# Gene Set Enrichment API – version 1.0[1]
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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 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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[1] If you use this data in your research or service, please reference this publication. Thank You

## Expression Atlas Organisms

### Format

| Item | Description |
|------|-------------|
| URL | http://www.ebi.ac.uk/fg/gse/api/getOrganisms |

## Gene Set Enrichment in an Organism

### Format

| Item | Description |
|------|-------------|
| URL PATTERN | **ROOT/FORMAT/getOverlappingComparisons/ORGANISM/GENE_IDS** |
| ROOT | http://www.ebi.ac.uk/fg/gse/api/ |
| FORMAT | tsv or json |
| ORGANISM | An organism returned by http://www.ebi.ac.uk/fg/gse/api/getOrganisms |
| GENE_IDs | A list of (maximum 100) space-separated Ensembl gene identifiers in ORGANISM |

### Example Calls to Retrieve Individual Run Data

| URL |
|-----|
| ROOT/tsv/getOverlappingComparisons/arabidopsis_thaliana/AT1G48030 AT1G53240 AT2G17130 AT2G20420 AT2G44350 AT2G47510 AT3G09810 AT3G15020 AT3G17240 AT3G27380 AT3G55410 AT3G60100 AT4G26910 AT4G35260 AT4G35650 AT4G35830 AT5G03290 AT5G08300 AT5G23250 AT5G40650 AT5G50950 AT5G55070 AT5G65165 AT5G65750 AT5G66760 |
| ROOT/tsv/getOverlappingComparisons/homo_sapiens/ENSG00000001167 ENSG00000001630 ENSG00000005339 ENSG00000012174 ENSG00000066136 ENSG00000067064 ENSG00000076555 ENSG00000079459 ENSG00000082014 ENSG00000084676 ENSG00000099194 ENSG00000100934 ENSG00000101849 ENSG00000104549 ENSG00000108424 ENSG00000109929 ENSG00000110921 ENSG00000112972 ENSG00000113161 ENSG00000113615 ENSG00000114650 ENSG00000119927 ENSG00000120837 ENSG00000125629 ENSG00000125686 ENSG00000130589 ENSG00000132142 ENSG00000132341 ENSG00000137574 ENSG00000138802 ENSG00000140396 ENSG00000140943 ENSG00000142453 ENSG00000149809 ENSG00000150961 ENSG00000152700 ENSG00000152904 ENSG00000160285 ENSG00000160752 ENSG00000163344 ENSG00000167508 ENSG00000169710 ENSG00000170522 ENSG00000172893 ENSG00000176986 ENSG00000177200 ENSG00000177565 ENSG00000185591 ENSG00000186350 ENSG00000186480 ENSG00000186951 ENSG00000188786 ENSG00000198646 ENSG00000198911 ENSG00000278540 |

## Returned Fields

| Field | Description |
| --- | --- |
| EXPERIMENT | Expression Atlas experiment accession |
| COMPARISON_ID | Comparison identifier in EXPERIMENT |
| P-VALUE | *P*-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 | *P*-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 |

## Acknowledgements

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