

# Gene Set Enrichment API – version 1.0<sup>1</sup>

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***A simple RESTful API to analyse (Fisher-exact) enrichment of user-provided set of Ensembl gene identifiers against differentially expressed genes in each comparison in Expression Atlas.***

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This document describes the RESTful API that was developed to analyse (Fisher-exact) enrichment of user provided set of Ensembl gene identifiers in a given organism against differentially expressed genes in each comparison for that organisms in Expression Atlas. The code used to perform the enrichment analysis is available from [https://github.com/gxa/atlas\\_gsa](https://github.com/gxa/atlas_gsa) and performs Fisher-exact gene set overlap (FDR = 0.01) between the user-provided set of genes in a given organism against the set of differentially expressed genes in each Atlas comparison for that organism. All genes tested for differential expression in a given comparison are treated as background.

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<sup>1</sup> If you use this data in your research or service, please reference this [publication](#). Thank You

## Expression Atlas Organisms

### Format

Item	Description
URL	<a href="http://www.ebi.ac.uk/fg/gsa/api/getOrganisms">http://www.ebi.ac.uk/fg/gsa/api/getOrganisms</a>

## Gene Set Enrichment in Differentially Expressed Genes in each Atlas Comparison in an Organism

### Format

Item	Description
URL PATTERN	<b>ROOT/FORMAT/getOverlappingComparisons/ORGANISM/GENE_IDS</b>
ROOT	<a href="http://www.ebi.ac.uk/fg/gsa/api/">http://www.ebi.ac.uk/fg/gsa/api/</a>
FORMAT	tsv or json
ORGANISM	An organism returned by <a href="http://www.ebi.ac.uk/fg/gsa/api/getOrganisms">http://www.ebi.ac.uk/fg/gsa/api/getOrganisms</a>
GENE_IDS	A list of (maximum 100) space-separated Ensembl gene identifiers in ORGANISM

### Example Calls

#### URL

[ROOT/tsv/getOverlappingComparisons/arabidopsis\\_thaliana/AT1G48030](http://www.ebi.ac.uk/fg/gsa/api/tsv/getOverlappingComparisons/arabidopsis_thaliana/AT1G48030)  
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[ROOT/tsv/getOverlappingComparisons/homo\\_sapiens/ENSG00000001167](http://www.ebi.ac.uk/fg/gsa/api/tsv/getOverlappingComparisons/homo_sapiens/ENSG00000001167)  
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## Returned Fields

Field	Description
EXPERIMENT	Expression Atlas experiment accession
COMPARISON_ID	Comparison identifier in EXPERIMENT
P-VALUE	<i>P</i> -value returned by the Fisher-exact test
OBSERVED	The number of user-provided genes that are differentially expressed in a given comparison
EXPECTED	The number of user-provided genes that have been tested in a given comparison
ADJUSTED P-VALUE	<i>P</i> -value adjusted by the multiple testing correction
EFFECT SIZE	OBSERVED/EXPECTED
COMPARISON_TITLE	The title of the COMPARISON_ID in EXPERIMENT
EXPERIMENT_URL	URL for COMPARISON_ID in EXPERIMENT

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