

# Working with selected R functions

## Introduction

There is a number of R functions available in the basic, pre-loaded packages, such as *base*, *utils* or *stats* and there is a huge number of functions available via third-party packages. Today, we will work a bit with some of the functions that are commonly used by R users coming from different disciplines. In particular, we will:

- Learn how to work with sets.
- Work with polynomials.
- Learn how to define and work with functions.
- Do some basic calculus.
- Learn about *formulas*.
- Work with some selected statistical tests.
- Learn more about setting up a statistical analyses workflow by fitting a linear model to example data.

## Exercise FNS1. Create and work with sets

1. Open R-studio and create three sets of genes:  $G1 = \{\text{'ANK-1'}, \text{'ANK-c'}, \text{'GALNTL-1'}\}$ ;  $G2 = \{\text{'ANK-1'}, \text{'FMA'}, \text{'RHO'}, \text{'GRP'}\}$ ;  $G3 = \{\text{'GALNTL-1'}, \text{'ANK-c'}, \text{'HGX'}\}$ . Visualise membership relations between all elements of the sets using Venn diagram. Use package *venn*.

:key: Click to see an example of how to do this in R {% highlight R %} library('venn') G1 = c('ANK-1', 'ANK-c', 'GALNTL-1') G2 = c('ANK-1', 'FMA', 'RHO', 'GRP') G3 = c('GALNTL-1', 'ANK-c', 'HGX') venn(list(G1=G1, G2=G2, G3=G3)) {% endhighlight %}

2. What is the:

- Union of G1 and G3?
- Union of intersections: G1 with G2 and G1 with G3?
- Difference between G2 and G3?
- Is union of G1 and G2 equal to the intersection of G2 with G3?
- Are genes *ANK-c* and *GALNTL-1* members of the intersection of G1 with G3?

:key: Click to see an example of how to do this in R {% highlight R %} union(G1, G3) union(intersect(G1, G2), intersect(G2, G3)) setdiff(G2, G3) setequal(union(G1, G2), intersect(G2, G3)) is.element(c('ANK-c', 'GALNTL-1'), intersect(G1, G3)) {% endhighlight %}

## Exercise A1. Create and work with sets