Short guide on good practices on data management

Data management is an essential part of responsible research practices. Data management includes how you will record your data, store it and make it accessible. Just as a quick reminder, the basic values of Responsible Research conduct are:

* Personal integrity: You are part of a professional community
* Quality of research
* Reproducibility

When **recording your data**, you must document the following:

* Title / project – task
* Brief description – scheme/aims
* Materials
* Methods
* Results
* Summary of conclusions (hypotheses and troubleshooting) *– very important and usually left out!*

Use the time of recording your data to think and reflect about your project and planning. These records must be part of your **laboratory notebook**, which is owned and archived by the institute. Your supervisor is responsible for assuring that your records are thoroughly kept.

Regarding your laboratory notebook remember to (this is easier in an electronic laboratory notebook):

* + Label it
  + Number each page
  + Date every entry
  + Table of contents
  + Pages for brainstorming/note taking
  + Cross reference to your files
  + Backup & keep copies

To ensure proper data management, it is highly recommended to develop a **data management plan**, where you detail your strategy for handling data - think of it as the “readme file”. Developing a data plan is also an excellent way for you to get acquainted on what the policies of the lab/institute are. Below are some resources on the importance of data management plans:

* <https://www.nature.com/articles/d41586-018-03065>
* <https://www.nature.com/articles/d41586-018-03071-1>
* https://pfern.github.io/OSODOS/gitbook/DATA\_MANAGEMENT/

Your data management plan should follow the **FAIR Guiding Principles**: to be Findable, Accessible, Interoperable and Reusable (<https://fair-dom.org/>). There are many resources online that can guide you in developing your own data plan, for example:

* NSF (USA): <https://www.nsf.gov/bio/pubs/BIODMP_Guidance.pdf>
* UK funders :<https://www.dcc.ac.uk/guidance/how-guides/develop-data-plan#Steps%20to%20get%20started>
* ERC: <https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/data-management_en.htm>
  + Template and guidelines from ERC: <https://erc.europa.eu/content/erc-data-management-plan-template>
* PLoS Computational Biology: <https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1004525>

In a nutshell, they recommend the following:

1. Describe the types of data and other materials to be produced during your project/tenure.
2. Describe the standards to be used for all the data types anticipated, including data or file format and metadata.
3. Describe the roles and responsibilities of all parties with respect to the management of the data (including for example, data ownership, contingency plans for the departure of key personnel from the project).
4. Describe the dissemination methods will be used to make the data and metadata available to others and any modifications or additional technical information regarding data access.
5. Describe the policies for data sharing, public access and re-use, including re-distribution by others and the production of derivatives. Where appropriate, include provisions for protection of privacy, confidentiality, security, intellectual property rights and other rights.
6. Where relevant, describe plans for archiving data, samples, and other research products, and for on-going access to these products through their lifecycle of usefulness to research and education.
7. Consider which data (or research products) will be deposited for long-term access and where. (What data repositories and facilities [including third party resources] will be used to store and preserve the data)

**Carefully consider that when you want to publish your data** you will have to provide detailed reports, so it is critical that you have all necessary information. Below are links to current guidelines by International Committee of Medical Journal Editors and examples of what journals require:

* International Committee of Medical Journal Editors: http://www.icmje.org/icmje-recommendations.pdf
* Nature: <https://www.nature.com/nature-research/editorial-policies/reporting-standards>; <https://www.nature.com/documents/nr-reporting-summary-flat.pdf>
* Cell: https://marlin-prod.literatumonline.com/pb-assets/journals/research/cell/methods/Methods%20Guide.pdf
* PLoS ONE: https://journals.plos.org/plosone/s/data-availability