 8 days-post differentiation were incubated with tritiated uridine at 0.4 or 4 µCi/mL for 0 or 4 hours. After this time, the adipocytes were lysed with lysis buffer and a cell scraper. The RNA was precipitated in ethanol and isolated by centrifugation. The pellet was washed twice with 80% ethanol to remove any unincorporated uridine contaminants. A) The pellet was resuspended in TE and dissolved in 5 mL scintillation fluid. The radioactivity was measured in counts per minute. B) A further 5 mL scintillant was added and the radioactivity was measured again. The data shows the average of two technical replicates and error bars give the range. The 0 and 4 hour time points were compared with a Student’s t-Test, ** indicates P < 0.01.
University of Sydney Research Data Store (RDS)
Recommended digital research tools

- Allows contextualisation of data
- Research process and metadata kept with files – understood data into the future
- Detailed audit trail
- Protects researchers and protects the University
  - Retains intellectual property
  - Ensures research integrity

- Secure storage provided by the University
- Substantial back up and disaster recovery protocols
- Suitable for:
  - Extremely large files (>4GB)
  - Files series with 100s-1000s of files
  - Files that need to be accessed “locally” by an application
Recommended digital research tools

- Limitations to storage capabilities
  - File limit 4GB per file
  - Poor handling of file series with 100-1000s of files
- Difficulty working with files that need to be accessed “locally”
  - E.g. Endnote, SPSS, MATLAB, NVivo
- Files divorced from broader research context and process
- Need to request access to share with external collaborators
- No audit trails:
  - Hard to track file changes/deletions
  - Limited intellectual property protections
No single tool meets all research needs

- Building integration between platforms
- **Improving both tools to meet researcher needs**
  - Features heavily requested
- Using LabArchives widgets to build a window into the Research Data Store
LabArchives Widgets

- Many in-built
- Design your own
  - Available to any eNotebooks under your account
- Can be centrally deployed to Institution
USYD RDS Link development

- RDS Integration Working Group
  - Research Data Strategy Team
  - ICT (coding and project management)
  - Academics
    - Users of both the eNotebook and RDS
- Iterative and collaborative process
  - Extensive testing and feedback
  - Ensuring functional product
  - Ensuring researcher’s needs met
4.5 Matrigel assay

Migration assay - Tubo formation in matrigel in vitro

Activation of VEGFR-2 throughout VEGF binding has been shown necessary for migration of endothelial cells. One of models to observe migration is the capacity of tube formation of HUVEC growing in extracellular matrix Matrigel. The tube formation is clearly demonstrated to be VEGF dependent when VEGF no VEGF stimulated HUVEC are compared in image 3.

Images gathered on Olympus FV1000 on 20/04/2017.

Stored in RDS below.

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USYD RDS Link 1-4-2

- 2016.10.27 Knockdown lipoas/
  - DS_Store
  - All.xlsx/
    - DS_Store
      - Beta_1.npd
      - Beta_2.npd
      - Beta_3.npd
      - Beta_4.npd
      - Beta_4001.npd
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Images gathered on Olympus FY100 on 20/04/2017.

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Images gathered on Olympus FY1000 on 20/04/2017.

Stored in RDS below.
Files easily accessible from eNotebook
Thank you!

— RDS Integration Working Group
  — Gareth Denyer
  — Dani Vicari
  — Joe Zhou
  — Megan South
  — Justin Chang
  — Ben Crossett
  — Alan Boddy
  — Anna Ceguerra
  — Willem Vervoort
  — Gene Melzack