Extending Bioconductor to exposome data analysis

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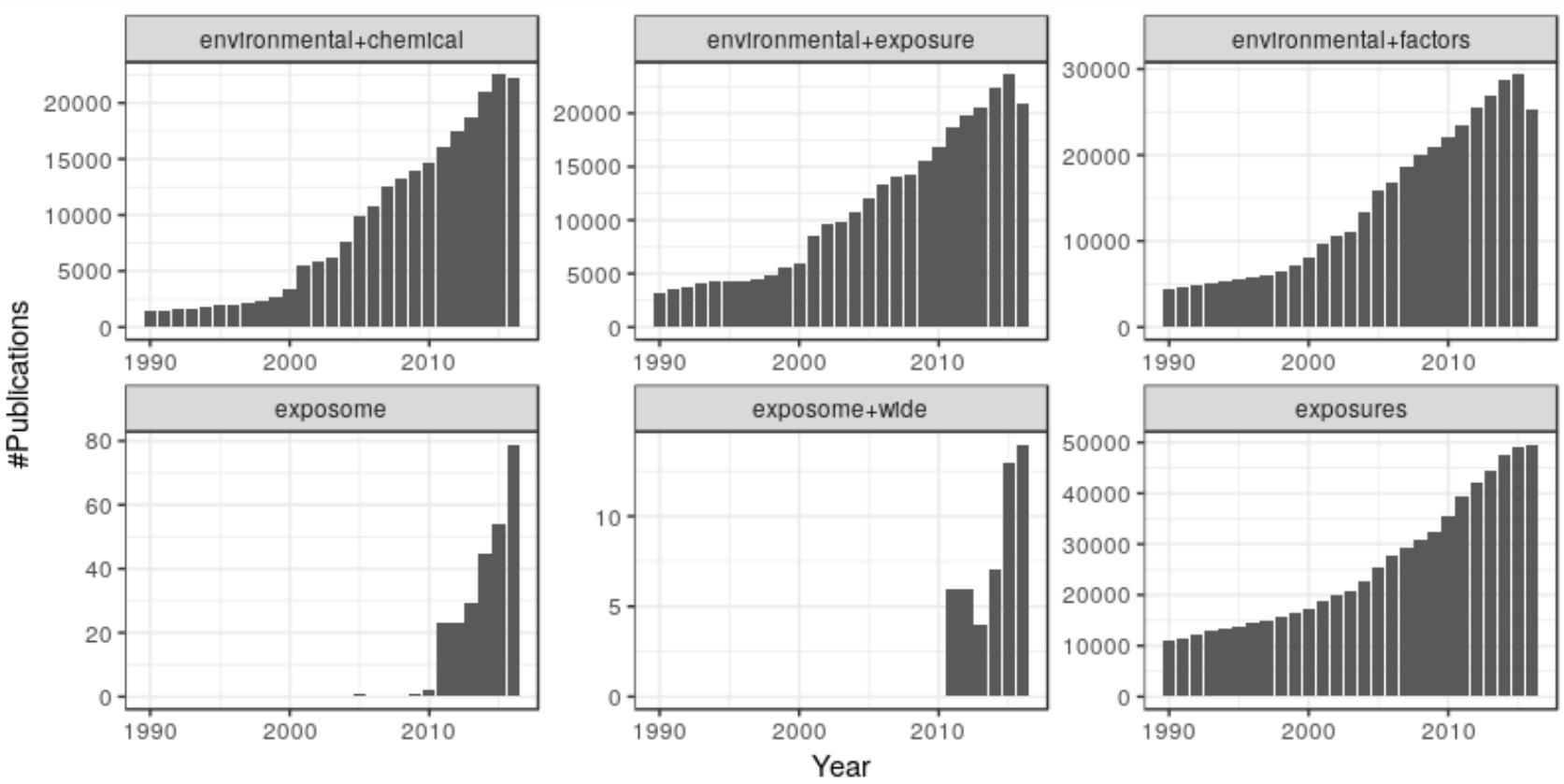
Environmental Health

The exposome encompasses the totality of human environmental [...] exposures from conception onwards, complementing the genome. Dr. Christopher Wild, "Complementing the Genome with an Exposome"

Publications containing *[term]* in title by year



Environmental Health

The European Commission awarded two large-grants to pursue exposome-related research (2012):

- The **HELIX project**, lead by *Barcelona Institute for Global Health*, will attempt to develop an early life exposome, noting that the first exposures occur during development.
- The **EXPOsOMICS**, lead by*Imperial College London*, will use smartphones that utilize GPS and environmental sensors to assess exposures in adulthood.

Late:

- Health and Environment-Wide Associations based on Large Scale population Surveys (**HEALS**)
- **HERCULES** that aims to provide expertise to develop and refine new tools and technologies to assess the exposome

The HELIX Project

Cohort	# Sample
BIB	14 000
EDEN	2 000
INMA	2 500
KANC	4 000
MoBa	8 000
RHEA	1 500

From the total (+30 000),
1 200 will get omic data

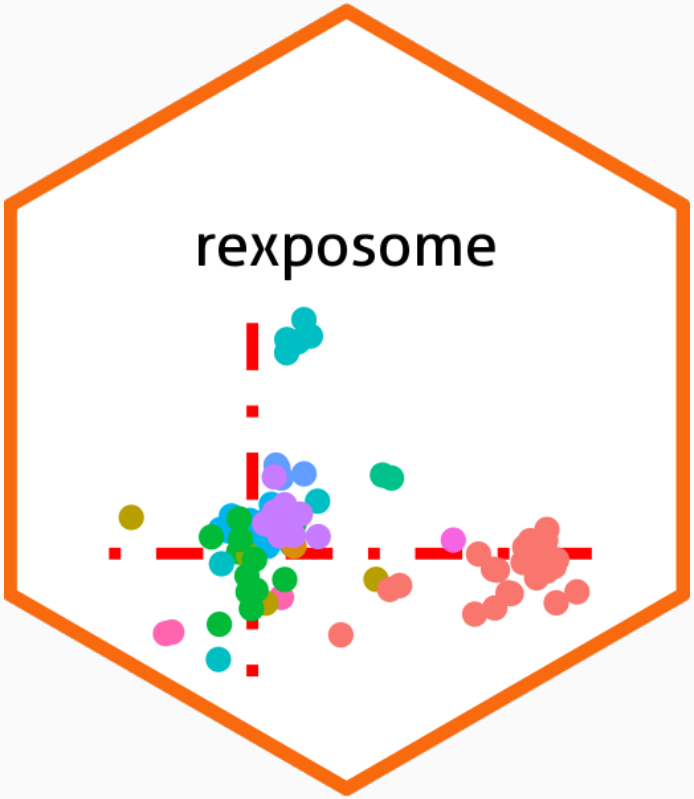
rexposome project[1]

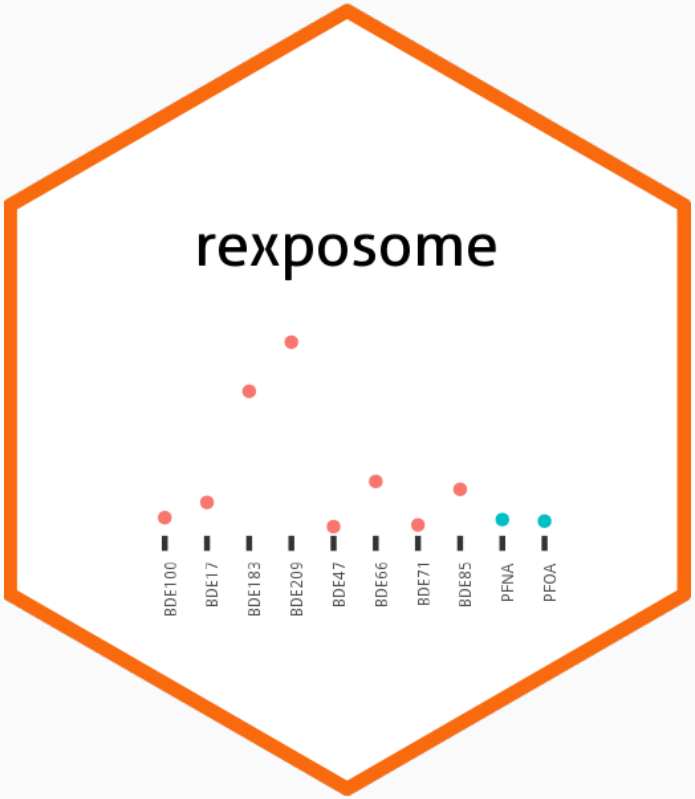
Aims to incorporate *the exposome* into Bioconductor ecosystem.

- `rexposome` (under revision): package for exposome data management, exposome characterization and testing exposome - health outcome association.
- `omicRexposome` (under revision): package for testing exposome - omic association (exposome and exposome cluster) and integration.

[1] Hernandez-Ferrer C, et al.; *Comprehensive analysis of the exposome, exposome-health associations and omics intermediates*; [submitted]

rexposome project





Contact Information

Any questions?

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```r
data     = rnorm(100)
attempts = 0
pvalue   = 1
while( pvalue > 0.05 ){
    attempts = attempts + 1
    cases    = sample(data,50)
    controls = data[!data %in% cases]
    pvalue   = t.test(cases,controls)$p.value }
cat("Congratulations! With p =",round(pvalue,3),
    "you achieved scientific success in",attempts,"attempts\n")
```

How to achieve scientific success in 10 lines of R code!

Leon Eyrich Jessen (@jessenleon) – October 23th, 2016