

Sanger Mouse Portal “How to” Guide

Extracting Mouse Genetic Project ontology calls

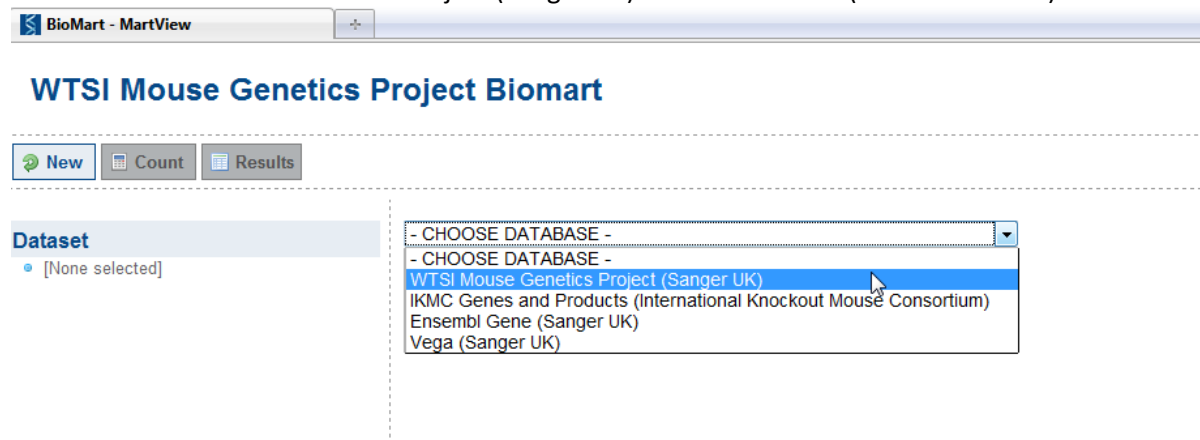
Introduction:

Raw and summary phenotyping data is available through a publicly available BioMart¹ interface. This can be accessed at the following web address <http://www.sanger.ac.uk/htgt/biomart>. Mouse Genetics Project data which has passed all necessary internal quality control checks is automatically published to this BioMart within 24 hours. Below are two step-wise examples of how to extract the summary data using the standard BioMart user interface. The first looks at how to extract data for a knockout line. The second demonstrates how to search for all knockout lines associated with a mammalian phenotype ontology term within the Mouse Genetics Project. Further information on using a BioMart can be found at: <http://bowtie-bio.sourceforge.net/recount/biomaRt.pdf>.

How to extract ontology calls for a knockout line?

The following example demonstrates the extraction of Mammalian Phenotype Ontology (MP) calls associated with the Mym1 knockout line.

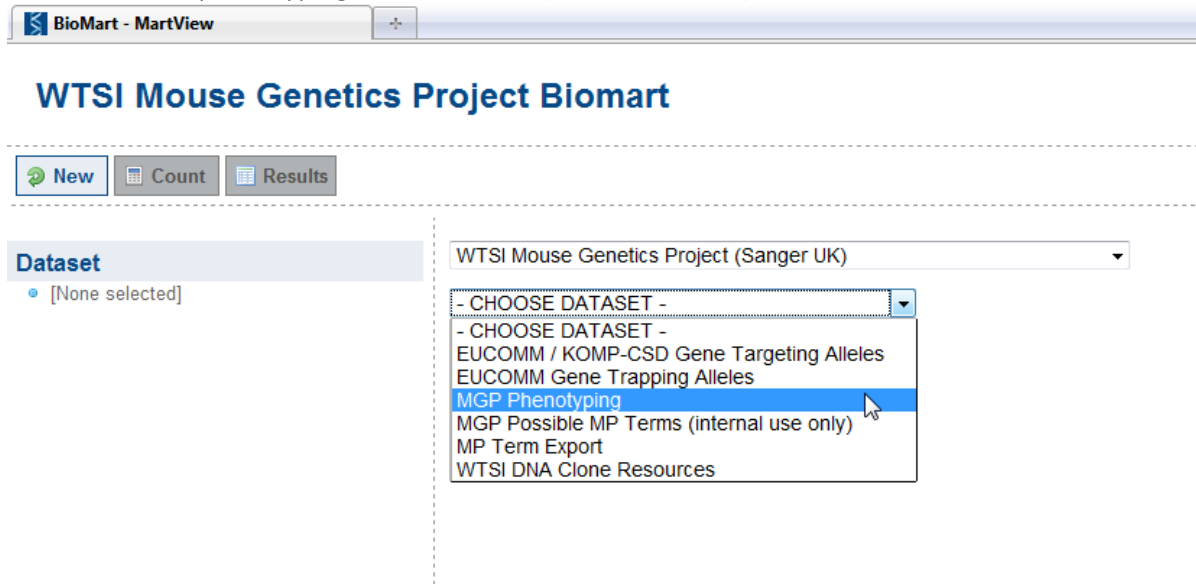
1. Open the BioMart by following the link: <http://www.sanger.ac.uk/htgt/biomart>.
2. Select “WTSI Mouse Genetics Project (Sanger UK)” as the database (as shown below).



The screenshot shows the BioMart MartView interface. At the top, there is a browser tab labeled "BioMart - MartView". Below the tab, the main heading is "WTSI Mouse Genetics Project Biomart". Underneath the heading, there are three buttons: "New", "Count", and "Results". On the left side, there is a "Dataset" section with a sub-section "[None selected]". On the right side, there is a dropdown menu for selecting a database. The dropdown menu is open, showing the following options: "- CHOOSE DATABASE -", "- CHOOSE DATABASE -", "WTSI Mouse Genetics Project (Sanger UK)", "IKMC Genes and Products (International Knockout Mouse Consortium)", "Ensembl Gene (Sanger UK)", and "Vega (Sanger UK)". A mouse cursor is pointing at the "WTSI Mouse Genetics Project (Sanger UK)" option.

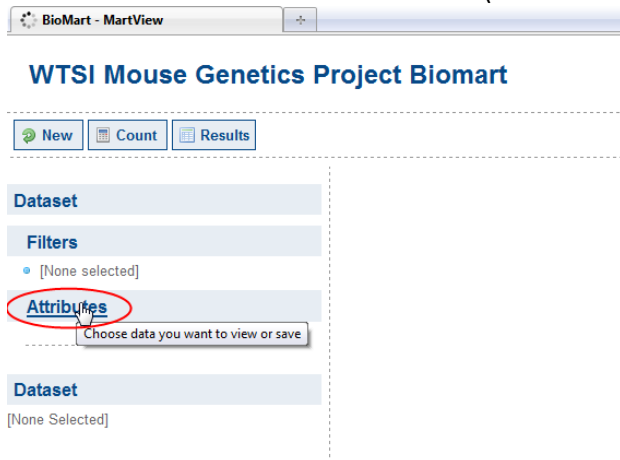
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3. Select “MGP phenotyping” as the dataset (as shown below).



The screenshot shows the BioMart - MartView interface. At the top, there is a browser tab labeled "BioMart - MartView". Below the tab, the page title is "WTSI Mouse Genetics Project Biomart". There are three buttons: "New", "Count", and "Results". The "Dataset" section shows "[None selected]" and a dropdown menu. The dropdown menu is open, showing a list of datasets: "- CHOOSE DATASET -", "- CHOOSE DATASET -", "EUCOMM / KOMP-CSD Gene Targeting Alleles", "EUCOMM Gene Trapping Alleles", "MGP Phenotyping", "MGP Possible MP Terms (internal use only)", "MP Term Export", and "WTSI DNA Clone Resources". The "MGP Phenotyping" option is highlighted in blue.

4. Click on the Attribute link on the left (as shown below).



The screenshot shows the BioMart - MartView interface. At the top, there is a browser tab labeled "BioMart - MartView". Below the tab, the page title is "WTSI Mouse Genetics Project Biomart". There are three buttons: "New", "Count", and "Results". The left sidebar has four sections: "Dataset", "Filters", "Attributes", and "Dataset". The "Attributes" section is highlighted with a red circle. Below the "Attributes" section, there is a text input field with the placeholder text "Choose data you want to view or save".

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5. Select Parameter Level Heatmap Data (as shown below).

WTSI Mouse Genetics Project Biomart bio::mart

New Count Results URL XML Perl Help

Dataset: MGP Phenotyping

Filters: [None selected]

Attributes

Please select columns to be included in the output and hit 'Results' when ready

- Heatmap Data
- Heatmap Graphs (Deprecated)
- Parameter Level Heatmap Data
- Published Graph Data
- Published Images
- Fertility
- Homozygote Viability
- Adult Expression
- Collaborator Data

6. Now click on Filters to access a dialog box to restrict the query (as shown below).

WTSI Mouse Genetics Project Biomart bio::mart

New Count Results URL XML Perl Help

Dataset: MGP Phenotyping

Filters: Restrict your query by filtering

Attributes

- Colony Prefix
- Gender
- Genotype
- Pipeline
- Test
- Parameter
- Protocol
- Manual Call
- MP ID
- MP Term
- Graph URL

Dataset: [None Selected]

Please select columns to be included in the output and hit 'Results' when ready

- Heatmap Data
- Heatmap Graphs (Deprecated)
- Parameter Level Heatmap Data
- Published Graph Data
- Published Images
- Fertility
- Homozygote Viability
- Adult Expression
- Collaborator Data

Features

Colony Details Select all Deselect all

- Colony Prefix

Test Data Select all Deselect all

- Gender
- Genotype
- Pipeline
- Test
- Parameter
- Protocol
- Protocol Description
- Manual Call
- Auto Call
- Auto Call Change of Direction
- MP ID
- MP Term
- Graph URL
- Raw Data URL

MIG IDs (Internal Use Only) Select all Deselect all

- Protocol Order By
- Parameter Order By
- Protocol ID
- Parameter ID
- Population ID

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7. Filter the data by a gene name e.g. Mysm1 (a.k.a. Marker symbol) (as shown below).

The screenshot displays the WTSI Mouse Genetics Project Biomart interface. The main heading is "WTSI Mouse Genetics Project Biomart" with the bio::mart logo. Below the heading are navigation buttons: "New", "Count", "Results", "URL", "XML", "Perl", and "Help".

The interface is divided into several sections:

- Dataset:** MGP Phenotyping
- Filters:** Marker Symbol (ID-list specified)
- Attributes:** Allele Name, Pipeline, Membership, Mouse Name, Gender, Genotype, Genetic Background, Observation, X Value, Y Value, Colony Prefix
- Dataset:** [None Selected]

The main query area is titled "Please restrict your query using criteria below" and contains several filter sections:

- Colony Details:** Includes a checkbox for "Colony Prefix" and a "Browse..." button.
- Marker Symbol:** A checkbox is checked, and the text "Mysm1" is entered in the input field. Both the checkbox and the text are circled in red.
- Allele Name:** Includes a checkbox and a "Browse..." button.
- Parameter Level Heatmap Details -- These Filters Only Apply to Parameter Level Heatmap Data:**
 - Gender:** A dropdown menu set to "Female".
 - Genotype:** A dropdown menu with options "Het", "Hom", and "Hemi".
 - Pipeline:** A dropdown menu with options "MGP Citrobacter Challenge", "MGP Pipeline 1", "MGP Pipeline 2", "MGP Salmonella Challenge", and "Mouse GP".
 - Test:** A dropdown menu with options "Adult LacZ Expression", "Auditory Brainstem Response", "Body Composition (DEXA)", "Brain Histopathology", "Citrobacter Challenge", and "Dysmorphology".

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8. To isolate the significant phenotype traits, select Manual Call as a filter and Significant as the setting. Alternatively both the Significant and Not Significant filters could be selected simultaneously by holding the control key down and clicking on the terms.

▣ Paramater Level Heatmap Details -- These Filters Only Apply to Parameter Level Heatmap Data

<input type="checkbox"/> Gender	Female ▾
<input type="checkbox"/> Genotype	Het Hom Hemi ▾
<input type="checkbox"/> Pipeline	MGP Citrobacter Challenge MGP Pipeline 1 MGP Pipeline 2 MGP Salmonella Challenge Mouse GP ▾
<input type="checkbox"/> Test	Adult LacZ Expression Auditory Brainstem Response Body Composition (DEXA) Brain Histopathology Citrobacter Challenge Dysmorphology ▾
<input checked="" type="checkbox"/> Manual Call	Complete and data/resources available Significant Early indication of possible phenotype Not Significant Not performed or applicable ▾
<input type="checkbox"/> Automatic Call	Significant Not Significant Auto Analysis Not Run ▾
<input type="checkbox"/> MP ID	<input type="text"/>

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9. Click on the Results button (as shown below) to filter as specified.

The screenshot shows the WTSI Mouse Genetics Project Biomart interface. At the top, there are buttons for 'New', 'Count', and 'Results', with the 'Results' button circled in red. Below these buttons is a 'Please restrict your query using criteria below' section. On the left, there is a 'Dataset' section for 'MGP Phenotyping' and a 'Filters' section with 'Marker Symbol : [ID-list specified]' and 'Manual Call : Significant'. The 'Attributes' section lists various fields like 'Colony Prefix', 'Gender', 'Genotype', etc. The main area shows 'Colony Details' with a 'Marker Symbol' field containing 'Myem1' and a 'Browse...' button.

10. Edit the number of rows shown to view the data (as shown below).

The screenshot shows the WTSI Mouse Genetics Project Biomart interface with the 'View' dropdown menu open. The 'View' dropdown is circled in red and shows '20 rows as HTML' selected. The 'Export' section is set to 'File' and 'TSV'. The 'Email notification to' field is empty. The 'View' section is set to '20 rows as HTML' and 'Unique results only' is checked. The main area displays a table of results with columns: Colony Prefix, Gender, Genotype, Pipeline, Parameter, Protocol, Manual Call, MP ID, MP Term, and Graph URL.

Colony Prefix	Gender	Genotype	Pipeline	Parameter	Protocol	Manual Call	MP ID	MP Term	Graph URL	
MAHN	Male	Het	MGP Salmonella Challenge	Salmonella Challenge	Ceecal contents	Standard Protocol	Significant	MP_0002412	increased susceptibility to bacterial infection	http://img1.sanger.ac.uk/graphs/MAHN/2043_541.png
MAHN	Male	Het	MGP Salmonella Challenge	Salmonella Challenge	Liver	Standard Protocol	Significant	MP_0002412	increased susceptibility to bacterial infection	http://img1.sanger.ac.uk/graphs/MAHN/2043_542.png
MAHN	Male	Het	MGP Salmonella Challenge	Salmonella Challenge	Spleen	Standard Protocol	Significant	MP_0002412	increased susceptibility to bacterial infection	http://img1.sanger.ac.uk/graphs/MAHN/2043_543.png
MAHN	Female	Hom	MGP Pipeline 2	Eye Morphology	Cornea Opacity	Standard Protocol	Significant	MP_0001314	corneal opacity	http://img1.sanger.ac.uk/graphs/MAHN/2234_268.png

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11. Results can be exported using the export facility (as shown below).

WTSI Mouse Genetics Project Biomart bioinformatics

[New](#) [Count](#) [Results](#) [URL](#) [XML](#) [Perl](#) [Help](#)

Dataset: MGP Phenotyping

Export all results to: **File** (dropdown) | **CSV** (dropdown) | Unique results only **Go** (button)

Email notification to:

View: 20 rows as **HTML** (dropdown) | Unique results only

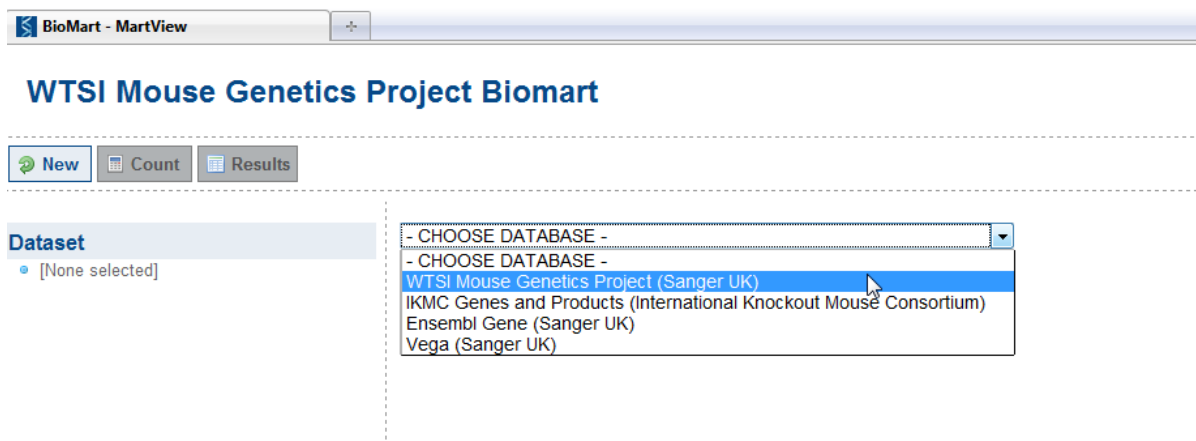
Colony Prefix	Gender	Genotype	Pipeline	Test	Parameter	Protocol	Manual Call	MP ID	MP Term	Graph URL
MAHN	Male	Het	MGP Salmonella Challenge	Salmonella Challenge	Cecal contents	Standard Protocol	Significant	MP-0002412	increased susceptibility to bacterial infection	http://img1.sanger.ac.uk/graphs/MAHN/2043_541.png
MAHN	Male	Het	MGP Salmonella Challenge	Salmonella Challenge	Liver	Standard Protocol	Significant	MP-0002412	increased susceptibility to bacterial infection	http://img1.sanger.ac.uk/graphs/MAHN/2043_542.png
MAHN	Male	Het	MGP Salmonella Challenge	Salmonella Challenge	Spleen	Standard Protocol	Significant	MP-0002412	increased susceptibility to bacterial infection	http://img1.sanger.ac.uk/graphs/MAHN/2043_543.png
MAHN	Female	Hom	MGP Pipeline 2	Eye Morphology	Comea Opacity	Standard Protocol	Significant	MP-0001314	corneal opacity	http://img1.sanger.ac.uk/graphs/MAHN/2234_268.png

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How to extract colonies with hits for a mammalian ontology term?

The following example, demonstrates the extraction of colonies associated with Mammalian Phenotype ontology terms within the Mouse Genetics Project.

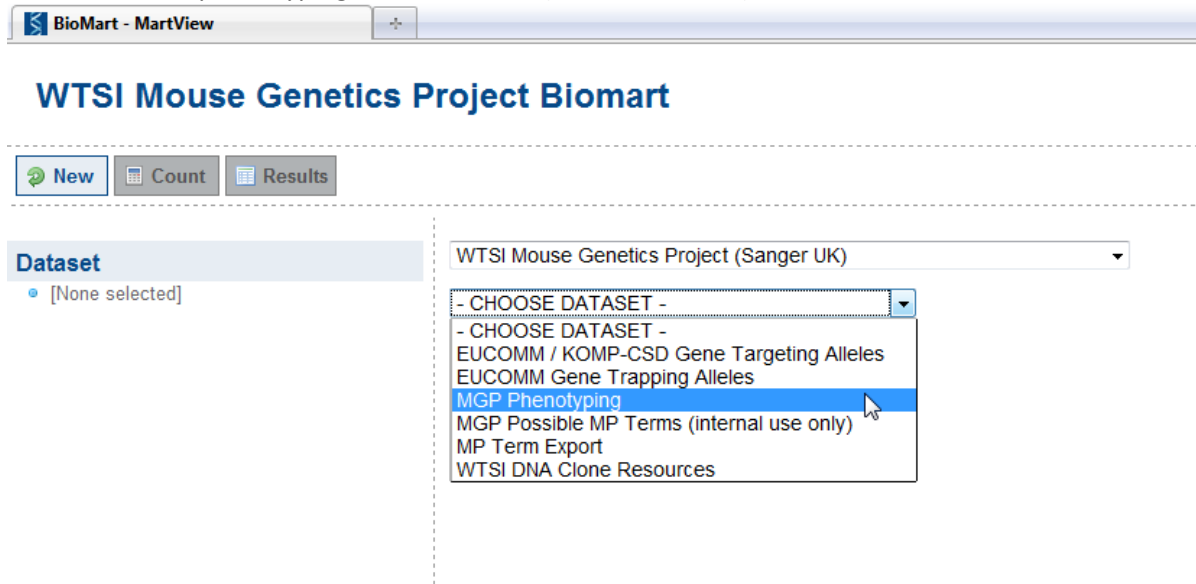
1. Open the BioMart by following the link: <http://www.sanger.ac.uk/htgt/biomart>.
2. Select “WTSI Mouse Genetics Project (Sanger UK)” as the database (as shown below).



The screenshot shows the BioMart MartView interface. At the top, there is a browser tab labeled "BioMart - MartView". Below the tab, the page title is "WTSI Mouse Genetics Project Biomart". There are three buttons: "New", "Count", and "Results". The "Dataset" section shows a dropdown menu with the following options: "- CHOOSE DATABASE -", "- CHOOSE DATABASE -", "WTSI Mouse Genetics Project (Sanger UK)", "IKMC Genes and Products (International Knockout Mouse Consortium)", "Ensembl Gene (Sanger UK)", and "Vega (Sanger UK)". The "WTSI Mouse Genetics Project (Sanger UK)" option is highlighted in blue.

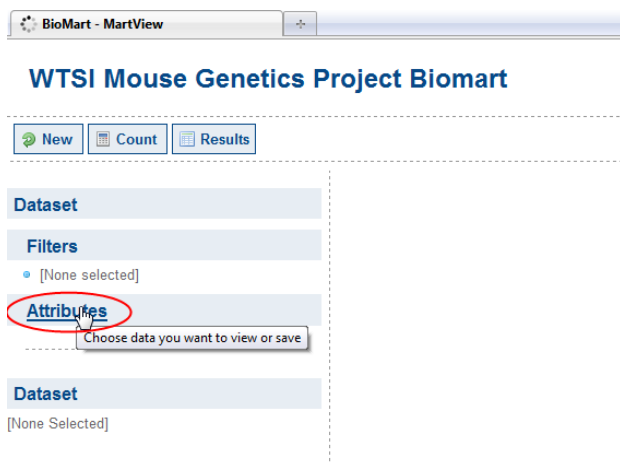
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3. Select “MGP phenotyping” as the dataset (as shown below).



The screenshot shows the BioMart - MartView interface. At the top, there is a browser tab labeled "BioMart - MartView". Below the tab, the page title is "WTSI Mouse Genetics Project Biomart". There are three buttons: "New", "Count", and "Results". The "Dataset" section shows "[None selected]". A dropdown menu is open, displaying the following options: "- CHOOSE DATASET -", "- CHOOSE DATASET -", "EUCOMM / KOMP-CSD Gene Targeting Alleles", "EUCOMM Gene Trapping Alleles", "MGP Phenotyping" (highlighted in blue), "MGP Possible MP Terms (internal use only)", "MP Term Export", and "WTSI DNA Clone Resources".

4. Click on the Attribute link on the left (as shown below).



The screenshot shows the BioMart - MartView interface. At the top, there is a browser tab labeled "BioMart - MartView". Below the tab, the page title is "WTSI Mouse Genetics Project Biomart". There are three buttons: "New", "Count", and "Results". The "Dataset" section shows "[None selected]". The "Filters" section shows "[None selected]". The "Attributes" link is highlighted with a red circle. Below the "Attributes" link, there is a tooltip that says "Choose data you want to view or save". The "Dataset" section at the bottom shows "[None Selected]".

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5. Select Parameter Level Heatmap Data (as shown below).

WTSI Mouse Genetics Project Biomart bio::mart

New Count Results URL XML Perl Help

Dataset: MGP Phenotyping

Filters: [None selected]

Attributes

Please select columns to be included in the output and hit 'Results' when ready

- Heatmap Data
- Heatmap Graphs (Deprecated)
- Parameter Level Heatmap Data
- Published Graph Data
- Published Images
- Fertility
- Homozygote Viability
- Adult Expression
- Collaborator Data

6. Now click on Filters to access a dialog box to restrict the query (as shown below).

WTSI Mouse Genetics Project Biomart bio::mart

New Count Results URL XML Perl Help

Dataset: MGP Phenotyping

Filters: Restrict your query by filtering

Attributes

- Colony Prefix
- Gender
- Genotype
- Pipeline
- Test
- Parameter
- Protocol
- Manual Call
- MP ID
- MP Term
- Graph URL

Dataset: [None Selected]

Please select columns to be included in the output and hit 'Results' when ready

- Heatmap Data
- Heatmap Graphs (Deprecated)
- Parameter Level Heatmap Data
- Published Graph Data
- Published Images
- Fertility
- Homozygote Viability
- Adult Expression
- Collaborator Data

Features

Colony Details Select all Deselect all

- Colony Prefix

Test Data Select all Deselect all

- Gender
- Genotype
- Pipeline
- Test
- Parameter
- Protocol
- Protocol Description
- Manual Call
- Auto Call
- Auto Call Change of Direction
- MP ID
- MP Term
- Graph URL
- Raw Data URL

MIG IDs (Internal Use Only) Select all Deselect all

- Protocol Order By
- Parameter Order By
- Protocol ID
- Parameter ID
- Population ID

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7. We can filter the data to see which colonies are associated with which mammalian phenotype terms. Exact MP terms can be searched using the filter MP ID (see http://www.informatics.jax.org/searches/MP_form.shtml for a browser showing possible terms and MP ID's). Alternatively the filter MP Term can be used with % as wildcard symbols e.g. %sodium% (as shown below).

<input type="checkbox"/> Test	Adult LacZ Expression Auditory Brainstem Response Body Composition (DEXA) Brain Histopathology Citrobacter Challenge Dysmorphology
<input type="checkbox"/> Manual Call	Complete and data/resources available Significant Early indication of possible phenotype Not Significant Not performed or applicable
<input type="checkbox"/> Automatic Call	Significant Not Significant Auto Analysis Not Run
<input type="checkbox"/> MP ID	
<input checked="" type="checkbox"/> MP Term (e.g. %bone%)	%sodium%

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8. Click on the Results button (as shown below) to filter as specified.

WTSI Mouse Genetics Project Biomart

bio::mart

New Count Results

Preview the results of the query

Please restrict your query using criteria below

Dataset: MGP Phenotyping

Filters: MP Term (e.g. %bone%): %sodium%

Attributes: Colony Prefix, Gender, Genotype, Pipeline, Test, Parameter, Protocol, Manual Call, MP ID, MP Term, Graph URL

Colony Details

Colony Prefix

Marker Symbol: Myam1

Allele Name

9. Edit the number of rows shown to view the data (as shown below).

WTSI Mouse Genetics Project Biomart

bio::mart

New Count Results

Export all results to: File TSV Unique results only Go

Email notification to:

View: 20 rows as HTML Unique results only

Colony Prefix	Gender	Genotype	Pipeline	Test	Parameter	Protocol	Manual Call	MP ID	MP Term	Graph URL
MCKS	Female	Hom	MGP Select	Plasma Chemistry	Sodium	Plasma Chemistry (Ketamine / Xylazine)	Significant	MP_0005633	increased circulating sodium level	http://img1.sanger.ac.uk/graphs/MCKS/4978_1643.png
MCTQ	Female	Hom	MGP Select	Plasma Chemistry	Sodium	Plasma Chemistry (Ketamine / Xylazine)	Significant	MP_0005633	increased circulating sodium level	http://img1.sanger.ac.uk/graphs/MCTQ/5169_1643.png
MCTQ	Male	Hom	MGP Select	Plasma Chemistry	Sodium	Plasma Chemistry (Ketamine / Xylazine)	Significant	MP_0005633	increased circulating sodium level	http://img1.sanger.ac.uk/graphs/MCTQ/5169_1643.png

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10. Results can be exported using the export facility (as shown below).

WTSI Mouse Genetics Project Biomart bio::mart

[New](#) [Count](#) [Results](#) [URL](#) [XML](#) [Perl](#) [Help](#)

Export all results to **File** **CSV** Unique results only

Email notification to

View **20** rows as **HTML** Unique results only

Colony Prefix	Gender	Genotype	Pipeline	Test	Parameter	Protocol	Manual Call	MP ID	MP Term	Graph URL
MCKS	Female	Hom	MGP Select	Plasma Chemistry	Sodium	Plasma Chemistry (Ketamine / Xylazine)	Significant	MP-0005633	increased circulating sodium level	http://img1.sanger.ac.uk/graphs/MCKS/4978_1643.png
MCTQ	Female	Hom	MGP Select	Plasma Chemistry	Sodium	Plasma Chemistry (Ketamine / Xylazine)	Significant	MP-0005633	increased circulating sodium level	http://img1.sanger.ac.uk/graphs/MCTQ/5169_1643.png
MCTQ	Male	Hom	MGP Select	Plasma Chemistry	Sodium	Plasma Chemistry (Ketamine / Xylazine)	Significant	MP-0005633	increased circulating sodium level	http://img1.sanger.ac.uk/graphs/MCTQ/5169_1643.png

Dataset
MGP Phenotyping

Filters

- MP Term (e.g. %bone%): %sodium%

Attributes

- Colony Prefix
- Gender
- Genotype
- Pipeline
- Test
- Parameter
- Protocol
- Manual Call
- MP ID
- MP Term
- Graph URL