Assignment

You are provided with .RData file called Assignment. The Assignment R workspace contains three objects:

1. **df\_ForMetaAnalysis**: A data frame of ~ 21,102 gut microbiome profiles containing the abundances of 112 species, along with the age (column: “age”) of the host and the study name (column: “study\_name”).
2. **SelectedStudies**: List of 12 studies for which we want to do the meta-analysis. You can select the gut microbiome profiles for only these studies by selecting upon the column “study\_name”.
3. **SelectSpecies**: The list of all species for which we want to do the meta-analysis for. This list contains the 112 species for which we wish to do the meta-analysis with age.

Task:

1. You have to perform Random Effects Model based meta-analysis on gut microbiomes with age >= 60 years, considering only those studies present in the SelectedStudies list. For each species, you have to compute the Random Effects Model summary estimate, p-value and the corrected p-value (FDR obtained using the Benjamini-Hochberg Correction).
2. You have to identify for individuals with age >= 60 years, which are the species that show a significant association with age (positive or negative) considering the list of 12 studies as the body of evidence. You have to produce a volcano plot like the image at the end of the assignment below.