FOS course Molecular Data Science

Exploiting public data - Bas Heijmans, 1 November 2018

In this practical you will explore the use of public data in the paper entitled 'Age-related accrual of methylomic variability is linked to fundamental ageing mechanisms' by Roderick Slieker et al (Genome Biol 2016). Public data is used in all phases: discovery, validation and interpretation.

The open access (!) paper can be found here: https://bit.ly/2CKqwZV

> Send your answers to b.t.heijmans@lumc.nl <

1. Discovery.
Figure 1c and 1d display results from the discovery phase.
a. What data type on how many samples was used to find age-related variably methylated positions (aVMPs)?
b. Can other researchers re-use the data? Provide information on the name of the repository, accession number of the data and possibility to download the data.

2. Validation.
Figures 2a and 2b show the results of the validation step.
a. Describe the 2 data-sets that were used for validation (type of data, biological source and number of samples) and give references.
b. Look-up the accession number and repository (e.g. in the methods). Can data be downloaded? Is it raw data or normalized (processed) data?
c. What is the conclusion from Figure 2a and 2b?

3. Interpretation 1: understand type of genomic regions accruing aVMPs.
Figures 3a uses external data to interpret findings, in particular the possible biological function of the genomic regions that accumulate aVMPs.
a. Data from which reference project was used?
b. Find out where data can be downloaded.
c. What is the conclusion from Figure 3a?

4. Interpretation 2: potential relevance for disease.
Figure 4f again displays a comparison with public data.
a. What is the source of public data? Go to the website of the source and describe the available data.
b. What is the conclusion from Figure 4f?

5. Interpretation 3: biological pathways.
Figures 5a and b link genes whose expression is associated with aVMPs to biological pathways implicated in the ageing process.
a. Which database was used?
b. Are there alternatives?