

RGD: Data and Tools for Translational Research in Otitis Media

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Rat Genome Database

Medical College of Wisconsin, Milwaukee, WI, USA

ISOM 22ND International Symposium on Recent Advances in Otitis Media



RGD is a multispecies resource for translational research and comparative genomics

Submit Data | Help | Video Tutorials | News | Publications | Download | REST API | Citing RGD | Contact | Sign In

Home | Data | Analysis & Visualization | Diseases | Phenotypes & Models | Pathways | Community

Enter Search Term... Advanced Search (OLGA) f t in y GitHub

RGD virtual office hours are available by appointment. [Contact us](#) to schedule a time.

Other Species Portals

Search: Genes, Strains, Ontology & Annotation, Ontomate (Literature), QTL, Orthologs, Genomic Region, All...

Analysis and Visualization: JBrowse, Variant Visualizer, VCMAP Synteny Browser (beta), OLGA Gene List Generator, Disease Portals, Phenotypes and Models, MOET Multi-Ontology Enrichment, Ontomate Advanced Literature Search, GA Tool Gene Annotator

Tweets from @ratgenome

Rat Genome Database @ratgen... · May 19

Save the dates: Oct 8-11, 2023, for the CTC-RG 20th Annual Meeting! Venue: Mooney Library, University of Tennessee Health Science Center Memphis with in person and Zoom options available @CTC_RG . Stay tuned for more details [complextrait.org](#)

Rat Genome Database Retweeted Alliance of Genomics @allianc... · May 11

The 2023 Alliance User Survey is currently running; please help make the Alliance better for YOU by sharing your thoughts via the survey! Here [surveymonkey.com](#)

- Houses data for ten mammalian species including human and chinchilla.
- Integrates data derived from expert literature curation with data imported from other databases and direct submissions from researchers.
- Provides an extensive and well-rounded corpus of genetic, genomic, disease and physiological data.
- Provides innovative tools for data analysis.

RGD is a multispecies resource for translational research and comparative genomics

The screenshot shows the RGD website interface. At the top, there is a navigation bar with links for 'Submit Data', 'Help', 'Video Tutorials', 'News', 'Publications', 'Download', 'REST API', 'Citing RGD', 'Contact', and 'Sign In'. Below this is a secondary menu with 'Home', 'Data', 'Analysis & Visualization', 'Diseases', 'Phenotypes & Models', 'Pathways', and 'Community'. A red arrow points to the 'Community' link. A search bar is located below the menu, with the text 'Enter Search Term...' and 'Advanced Search (OLGA)'. Below the search bar, there is a banner for 'RGD virtual office hours are available by appointment. Contact us to schedule a time.' Below the banner, there is a section for 'Other Species Portals' with icons for various species: human, mouse, rat, dog, bird, pig, and monkey. Below this is a 'Search' section with tabs for 'Genes', 'Strains', 'Ontology & Annotation', 'Ontomate (Literature)', 'QTL', 'Orthologs', 'Genomic Region', and 'All...'. Below the search section is an 'Analysis and Visualization' section with several tool tiles: 'JBrowse Genome Browser', 'Variant Visualizer', 'VCMaP Synteny Browser (beta)', 'OLGA Gene List Generator', 'Disease Portals', 'Phenotypes and Models', 'MOET Multi-Ontology Enrichment', 'Ontomate Advanced Literature Search', and 'GA Tool Gene Annotator'. On the right side of the page, there is a 'Tweets from @ratgenome' section with two tweets. The first tweet is from 'Rat Genome Database' (@ratgenome) dated May 19, mentioning the CTC-RG 20th Annual Meeting. The second tweet is a retweet from 'Alliance of Genomics' (@alliance) dated May 11, mentioning a 2023 Alliance User Survey.

- Data and tools are accessible using the menus at the top of the page.

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	C	A	T	
ACI/N (KNAW)	A	C	A	T
BBDP/WorN (ICL)	G	C	G	T
ACI/EurMcwi (ICL)	A	C	A	T
BN-Lx/Cub (ICL)	G	A	G	C

	Rat	Mouse
Genes:	3202	3232
QTL:	715	0
Strains:	301	

- Data and tools are accessible using the menus at the top of the page
- Data can also be accessed using the general search box or targeted searches.

The screenshot shows a tweet from @ratgenome dated May 19. The tweet text reads: 'Save the dates: Oct 8-11, 2023, for the CTC-RG 20th Annual Meeting! Venue: Mooney Library, University of Tennessee Health Science Center Memphis with in person and Zoom options available @CTC_RG . Stay tuned for more details complextrait.org'. Below the tweet is a retweet from the Alliance of Genomics and Health (@allianc...), dated May 11. The retweet text reads: 'The 2023 Alliance User Survey is currently running; please help make the Alliance better for YOU by sharing your thoughts via the survey! Here surveymonkey.com'.

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	C	A	T
ACI/N (KNAW)	A	C	A
BBDP/WorN (ICL)	G	C	G
ACI/EurMcwi (ICL)	A	C	A
BN-Lx/Cub (ICL)	G	A	G

	C	A	T
ACI/N (KNAW)	A	C	A
BBDP/WorN (ICL)	G	C	G
ACI/EurMcwi (ICL)	A	C	A
BN-Lx/Cub (ICL)	G	A	G

	C	A	T
ACI/N (KNAW)	A	C	A
BBDP/WorN (ICL)	G	C	G
ACI/EurMcwi (ICL)	A	C	A
BN-Lx/Cub (ICL)	G	A	G

- Data and tools are accessible using the menus at the top of the page
- Data can also be accessed using the general search box or targeted searches.
- Tools can also be accessed using the Analysis and Visualization links on the front page.

Tweets from @ratgenome

Rat Genome Da...
@ratgen... · May 19

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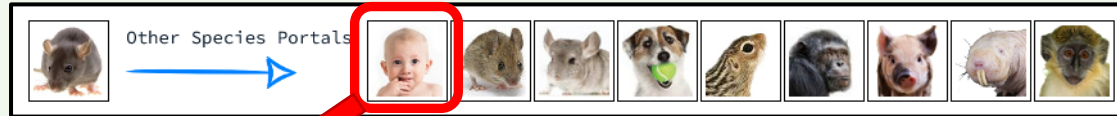
Below the navigation bar, there is a banner for 'RGD virtual office hours are available by appointment. Contact us to schedule a time.' Below this is the 'Other Species Portal' section, which features a grid of species icons. A red box highlights the icons for Human, Mouse, Rat, Dog, Bird, Monkey, Pig, Guinea Pig, and Rabbit. A blue arrow points from the mouse icon to the right.

The 'Search' section includes a horizontal menu with options: 'Genes', 'Strains', 'Ontology & Annotation', 'Ontomate (Literature)', 'QTL', 'Orthologs', 'Genomic Region', and 'All...'. Below this is the 'Analysis and Visualization' section, which contains several tool cards: 'JBrowse Genome Browser', 'Variant Visualizer', 'VCMAP Synteny Browser (beta)', 'OLGA Gene List Generator', 'Disease Portals', 'Phenotypes and Models', 'MOET Multi-Ontology Enrichment', 'Ontomate Advanced Literature Search', and 'GA Tool Gene Annotator'.

On the right side of the screenshot, there is a 'Tweets from @ratgenome' section. The first tweet is from 'Rat Genome Database' (@ratgen...) dated May 19, 2023, announcing the CTC-RG 20th Annual Meeting. The second tweet is from 'Alliance of Genomics' (@allianc...) dated May 11, 2023, announcing a survey.

- Data and tools are accessible using the menus at the top of the page
- Data can also be accessed using the general search box or targeted searches.
- Tools can also be accessed using the Analysis and Visualization links on the front page.
- Species icons link to informational landing pages for each species.


Species portals provide easy access to species-oriented information, data, and tools



Human

Homo sapiens

Welcome to the Human Portal within RGD. This portal contains links to data related to *Homo sapiens*, and to tools that clinical researchers can use to find and analyze that data. Please feel free to [contact us](#) with suggestions for additional data or tools that would help advance your research.



"Human diseases and conditions are routinely studied directly in human subjects, via controlled case studies and regulated clinical trials. However, pre-clinical studies are also vitally necessary. Animal models are employed that represent "a living organism in which normative biology or behavior can be studied, or in which a spontaneous or induced pathological process can be investigated, and in which the phenomenon in one or more respects resembles the same phenomenon in humans." Researchers need to be able to determine and utilize the most precise models for their disease of interest, that is, models that closely mimic the human phenotypic profile for, or aspects of a disease or condition. Sometimes despite promising results with preclinical treatments in one animal model, the same treatments do not always translate to successful human clinical trials. Thus, increasingly researchers want information about more than one model organism, and research benefits greatly from being able to explore integrated data. Having both human and model organism data accessible in one place will help researchers find the data they need for both clinical and translational research. Whether a researcher is looking for models of a disease, or human variations, or is working with a particular species and is looking for corroboration in other species, the power of combined data can be applied to research within the Rat Genome Database using the tools found on this page."

Sources: PMID:10845564; PMID:31552413; PMID:3155241; NLM Unique ID:101117739; Hau J. (2008) Sourcebook of Models for Biomedical Research; Simmons, D. (2008) Nature Education 1(1):70

Human Data

- Ontomate: Main
- Ontomate: Pre-filtered to Human
- Human QTL Search
- Human Gene Search
- Human Genetic Variants Visualizer
- RGD's Disease Annotations
- RGD's Disease Portals
- RGD's Pathway Annotations
- RGD's Pathway Diagrams
- GO: Molecular Function Annotations
- GO: Biological Process Annotations
- GO: Cellular Component Annotations
- RGD's Human Download Site
- RGD's Full Download Site

Human Analysis Tools

- Human JBrowse Genome Browser
- OLGA: Object List Generator & Analyzer
- MOET: Multi Ontology Enrichment Tool
- GA Tool: Annotation Search and Export
- GOLF: Gene and Ortholog Location Finder
- InterViewer – Protein Interactions


Human Genome Resources

- RGD Video Tutorials

Human Data

Ontomate: Concept-Based Literature Search

Ontomate: pre-filtered for Human literature



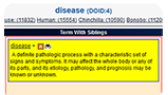
Human QTLs at RGD

Human Genes at RGD

Human Genetic Variants Visualizer

G	A	G	G	C	A	A	C
G	A	G	G	C	A	A	C
A	C	G	A	C	A	A	C
A	C	G	A	C	A	A	C

RGD Disease Annotations



As an example, this is the top of the species page for human. The layout is essentially the same for all of the species portals, although depending on the data and tools available for each, there are differences. The next few slides show the sections of the chinchilla portal.

Species portals provide easy access to species-oriented information, data, and tools



Long-tailed Chinchilla

Chinchilla lanigera

Welcome to the Chinchilla Portal within RGD. This portal contains links to data related to the long-tailed chinchilla, *Chinchilla lanigera*, and to tools that chinchilla researchers can use to find and analyze that data. Please feel free to [contact us](#) with suggestions for additional data or tools that would help advance your research.



"The long-tailed chinchilla (*Chinchilla lanigera*) is used as a model for understanding the physiology, development and function of the auditory system. The chinchilla is used in several research areas, including otitis media, upper respiratory tract infections, hearing, psychoacoustics and ototoxicity. The chinchilla has been used for auditory or acoustics research because of the anatomical and physiological similarities between its inner ear and that of human (1-4). Its middle ear and Eustachian tube structures are also similar to that of humans and unlike other rodent models it is not susceptible to innate middle ear infections, making it an ideal model organism for otitis media (OM) studies (5-7). The presence of a large cephalid bulla, from which sufficient quantities of middle ear fluids can be withdrawn for microbiological and immunological assessment, is also an advantage. Most interestingly, the chinchilla has a permanently semipatulous Eustachian tube, which makes this tubal organ highly similar to the 'floppy' Eustachian tube of childhood (5). The chinchilla is recognized as an ideal model of otitis media and its use has produced critical information regarding the molecular mechanisms of pathogenesis of pneumococcal OM, the immune response to *S. pneumoniae*-induced OM, the efficacy of antimicrobial drugs that target *S. pneumoniae*, and the immunogenicity and protective efficacy of pneumococcal capsular polysaccharide vaccine antigens (8)."

Source: PMID:27173523

Chinchilla Data

Ontomate: Concept-Based Literature Search

Ontomate: pre-filtered for Chinchilla literature



Chinchilla Genes at RGD



RGD Disease Annotations

Chinchilla Otitis Media Annotations



Chinchilla Data

- Ontomate: Main
- Ontomate: pre-filtered for Chinchilla
- Chinchilla Genes at RGD
- RGD Disease Annotations
- Chinchilla Otitis Media Annotations
- RGD's Pathway Annotations
- RGD's Pathway Diagrams
- GO: Molecular Function Annotations
- GO: Biological Process Annotations
- GO: Cellular Component Annotations
- RGD's Chinchilla Download Site
- RGD's Full Download Site

Chinchilla Analysis Tools

- Chinchilla JBrowse Genome Browser
- OLGA: Object List Generator & Analyzer
- MOET: Multi Ontology Enrichment Tool
- GA Tool: Annotation Search and Export
- GOLF: Gene and Ortholog Location Finder
- Chinchilla PhenoMiner

Chinchilla Genome Resources



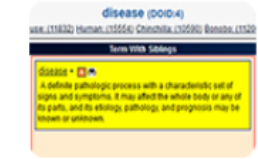
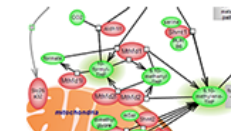


- RGD's Genome Information page
- NCBI Genome Page

The top of the chinchilla portal gives information about chinchilla as a model of human disease

Species portals provide easy access to species-oriented information, data, and tools



Chinchilla Data

<p>Ontomate: Concept-Based Literature Search</p> <p>Ontomate: pre-filtered for Chinchilla literature</p> 	<p>Chinchilla Genes at RGD</p> 	<p>RGD Disease Annotations</p> <p>Chinchilla Otitis Media Annotations</p> 
<p>RGD's Pathway Annotations</p> <p>RGD's Pathway Diagrams</p> 	<p>Gene Ontology Annotations</p> <p>Molecular Function Biological Process Cellular Component</p> 	<p>RGD's Chinchilla Download Site</p> 

NCBI Genome Page

The second section provides links to chinchilla data, including a link to RGD's download site for chinchilla data.


Species portals provide easy access to species-oriented information, data, and tools



Chinchilla Data

Chinchilla laniger



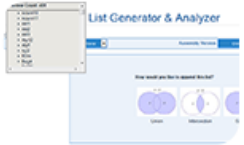
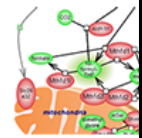
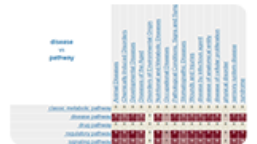


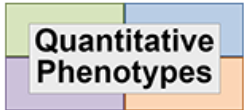
Welcome to the Chinchilla Portal, and to tools that chinchilla researchers can use to find suggestions for additional data.



The chinchilla is a small rodent with long, soft fur. It is known for its ability to jump high and its long lifespan.

Source: [Chinchilla Data](#)

Tools for Chinchilla Data Analysis

<p>Ontomate: Concept-Based Literature Search</p> <p>Ontomate: pre-filtered for Chinchilla literature</p> 	<p>Chinchilla JBrowse Genome Browser</p> 	<p>OLGA: Object List Generator & Analyzer</p> 
<p>RGD's Pathway</p> <p>RGD's Pathway</p> 	<p>GA Tool: Annotation Search and Export</p> 	<p>GOLF: Gene and Ortholog Location Finder</p> 
<p>MOET: Multi Ontology Enrichment Tool</p> 	<p>Chinchilla PhenoMiner</p> <p>Quantitative Phenotypes</p> 	

The third section gives links to RGD tools with chinchilla already selected as the species.

Species portals provide easy access to species-oriented information, data, and tools



Chinchilla Data

Tools for Chinchilla Data Analysis

Genome and Gene Resources

Chinchilla JBrowse Genome Browser

RGD's Chinchilla Genome Information Page for Chinchilla

Chinchilla Taxonomy Page

Chinchilla Species Browser

Chinchilla Genome Page

ChiLan1.0 Assembly Page

Ensembl's Chinchilla Information Page

Chinchilla Assembly, Gene Annotation and Statistics at Ensembl

NCBI

e!Ensembl

Quantitative Phenotypes

GA Tool: Annotation Search and Export

Ontomate: Concept-Based Literature Search

Ontomate: pre-filtered for Chinchilla literature

RGD's Pathway Analysis

RGD's Pathway Database

Ontomate: Concept-Based Literature Search

Ontomate: pre-filtered for Chinchilla literature

Chinchilla Data

Chinchilla lanigera

Welcome to the Chinchilla Portal for *Chinchilla lanigera*, and to tools that chinchilla researchers can use to find suggestions for additional data and tools.

The first section of the portal provides information about the chinchilla and its biology. The second section provides information about the chinchilla genome and gene resources. The third section provides information about the chinchilla phenotype and quantitative traits. The fourth section provides information about the chinchilla genome and gene resources.

In the fourth section there are links to gene and genome information at RGD, NCBI and Ensembl.

Species portals provide easy access to species-oriented information, data, and tools



Chinchilla Data

Tools for Chinchilla Data Analysis

- Ontomate: Concept-Based Literature Search
- Ontomate: pre-filtered for Chinchilla literature
- Ontomate
- Chinchilla JBrowse Genome Browser
- RGD's Chinchilla Genome Information Page for Chinchilla
- Chinchilla Taxonomy Page
- Chinchilla Species Browser
- Chinchilla Genome Page
- ChiLan1.0 Assembly Page
- NCBI
- GA Tool: Annotation Search and Export
- RGD's Pathway Analysis
- RGD's Pathway Database
- Quantitative Phenotypes

The screenshot shows a web portal for Chinchilla data. A red box highlights the 'Tools for Chinchilla Data Analysis' section, which contains various tools and links. A red arrow points from the chinchilla icon in the top navigation bar to this section.

All of these are also available in the right sidebar, along with links to chinchilla research laboratories and selected publications.

Chinchilla Analysis Tools

- Chinchilla JBrowse Genome Browser
- OLGA: Object List Generator & Analyzer
- MOET: Multi Ontology Enrichment Tool
- GA Tool: Annotation Search and Export
- GOLF: Gene and Ortholog Location Finder
- Chinchilla PhenoMiner

Chinchilla Genome Resources

- RGD's Genome Information page
- NCBI Genome Page
- NCBI Assembly Page
- NCBI Taxonomy Page
- NCBI Species Browser
- Ensembl Genome Page

Featured Chinchilla Research

- Lauren O. Bakaletz, Ph.D.
- Garth Ehrlich, Ph.D.
- Wenzhou Hong, Ph.D.
- Joseph E. Kerschner, M.D.
- Kevin Mason, Ph.D.

RGD Publications

- The Chinchilla Research Resource Database: resource for an otolaryngology disease model.
- PhenoMiner: quantitative phenotype curation at the rat genome database.

The right sidebar contains a list of tools, genome resources, featured research, and publications related to Chinchilla. A red box highlights the 'Chinchilla Analysis Tools' section.

Species portals provide easy access to species-oriented information, data, and tools



Long-term Chinchilla

Chinchilla lanigera

Welcome to the Chinchilla Portal for *Chinchilla lanigera*, and to tools that chinchilla researchers can use to find suggestions for additional data.



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Chinchilla Data

Ontomate: Concept-Based Literature Search

Ontomate: pre-filtered for Chinchilla literature



Chinchilla Data

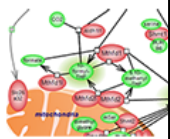
Ontomate: Concept-Based Literature Search

Ontomate: pre-filtered for Chinchilla literature



RGD's Pathway Analysis

RGD's Pathway Database



Tools for Chinchilla Data Analysis

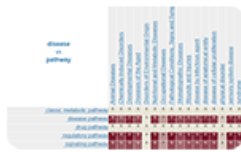
Chinchilla JBrowse

We will highlight just a few of the items listed on this page, starting with the Chinchilla PhenoMiner.

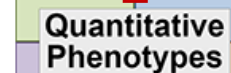
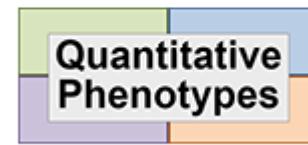
Genome and Gene Resources



GA Tool: Annotation Search and Export



Chinchilla PhenoMiner



Chinchilla Analysis Tools

Chinchilla JBrowse Genome Browser

OLGA: Object List Generator & Analyzer

MOET: Multi Ontology Enrichment Tool

GA Tool: Annotation Search and Export

GOLF: Gene and Ortholog Location Finder

Chinchilla PhenoMiner

Chinchilla Genome Resources

RGD's Genome Information page

NCBI Genome Page

NCBI Assembly Page

NCBI Taxonomy Page

NCBI Species Browser

Ensembl Genome Page

Featured Chinchilla Research

Lauren O. Bakaletz, Ph.D.

Garth Ehrlich, Ph.D.

Wenzhou Hong, Ph.D.

Joseph E. Kerschner, M.D.

Kevin Mason, Ph.D.

RGD Publications

The Chinchilla Research Resource Database: resource for an otolaryngology disease model.

PhenoMiner: quantitative phenotype curation at the rat genome database.

PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

PhenoMiner Database Rat Phenominer Chinchilla Phenominer

Select a Category Tab in the lower right panel, then select values from categories of interest and select "Generate Report" to build report.

Chinchilla Sources
Search for data related to one or more chinchilla sources.

Clinical Measurements
Query by clinical measurement

Rat Phenominer Chinchilla Phenominer

Clinical Measurement Selection
Ex: heart rate, blood cell count

Sources	Clinical Measurements	Measurement Methods	Experimental Conditions
<input type="checkbox"/> bacterial infection severity score based on inflammatory foci in exudate(58)	<input type="checkbox"/> body morphological measurement(131)		
<input type="checkbox"/> bacterial infection severity score based on mucosal leukocyte infiltration(57)	<input type="checkbox"/> disease process measurement(271)		
<input type="checkbox"/> body weight(131)	<input type="checkbox"/> exudate measurement(197)		
<input type="checkbox"/> inflammatory exudate volume(81)	<input type="checkbox"/> organ measurement(57)		
<input type="checkbox"/> logarithm of the total number of Streptococcus pneumoniae bacterial colony forming units recovered(31)	<input type="checkbox"/> renal/urinary measurement(59)		
<input type="checkbox"/> logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered(42)			
<input type="checkbox"/> ratio of the number of lymphocytes in an inflammatory exudate to the number of all cells in that exudate(58)			
<input type="checkbox"/> ratio of the number of neutrophils in an inflammatory exudate to number of all cells in that exudate(58)			
<input type="checkbox"/> total number of bacterial colony forming units recovered(83)			
<input type="checkbox"/> tympanic cavity epithelium thickness(57)			
<input type="checkbox"/> urine specific gravity(41)			
<input type="checkbox"/> urine total protein level(18)			

- The data in PhenoMiner is a combination of curated data from the literature and direct submissions from researchers.
- The link from the Chinchilla portal directly accesses the Chinchilla PhenoMiner.



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

PhenoMiner Database

Select a Category Tab in the lower right panel, then select values from categories of interest and select "Generate Report" to build report

Rat Phenominer Chinchilla Phenominer

Chinchilla Sources	Clinical Measurements	Measurement Methods	Experimental Conditions
Search for data related to one or more chinchilla sources.	Query by clinical measurement. <input checked="" type="checkbox"/> logarithm of the total number of Streptococcus pneumoniae bacterial colony forming units recovered(31) <input checked="" type="checkbox"/> logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered(42)	Filter results by Measurement method.	Filter based condition.

Clinical Measurement Selection

Ex: heart rate, blood cell count

Sources	Clinical Measurements	Measurement Methods	Experimental Conditions
		<input checked="" type="checkbox"/> logarithm of the total number of bacterial colony forming units recovered(156) <input checked="" type="checkbox"/> logarithm of the total number of Haemophilus influenzae bacterial colony forming units recovered(42) <input type="checkbox"/> logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered(42) <input type="checkbox"/> logarithm of the total number of Streptococcus pneumoniae bacterial colony forming units recovered(31)	

- Selecting terms in the bottom section of the PhenoMiner home page adds them to the corresponding bins in the top section.



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

The screenshot displays the PhenoMiner Database interface. At the top, it says "PhenoMiner Database" and "Select a Category Tab in the lower right panel, then select values from categories of interest and select 'Generate Report' to build report". There are radio buttons for "Rat Phenominer" and "Chinchilla Phenominer", with "Chinchilla Phenominer" selected. Below this are four main panels: "Chinchilla Sources", "Clinical Measurements", "Measurement Methods", and "Experimental Conditions". The "Clinical Measurements" panel is active, showing two selected items: "logarithm of the total number of Streptococcus pneumoniae bacterial colony forming units recovered(31)" and "logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered(42)". Below these panels is a navigation bar with four tabs: "Sources", "Clinical Measurements", "Measurement Methods", and "Experimental Conditions". The "Clinical Measurements" tab is selected. Below the navigation bar, there is a search results list on the left and a hierarchical tree view on the right. The search results list includes items like "bacterial infection severity score based on inflammatory foci in exudate(58)", "body weight(131)", "inflammatory exudate volume(81)", etc. The tree view shows a hierarchy of categories such as "body morphological measurement(131)", "disease process measurement(271)", "disease severity measurement(271)", "infection severity measurement(271)", "bacterial infection severity measurement(271)", "bacteria count(156)", "total number of bacterial colony forming units recovered(156)", etc.

- Data can be chosen on the basis of any or all of four criteria:
 - Chinchilla Sources
 - Clinical Measurement (what was measured)
 - Measurement Method (how it was measured)
 - Experimental Conditions (under what condition(s) was it measured)



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

The screenshot displays the PhenoMiner Database interface. At the top, there are radio buttons for 'Rat Phenominer' and 'Chinchilla Phenominer', with 'Chinchilla Phenominer' selected. Below this, there are four main panels: 'Chinchilla Sources', 'Clinical Measurements', 'Measurement Methods', and 'Experimental Conditions'. The 'Clinical Measurements' panel is active, showing two selected items: 'logarithm of the total number of Streptococcus pneumoniae bacterial colony forming units recovered(31)' and 'logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered(42)'. A blue 'Generate Report' button is located below the panels, with a red arrow pointing to it from the right. Below the main interface, there is a 'Clinical Measurement Selection' panel with a list of measurements and their counts, such as 'bacterial infection severity score based on inflammatory foci in exudate(58)'. To the right of this panel is a tree view showing a hierarchical structure of measurement categories and sub-categories.

- Once selections have been made, click "Generate Report" to view the associated data.



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

Phenominer Database Results (73 results)

Colored By: Sex Legend

Table "column sort" updates the order of the bars in the chart.

Strain	Phenotype	Conditions	Study	Experiment Name	Sex	Age	# of Animals	Value	Units	SEM	SD	Individual Records	Method	Method Duration	Post Insult Time Value	Experiment Notes	Record ID
Rrcjo:Chin	logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered	Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 14 days)	Hong2012	bacteria quantity	male	180 days-300 days	1	6.65	null			View Values	plate count using supplemented brain-heart infusion/vancomycin plates		0	Otitis Media	477
Rrcjo:Chin	logarithm of the total number of	Haemophilus influenzae 86-028NP	Hong2012	bacteria quantity	female	180 days-300 days	1	7.08	null			View Values	plate count using supplemented brain-heart		0	Otitis Media	480

- Results consist of three parts:
 - A graph
 - A detailed table
 - Filters in the left sidebar.
- The three sections work together so filters selected on the left remove bars from the graph and rows from the table, and sorting the table reorders bars in the graph.



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

Phenominer Database Results (73 results)

[Edit Query](#)
[New Query](#)
[Download all records](#)
[Download table view records](#)

Colored By: Sex Condition Strain Phenotype Method Sex

Legend

- female
- male

Strain	Phenotype	Conditions	Study	Experiment Name	Sex	Age	# of Animals	Value	Units	SEM	SD	Individual Records	Method	Method Duration	Post Insult Time Value	Experiment Notes	Record ID
Rrcjo:Chin	logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered	Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 14 days) (4)	Hong2012	bacteria quantity	male	180 days-300 days	1	6.65	null			View Values	plate count using supplemented brain-heart infusion/vancomycin plates		0	Otitis Media	477
Rrcjo:Chin	logarithm of the total number of	Haemophilus influenzae 86-028NP	Hong2012	bacteria quantity	female	180 days-300 days	1	7.08	null			View Values	plate count using supplemented brain-heart		0	Otitis Media	480

- The "Colored by" functionality gives options for coloring the bars of the graph.
- The default is to color by condition but any of the options can be selected.
- A dropdown legend is available to indicate what color corresponds to each possible value for the selected experimental variable.



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

- Here the table is sorted by condition and bars are colored by the sex of the animals.

Phenominer Database Results (73 results)

[Edit Query](#)
[New Query](#)
[Download all records](#)
[Download table view records](#)

Colored By: Sex Legend ▾

Table "column sort" updates the order of the bars in the chart.

The chart displays bacterial quantity (logarithm of total nontypeable Haemophilus influenzae bacterial colony forming units recovered) for 73 conditions. The y-axis ranges from 0 to 8. The x-axis lists conditions like Rrcjo:Chin_male and Rrcjo:Chin_female. Bars are colored by sex: light blue for males and light green for females.

Strain	Phenotype	Conditions	Study	Experiment Name	Sex	Age	# of Animals	Value	Units	SEM	SD	Individual Records	Method	Method Duration	Post Insult Time Value	Experiment Notes	Record ID
Rrcjo:Chin	logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered	Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 3 days)	Hong2012	bacteria quantity	male	180 days-300 days	1	6.65	null			View Values	plate count using supplemented brain-heart infusion/vancomycin plates		0	Otitis Media	477
Rrcjo:Chin	logarithm of the total number of	Haemophilus influenzae 86-028NP	Hong2012	bacteria quantity	female	180 days-300 days	1	7.08	null			View Values	plate count using supplemented brain-heart		0	Otitis Media	480

- Measurements
 - BACTERIA QUANTITY (null)
 - logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered (42)
 - logarithm of the total number of Streptococcus pneumoniae bacterial colony forming units recovered (31)
- Sources
 - Rrcjo:Chin (73)
- Methods
 - plate count using Todd-Hewitt yeast extract agar plates (31)
 - plate count using supplemented brain-heart infusion/vancomycin plates (42)
- Conditions
 - Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 14 days) (4)
 - Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 3 days) (4)
 - Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 7 days) (4)
 - Haemophilus influenzae 86-028NP (90000000 CFU) (for 14 days) (3)
 - Haemophilus influenzae 86-028NP C5 mutant (52000000 CFU/ear) (for 14 days) (3)
- Sex



PhenoMiner is a data mining tool for quantitative phenotype measurement data for rat and chinchilla

Phenominer Database Results (73 results)

Colored By: Sex

Download all records Download table view records

Download all records Download table view records

Table "column sort" updates the order of the bars in the chart.

Strain	Phenotype	Conditions	Study	Experiment Name	Sex	Age	# of Animals	Value	Units	SEM	SD	Individual Records	Method	Method Duration	Post Insult Time Value	Experiment Notes	Record ID
Rrcjo:Chin	logarithm of the total number of nontypeable Haemophilus influenzae bacterial colony forming units recovered	Haemophilus influenzae 86-028NP (2600000 CFU/ear) (for 14 days)	Hong2012	bacteria quantity	male	180 days-300 days	1	6.65	null			View Values	plate count using supplemented brain-heart infusion/vancomycin plates		0	Otitis Media	477
Rrcjo:Chin	logarithm of the total number of	Haemophilus influenzae 86-028NP	Hong2012	bacteria quantity	female	180 days-300 days	1	7.08	null			View Values	plate count using supplemented brain-heart		0	Otitis Media	480

- Options are provided to download all records matching the original query or, if filters have been applied, just the filtered set of records.



RGD's general search searches across datatypes and across species

The screenshot shows the RGD website interface. At the top, there is a navigation bar with links for 'Submit Data', 'Help', 'Video Tutorials', 'News', 'Publications', 'Download', 'REST API', 'Citing RGD', and 'Contact'. Below this is a secondary navigation bar with dropdown menus for 'Home', 'Data', 'Analysis & Visualization', 'Diseases', 'Phenotypes & Models', 'Pathways', and 'Community'. A search bar contains the text 'otitis media' and a search button. To the right of the search bar are social media icons for Facebook, Twitter, LinkedIn, YouTube, and a GitHub link.

The main content area displays 'RGD Search Results..' with a 'View All' link. Below this, it states '457 results found for "otitis media"'. A table shows the distribution of results across various datatypes and species. The 'RDO: RGD Disease Ontology' row is highlighted with a red box.

	Rat	Mouse	Human	Chinchilla	Bonobo	Dog	Squirrel	Pig	Green Monkey	Naked Mole-Rat	All
Gene	17	19	2	36	20	19	19	20	21	18	191
Strain	-	-	-	-	-	-	-	-	-	-	-
QTL	-	-	-	-	-	-	-	-	-	-	-
SSLP	-	-	-	-	-	-	-	-	-	-	-
Variant	-	-	91	-	-	-	-	-	-	-	91
Promoter	-	-	-	-	-	-	-	-	-	-	-
Cell line	-	-	-	-	-	-	-	-	-	-	-
Results Matrix											
ChEBI: ChEBI Ontology											3
EFO: Experimental Factor Ontology											15
HP: Human Phenotype											5
MP: Mammalian Phenotype											1
RDO: RGD Disease Ontology											32
XCO: Experimental Condition											2
Ontology Terms (58)											
Reference											117
References											

- A search for "otitis media" returns
 - A number of genes for each species
 - Human clinical variants from NCBI's ClinVar database
 - Links to vocabularies that RGD uses for functional annotations, including the Disease Ontology.
- Clicking the line for the Disease Ontology takes you to the list of terms in that vocabulary that match the search term "otitis media".

RGD's general search searches across datatypes and across species

RGD Search Results..

32 results found for term "otitis media" in category "Ontology"

Ontology Search:

[Results Matrix](#)

Filters

[View All Results](#)

Go To Page: [Go!](#) View Results Page 1 of 1

32 RDO: RGD Disease Ontology records found for "otitis media"
Showing results 1 - 32 of 32 results

	Term	Annotations	RGD ID / Term_acc
<input type="checkbox"/>	otitis media	Term (760) + Child Term (302)	DOID:10754
<input type="checkbox"/>	Otitis Media with Effusion	Term (194) + Child Term (0)	DOID:9008821
<input type="checkbox"/>	acute allergic sanguinous otitis media		DOID:3728
<input type="checkbox"/>	purulent acute otitis media		DOID:10435
<input type="checkbox"/>	chronic purulent otitis media		DOID:14247
<input type="checkbox"/>	acute allergic serous otitis media		DOID:11558
<input type="checkbox"/>	acute sanguinous otitis media		DOID:3696
<input type="checkbox"/>	non-suppurative otitis media		DOID:11180
<input type="checkbox"/>	acute serous otitis media		DOID:11557
<input type="checkbox"/>	acute transudative otitis media		DOID:3697
<input type="checkbox"/>	suppurative otitis media	Term (47) + Child Term (0)	DOID:11506
<input type="checkbox"/>	serous glue ear		DOID:11181
<input type="checkbox"/>	blue drum syndrome		DOID:9736
<input type="checkbox"/>	adenoid hypertrophy		DOID:0060311
<input type="checkbox"/>	primary ciliary dyskinesia 41	Term (14) + Child Term (0)	DOID:0111858
<input type="checkbox"/>	focal labyrinthitis		DOID:13867
<input type="checkbox"/>	Otitis	Term (0) + Child Term (1062)	DOID:9007481
<input type="checkbox"/>	actinobacillosis		DOID:4974

- RGD uses ontologies for data standardization.
- An ontology is a structured vocabulary which is often shown as an upside-down tree structure with fewer more general terms toward the top and larger numbers of more specific terms as you move down the tree.

RGD's general search searches across datatypes and across species

RGD Search Results..

32 results found for term "otitis media" in category "Ontology"

Ontology Search: otitis media

[← Results Matrix](#)

Filters

[View All Results](#)

Go To Page:

View Results

Page 1 of 1

1

Go!


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32 RDO: RGD Disease Ontology records found for "otitis media"

Showing results 1 - 32 of 32 results

Term	Annotations	RGD ID / Term_acc
<input type="checkbox"/> otitis media 	Term (760) + Child Term (302)	DOID:10754
<input type="checkbox"/> Otitis Media with Effusion	Term (104) + Child Term (0)	DOID:000921







Ontology Browser

Term:
















otitis media (DOID:10754)

Annotations: Rat: (100) Mouse: (100) Human: (106) Chinchilla: (97) Bonobo: (101) Dog: (101) Squirrel: (92) Pig: (99)

Parent Terms

[middle ear disease](#) +   
[Otitis](#) +   

Term With Siblings

[cholesteatoma of middle ear](#) +  
[dislocation of ear ossicle](#) 
[labyrinthitis](#) +  
[middle ear adenoma](#) 
[middle ear cancer](#) + 
[necrosis of ear ossicle](#) 
[otitis externa](#) +  
[otitis media](#) +  
A otitis which involves inflammation of the middle ear. (DO)
[polyp of middle ear](#) 
[tympanic membrane disease](#) +  

Child Terms

[Acute Otitis Media](#)  
[adhesive otitis media](#) 
[mastoiditis](#)  
[middle ear cholesterol granuloma](#) 
[non-suppurative otitis media](#) + 
[Otitis Media with Effusion](#)  
[petrositis](#) 
[suppurative otitis media](#) +  

- RGD uses ontologies for data standardization.
- An ontology is a structured vocabulary which is often shown as an upside-down tree structure with fewer more general terms toward the top and larger numbers of more specific terms as you move down the tree.
- The leaf icon in the search results list takes you to that term in RGD's ontology browser which makes it very easy to navigate up the tree to the more general term and down the tree to the more specific ones.

Refer

References

RGD's general search searches across datatypes and across species

RGD Search Results..

32 results found for term "otitis media" in category "Ontology"

Ontology Search: otitis media

[← Results Matrix](#)

Filters

[View All Results](#)

Go To Page:

View Results

Page 1 of 1

1

















Go!

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32 RDO: RGD Disease Ontology records found for "otitis media"

Showing results 1 - 32 of 32 results

	Term	Annotations	RGD ID / Term_acc
<input type="checkbox"/>	otitis media  	Term (760) + Child Term (302)	DOID:10754
<input type="checkbox"/>	Otitis Media with Effusion  	Term (194) + Child Term (0)	DOID:9008821
<input type="checkbox"/>	acute allergic sanguinous otitis media 		DOID:3728
<input type="checkbox"/>	purulent acute otitis media 		DOID:10435
<input type="checkbox"/>	chronic purulent otitis media 		DOID:14247
<input type="checkbox"/>	acute allergic serous otitis media 		DOID:11558
<input type="checkbox"/>	acute sanguinous otitis media 		DOID:3696
<input type="checkbox"/>	non-suppurative otitis media 		DOID:11180
<input type="checkbox"/>	acute serous otitis media 		DOID:11557
<input type="checkbox"/>	acute transudative otitis media 		DOID:3697
<input type="checkbox"/>	suppurative otitis media  	Term (47) + Child Term (0)	DOID:11506
<input type="checkbox"/>	serous glue ear 		DOID:11181
<input type="checkbox"/>	blue drum syndrome 		DOID:9736
<input type="checkbox"/>	adenoid hypertrophy 		DOID:0060311
<input type="checkbox"/>	primary ciliary dyskinesia 41  	Term (14) + Child Term (0)	DOID:0111858
<input type="checkbox"/>	focal labyrinthitis 		DOID:13867
<input type="checkbox"/>	Otitis  	Term (0) + Child Term (1062)	DOID:9007481
<input type="checkbox"/>	actinobacillosis 		DOID:4974

- The "A" icon links to the ontology report page as seen in the next slide.

[Reference](#)


117


References

RGD's Disease Report page for Otitis Media

RGD DISEASE ONTOLOGY - ANNOTATIONS

RGD uses the Human Disease Ontology (DO, <https://disease-ontology.org/>) for disease curation across species. RGD automatically downloads terms required for RGD's curation purposes but are not currently covered in the official version of DO have been added. As corresponding terms are added to DO, these annotations will be updated and subsequently used for curation.

Term: otitis media  [go back to main search page](#)

Accession: [DOID:10754](#)  [browse the term](#)

Definition: A otitis which involves inflammation of the middle ear. (DO)

Synonyms: exact_synonym: COME/ROM; Middle Ear Inflammation; OMS

narrow_synonym: FAMILIAL OTITIS MEDIA; Nonsyndromic otitis media; OTITIS MEDIA, CHRONIC/RECURRENT

related_synonym: OTITIS MEDIA, SUSCEPTIBILITY TO; SUSCEPTIBILITY TO NONSYNDROMIC OTITIS MEDIA

primary_id: [MESH:D010033](#)

alt_id: [OMIM:166760](#)

xref: [EFO:0004992](#); [ICD10CM:H66.9](#); [ICD9CM:382.9](#); [NCI:C34885](#)

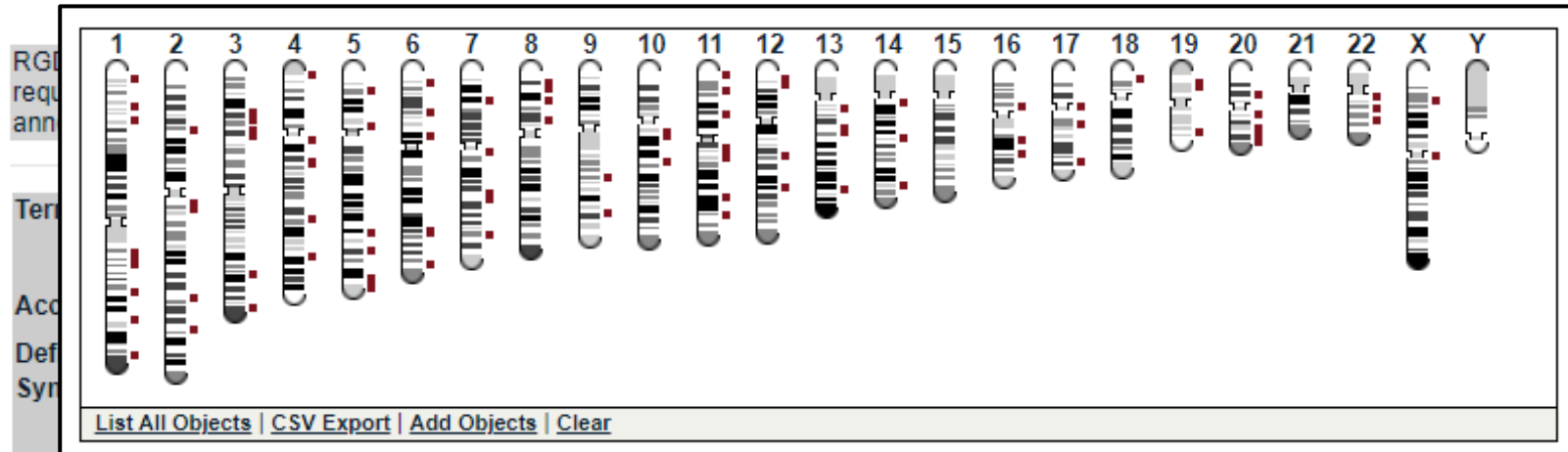
For additional species annotation, visit the [Alliance of Genome Resources](#).

- The top of the disease report page gives information about the term, including the definition, synonyms for the term and links to related terms in other vocabularies and information in other databases such as the Online Mendelian Inheritance in Man (OMIM) database.



RGD's Disease Report page for Otitis Media

RGD DISEASE ONTOLOGY - ANNOTATIONS



- Where possible a genome-level view of the genes annotated to the term is shown. For rat, the genome level view also shows positions for QTLs and mapped strains annotated to the selected term.

related_synonym: OTITIS MEDIA, SUSCEPTIBILITY TO; SUSCEPTIBILITY TO NONSYNDROMIC OTITIS MEDIA

primary_id: [MESH:D010033](#)

alt_id: [OMIM:166760](#)

xref: [EFO:0004992](#); [ICD10CM:H66.9](#); [ICD9CM:382.9](#); [NCI:C34885](#)

For additional species annotation, visit the [Alliance of Genome Resources](#).



RGD's Disease Report page for Otitis Media

RGD DISEASE ONTOLOGY - ANNOTATIONS

show annotations for term's descendants Sort by: **symbol** **↑ asc** [download annotations](#)

[Rat \(100\)](#) [Mouse \(100\)](#) **[Human \(168\)](#)** [Chinchilla \(97\)](#) [Bonobo \(101\)](#) [Dog \(101\)](#) [Squirrel \(92\)](#) [Pig \(99\)](#) [Green Monkey \(99\)](#) [Naked Mole-rat \(94\)](#) [All](#)

[Genes \(106\)](#) [Variants \(62\)](#)

otitis media

Symbol	Object Name	Qualifiers	Evidence Notes	Source	PubMed Reference(s)	RGD Reference(s)	Position
A2M	alpha-2-macroglobulin	treatment	ISO	RGD	PMID:2473673 PMID:2459981	RGD:11553864 RGD:11553918	NCBI chr12:9,067,708...9,116,229 Ensembl chr12:9,067,664...9,116,229
A2ML1	alpha-2-macroglobulin like 1	susceptibility	IAGP EXP ClinVar Annotator: match by term: Nonsyndromic otitis media ClinVar Annotator: match by term: Otitis media, susceptibility to CTD Direct Evidence: marker/mechanism	ClinVar OMIM CTD	PMID:16199547 PMID:24824130 PMID:24896146 PMID:24939586 PMID:25741868 More...		NCBI chr12:8,822,621...8,887,459 Ensembl chr12:8,822,621...8,887,001
BPIFA1	BPI fold containing family A member 1		ISS OMIM:166760	MouseDO			NCBI chr20:33,235,996...33,243,306 Ensembl chr20:33,235,995...33,243,311
BTC	betacellulin		ISO mRNA:decreased expression:middle ear	RGD	PMID:12148846	RGD:2306978	NCBI chr 4:74,744,759...74,794,523 Ensembl chr 4:74,744,759...74,794,523
C2	complement C2		ISO associated with Pneumococcal Infections	RGD	PMID:20065024	RGD:7411716	NCBI chr 6:31,897,783...31,945,672 Ensembl chr 6:31,897,785...31,945,673
C3	complement C3		ISO associated with Pneumococcal Infections	RGD	PMID:21502587 PMID:19139190	RGD:7401269 RGD:11554035	NCBI chr19:6,677,704...6,720,650 Ensembl chr19:6,677,704...6,730,562

- For human, RGD has annotations to otitis media for both genes and ClinVar variants.



RGD's Disease Report page for Otitis Media

RGD DISEASE ONTOLOGY - ANNOTATIONS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 X Y


show annotations for term's descendants Sort by: symbol ↑ asc download annotations

Rat (100) Mouse (100) **Human (168)** Chinchilla (97) Bonobo (101) Dog (101) Squirrel (92) Pig (99) Green Monkey (99) Naked Mole-rat (94) All













Genes (106) Variants (62)

Rat (100) Mouse (100) **Human (168)** Chinchilla (97) Bonobo (101) Dog (101) Squirrel (92)

Genes (106) **Variants (62)**

otitis media 

Symbol	Object Name	Evidence	Notes	Source	PubMed Reference
V CV1048158	NM_144670.6(A2ML1):c.289C>T (p.Arg97Trp)	IAGP	ClinVar Annotator: match by term: Otitis media, susceptibility to	ClinVar	PMID:25741868 PMID:28492532
V CV125846	NM_144670.6(A2ML1):c.1918G>A (p.Asp640Asn)	IAGP	ClinVar Annotator: match by term: Otitis media, susceptibility to	ClinVar	PMID:24896146 PMID:25741868 PMID:28492532
V CV1284219	NM_152750.5(CDHR3):c.622G>A (p.Val208Met)	IAGP	ClinVar Annotator: match by term: Susceptibility to nonsyndromic otitis media	ClinVar	
V CV1284224	NM_152750.5(CDHR3):c.1653+3G>A	IAGP	ClinVar Annotator: match by term: Susceptibility to nonsyndromic otitis media	ClinVar	PMID:34322716

Position
chr12:9,067,708...9,116,229 
chr12:9,067,664...9,116,229 
chr12:8,822,621...8,887,459 
chr12:8,822,621...8,887,001 
20:33,235,996...33,243,306 
20:33,235,995...33,243,311 
4:74,744,759...74,794,523 
4:74,744,759...74,794,523 
6:31,897,783...31,945,672 
6:31,897,785...31,945,673 
chr19:6,677,704...6,720,650 
chr19:6,677,704...6,730,562 

- For human, RGD has annotations to otitis media for both genes and ClinVar variants.



RGD's Disease Report page for Otitis Media

RGD DISEASE ONTOLOGY - ANNOTATIONS

GViewer not supported for the selected species.

show annotations for term's descendants

Sort by: symbol

↑ asc

download annotations

Rat (100)

Mouse (100)

Human (168)

Chinchilla (97)

Bonobo (101)

Dog (101)

Squirrel (92)

Pig

Genes (97)

otitis media 

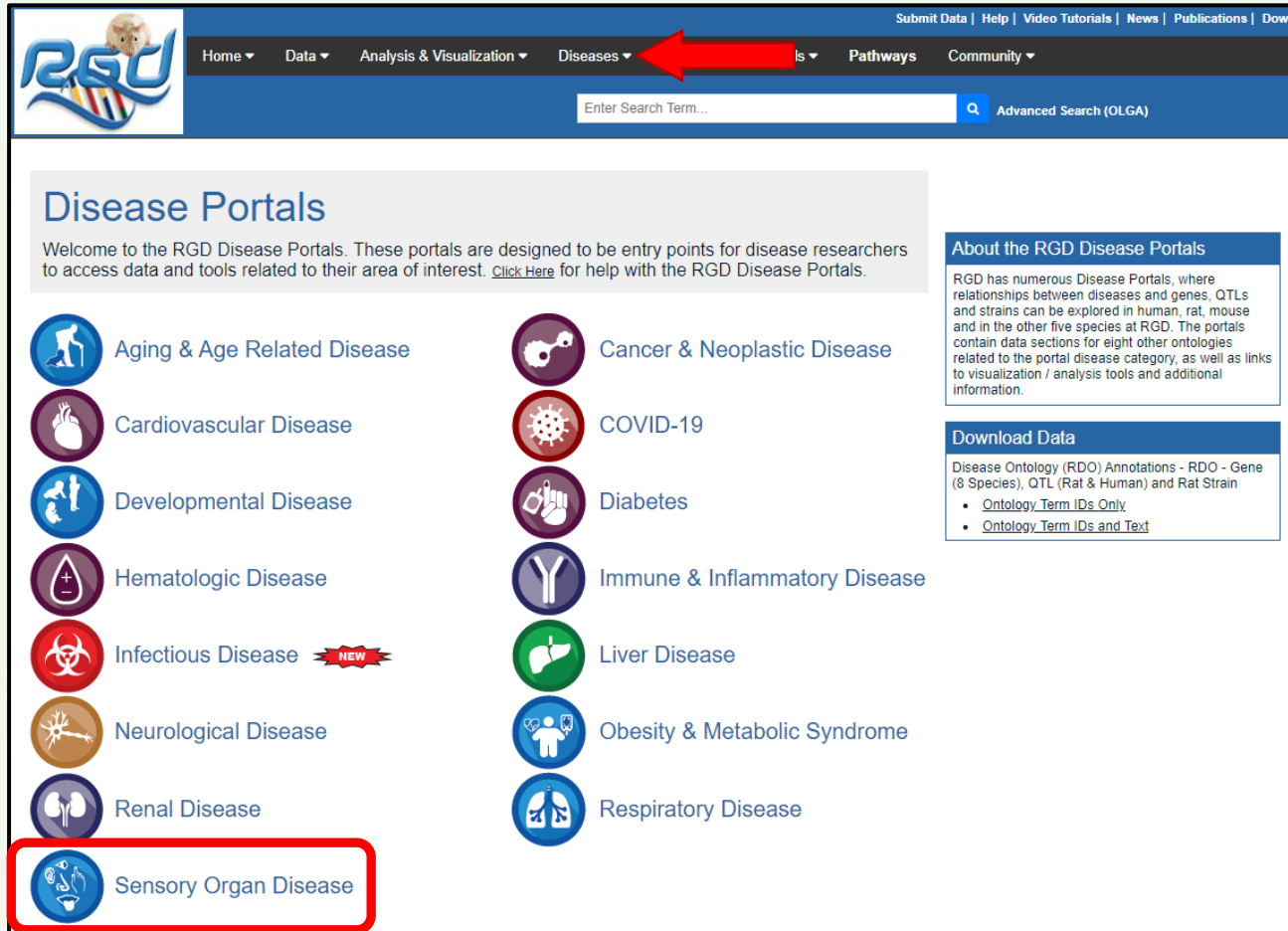
Symbol	Object Name	Qualifiers	Evidence Notes	Source	PubMed Reference(s)
G <u>Bpifa1</u>	BPI fold containing family A member 1		<u>ISO</u> OMIM:166760	<u>MouseDO</u>	
G <u>Btc</u>	betacellulin		<u>ISO</u> mRNA:decreased expression:middle ear	<u>RGD</u>	<u>PMID:12148846</u>
G <u>C2</u>	complement C2		<u>ISO</u> associated with Pneumococcal Infections	<u>RGD</u>	<u>PMID:20065024</u>
G <u>C3</u>	complement C3		<u>IDA</u>	<u>RGD</u>	<u>PMID:19139190</u>
G <u>Cat</u>	catalase	treatment	<u>ISO</u> protein:decreased activity:cochlea,serum:	<u>RGD</u>	<u>PMID:22173336</u>

Note that Chinchilla does not have a genome-level view since the genome is only assembled to the point of scaffolds.

- For chinchilla, most gene annotations are derived from orthologous genes in other species ("ISO" evidence code), but RGD curators have reviewed the literature and made experimental annotations directly to chinchilla wherever possible (in this case indicated by the "inferred from direct assay" (IDA) evidence code).



RGD's Disease Portals provide consolidated views of data related to 15 disease categories



The screenshot shows the RGD website interface. At the top, there is a navigation bar with the RGD logo on the left and a menu with items: Home, Data, Analysis & Visualization, Diseases (highlighted with a red arrow), Pathways, and Community. Below the navigation bar is a search bar with the text 'Enter Search Term...' and a search button labeled 'Advanced Search (OLGA)'. The main content area is titled 'Disease Portals' and includes a welcome message: 'Welcome to the RGD Disease Portals. These portals are designed to be entry points for disease researchers to access data and tools related to their area of interest. [Click Here](#) for help with the RGD Disease Portals.' Below this is a grid of 15 disease categories, each with an icon and a label. The 'Sensory Organ Disease' category is highlighted with a red box. To the right of the grid are two informational boxes: 'About the RGD Disease Portals' and 'Download Data'.

Disease Portals

Welcome to the RGD Disease Portals. These portals are designed to be entry points for disease researchers to access data and tools related to their area of interest. [Click Here](#) for help with the RGD Disease Portals.

- Aging & Age Related Disease
- Cardiovascular Disease
- Developmental Disease
- Hematologic Disease
- Infectious Disease **NEW**
- Neurological Disease
- Renal Disease
- Sensory Organ Disease
- Cancer & Neoplastic Disease
- COVID-19
- Diabetes
- Immune & Inflammatory Disease
- Liver Disease
- Obesity & Metabolic Syndrome
- Respiratory Disease

About the RGD Disease Portals

RGD has numerous Disease Portals, where relationships between diseases and genes, QTLs and strains can be explored in human, rat, mouse and in the other five species at RGD. The portals contain data sections for eight other ontologies related to the portal disease category, as well as links to visualization / analysis tools and additional information.

Download Data

Disease Ontology (RDO) Annotations - RDO - Gene (8 Species), QTL (Rat & Human) and Rat Strain

- [Ontology Term IDs Only](#)
- [Ontology Term IDs and Text](#)

- Disease portals can be accessed via a dropdown list in the top menu bar (arrow), or by clicking the "Diseases" tab in the menu bar to go to the disease portal landing page shown here which provides links to all of the disease portals.
- We will use the Sensory Organ Disease Portal as our example.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

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Sensory Organ Disease Portal

Homo sapiens (Human)

Select a category

- Diseases (Sensory Organ Disease)
- Mammalian Phenotype (Sensory Organ Disease)
- Human Phenotype (Sensory Organ Disease)
- Biological Processes (Sensory Organ Disease)
- Pathways (Sensory Organ Disease)
- Chemicals and Drugs (Sensory Organ Disease)
- Vertebrate Traits (Sensory Organ Disease)
- Clinical Measurements (Sensory Organ Disease)
- Experimental Conditions (Sensory Organ Disease)

Select a species

Species	Genes	QTL
Rat	101	0
Mouse	101	0
Human	106	0
Chinchilla	98	0
Bonobo	102	0
Dog		
Squirrel		
Pig		
Green Monkey		
Naked Mole-Rat		

- When accessing a disease portal, first select a data type, in this case, "Diseases", which is the default.
- Select a species, here we have chosen human.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

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Sensory Organ Disease Portal Homo sapiens (Human)

Select a term

otitis media (DOID:10754) << Back

Parent Terms Term With Siblings Child Terms

middle ear disease [x] [i]
Otitis [x] [i]

cholesteatoma of middle ear [x]
labyrinthitis [x]
otitis externa [x]
otitis media [x]
A otitis which involves inflammation of the middle ear. (DO)
tympanic membrane disease [x]

Acute Otitis Media [x]
mastoiditis [x]
Otitis Media with Effusion [x]
suppurative otitis media [x]

Sensory Organ Disease AND otitis media Homo sapiens (Human)

Genes: 106 [x] [XLSX] QTL: 0 [x] [XLSX] Strains: 0 [x] [XLSX]

A2M
A2ML1
ALB
ARPC4
BMP1
BMP4
BMP6

Dog Squirrel Pig Green Monkey Naked Mole-Rat

- Disease portals start with the most general term in the category, in this case, "sensory system disease".
- Use the embedded ontology browser to select a more specific term. The portals leverage the structure of the ontology to show all data, in this case, all data annotated to the selected term and it's more specific children.
- Here there are 106 human genes annotated to otitis media or a more specific child term in the list below the browser.

- As selections are made in the browser, the list of genes below and the object counts for each species above are updated on the fly.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

- For human and other species with chromosome-level assemblies, the genome-wide view of gene positions is shown.

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Sensory Organ Disease Portal Homo sapiens (Human)

Select a term

middle e
Otitis

Select

Sensor

Genome View

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 X Y

List All Objects | CSV Export | Add Objects | Clear

Gene Set Enrichment

DO: Diseases Ontology Enrichment PW: Pathway Ontology Enrichment MP: Phenotype Ontology Enrichment GO: Biological Process Enrichment

GO: Cellular Component Enrichment GO: Molecular Function Enrichment CHEBI: Chemical/Drug Enrichment

Additional Resources

Analysis Tools Rat Strain Models Related Links



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

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Sensory Organ Disease Portal Homo sapiens (Human)

Select a term

Genome View

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 X Y

List All Objects | CSV Export | Add Objects | Clear

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Additional Resources

Analysis Tools Rat Strain Models Related Links

- For human and other species with chromosome-level assemblies, the genome-wide view of gene positions is shown.
- RGD's Multi-Ontology Enrichment Tool is embedded into the disease portals. (*More about this later.*)



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

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Sensory Organ Disease Portal Homo sapiens (Human)

Select a term

middle e
Otitis

Genome View

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 X Y

List All Objects | CSV Export | Add Objects | Clear

Gene Set Enrichment

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Additional Resources

Analysis Tools Rat Strain Models Related Links











- For human and other species with chromosome-level assemblies, the genome-wide view of gene positions is shown.
- RGD's Multi-Ontology Enrichment Tool is embedded into the disease portals. (*More about this later.*)
- Links to additional information are provided at the bottom of the page.
- The same functionality is available for all species.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories












- Going back up to the top of the page, we will select chinchilla as the species.

Select a species

 Rat Genes: 101 QTL: 0 Strains: 0	 Mouse Genes: 101 QTL: 0	 Human Genes: 106 QTL: 0	 Chinchilla Genes: 98 QTL: 0	 Bonobo Genes: 102 QTL: 0
 Dog Genes: 102 QTL: 0	 Squirrel Genes: 93 QTL: 0	 Pig Genes: 100 QTL: 0	 Green Monkey Genes: 100	 Naked Mole-Rat Genes: 95

Select a term

<< Back otitis media (DOID:10754)

Parent Terms	Term With Siblings	Child Terms
middle ear disease  Otitis 	cholesteatoma of middle ear  labyrinthitis  otitis externa  otitis media  A otitis which involves inflammation of the middle ear. (DO) tympanic membrane disease 	Acute Otitis Media  mastoiditis  Otitis Media with Effusion  suppurative otitis media 



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

Select a species

Sensory Organ Disease AND otitis media

Genes: 98

LOC102004444
LOC102005867
LOC102021597
LOC102021956
Lcp1
Lmna
Lta4h
Ltb4r
Ltc4s
Ltf
Mapk8
Mbl2
Mecom
Mmp2
Mmp9
Muc1
Muc4
Muc5ac
Muc5b
Naalu

XLSX

Bonobo
Genes: 102
QTL: 0

Naked Mole-Rat
Genes: 95

Child Terms

- Acute Otitis Media
- mastoiditis
- Otitis Media with Effusion
- suppurative otitis media

- Going back up to the top of the page, we will select chinchilla as the species.
- When Chinchilla is chosen the list shows the 98 genes in chinchilla annotated to otitis media or any of its more specific children.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

Select a species

Sensory Organ Disease AND otitis media

Gene Set Enrichment

DO: Diseases Ontology Enrichment

PW: Pathway Ontology Enrichment

MP: Phenotype Ontology Enrichment

GO: Biological Process Enrichment

GO: Cellular Component Enrichment

GO: Molecular Function Enrichment

CHEBI: Chemical/Drug Enrichment

Pathway Ontology [Download Result Set](#)

Term	Annotated Genes	Ref Genes	p value	Bonferroni Correction	Odds Ratio
interleukin-23 signaling pathway (PW:0000915)	8	35	1.53E-8	5.11E-6	24.252167
proteoglycan signaling pathway (PW:0000657)	12	134	1.90E-7	6.35E-5	8.582539
signaling pathway (PW:0000003)	45	1890	2.16E-7	7.21E-5	4.9487805
immune response pathway (PW:0000023)	13	175	4.91E-7	1.64E-4	7.0922985
innate immune response pathway (PW:0000234)	12	149	6.10E-7	2.04E-4	7.61229
interleukin-27 signaling pathway (PW:0000916)	6	26	1.06E-6	3.54E-4	23.595919
interleukin-12 family mediated signaling pathway (PW:0000913)	9	81	1.26E-6	4.21E-4	10.331522
Interleukin mediated signaling pathway	14	234	2.33E-6	7.78E-4	5.6713967

Pvalue Limit 0.05

Gene Enrichment

NaqLu

- Going back up to the top of the page, we will select chinchilla as the species.
- When Chinchilla is chosen the list shows the 98 genes in chinchilla annotated to otitis media or any of its more specific children.
- When an ontology is selected in the "Gene Set Enrichment" section of the page, the list of genes is automatically submitted to the embedded MOET tool for enrichment analysis.
- Here RGD's Pathway Ontology has been selected.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

Select a species

Sensory Organ Disease AND otitis media

Gene Set Enrichment

DO: Diseases Ontology Enrichment

PW: Pathway Ontology Enrichment

MP: Phenotype Ontology Enrichment

GO: Biological Process Enrichment

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Pathway Ontology Download Result Set

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Gene Enrichment

No of genes

p value

- The table in the enrichment results shows the list of terms over-represented in the annotations for the otitis media-related genes, the number of genes in the list annotated to that specific term or its children, uncorrected and Bonferroni-corrected p-values and odds ratios for each term.



RGD's Disease Portals provide consolidated views of pathways related to 15 disease categories

Select a species

Sensory Organ Disease A

Gene Set Enrichment

DO: Diseases Ontology Enrichment

GO: Cellular Component Enrichment

Pathway Ontology [Download Results](#)

Term	Annotated Genes	Ref Genes
interleukin-23 signaling pathway (PW:0000915)	8	35
proteoglycan signaling pathway (PW:0000657)	12	134
signaling pathway (PW:0000003)	45	1890
immune response pathway (PW:0000023)	13	175
innate immune response pathway (PW:0000234)	12	149
interleukin-27 signaling pathway (PW:0000916)	6	26
interleukin-12 family mediated signaling pathway (PW:0000913)	9	81
Interleukin mediated signaling pathway	14	234

Naalu

Term Annotat

interleukin-23 signaling pathway (PW:0000915)

proteoglycan signaling pathway (PW:0000657)

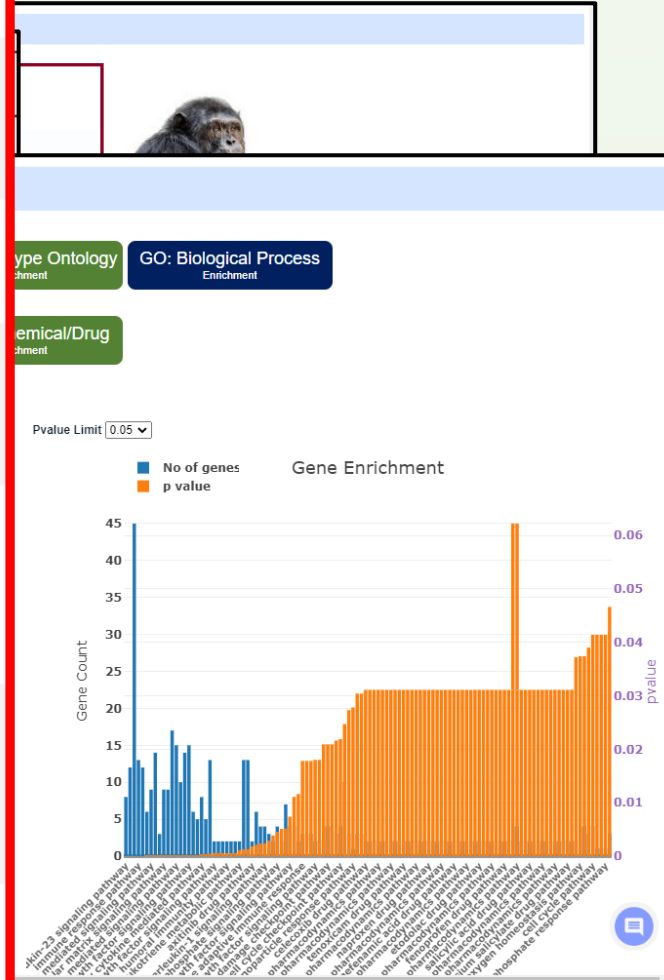
signaling pathway (PW:0000003)

immune response pathway (PW:0000023)

innate immune response pathway (PW:0000234)

interleukin-27 signaling pathway (PW:0000916)

interleukin-12 family mediated signaling pathway (PW:0000913)



- The table in the enrichment results shows the list of terms over-represented in the annotations for the otitis media-related genes, the number of genes in the list annotated to that specific term or its children, uncorrected and Bonferroni-corrected p-values and odds ratios for each term.
- Not surprisingly, the most enriched terms in the pathway ontology for the otitis media-related genes are interleukin signaling and immune-related pathways.



RGD's Disease Portals provide consolidated views of data related to 15 disease categories

Select a species

Sensory Organ Disease AND otitis media

Gene Set Enrichment

DO: Diseases Ontology Enrichment

PW: Pathway Ontology Enrichment

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Pathway Ontology [Download Result Set](#)

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Naqlu

Gene Enrichment


Pvalue Limit 0.05

- The table in the enrichment results shows the list of terms over-represented in the annotations for the otitis media-related genes, the number of genes in the list annotated to that specific term or its children, uncorrected and Bonferroni-corrected p-values and odds ratios for each term.
- Not surprisingly, the most enriched terms in the pathway ontology for the otitis media-related genes are interleukin signaling and immune-related pathways.
- The graph shows the number of genes in blue and p-values in orange for each term in the list.



RGD's JBrowse genome browser shows genes and RNA-Seq data in their genomic context

Sensory Organ Disease AND otitis media

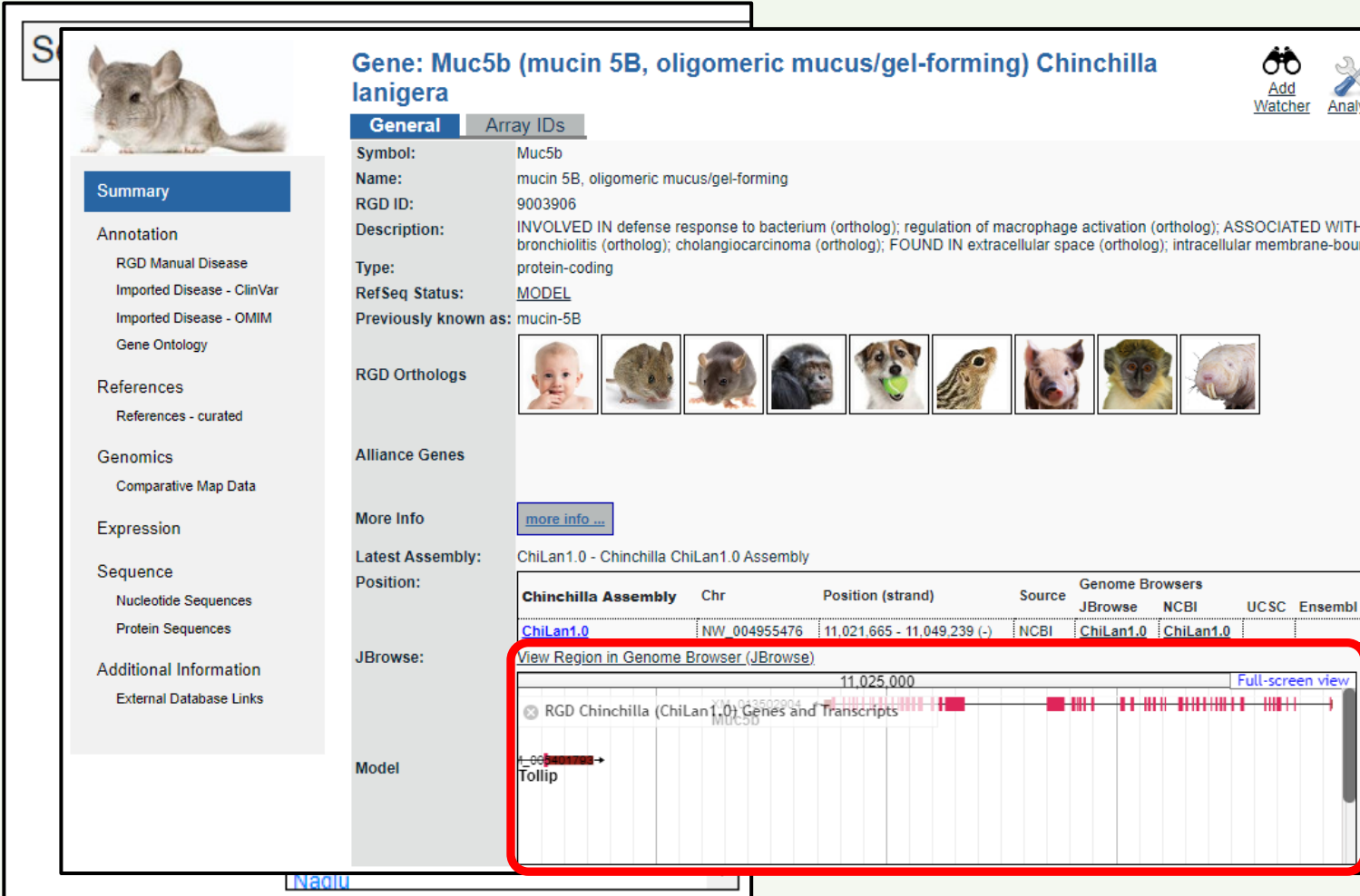
Genes: 98 

LOC102004444
LOC102005867
LOC102021597
LOC102021956
Lcp1
Lmna
Lta4h
Ltb4r
Ltc4s
Ltf
Mapk8
Mbl2
Mecom
Mmp2
Mmp9
Muc1
Muc4
Muc5ac
Muc5b ←
Naalu

- Each gene in the disease portal list links to the respective gene report page, so clicking "Muc5b" takes you to the chinchilla mucin 5b gene page.




RGD's JBrowse genome browser shows genes and RNA-Seq data in their genomic context



Gene: Muc5b (mucin 5B, oligomeric mucus/gel-forming) Chinchilla lanigera

General | Array IDs

Symbol: Muc5b
Name: mucin 5B, oligomeric mucus/gel-forming
RGD ID: 9003906
Description: INVOLVED IN defense response to bacterium (ortholog); regulation of macrophage activation (ortholog); ASSOCIATED WITH bronchiolitis (ortholog); cholangiocarcinoma (ortholog); FOUND IN extracellular space (ortholog); intracellular membrane-bound protein-coding
Type: protein-coding
RefSeq Status: MODEL
Previously known as: mucin-5B

RGD Orthologs: 

Alliance Genes

More Info: [more info ...](#)

Latest Assembly: ChiLan1.0 - Chinchilla ChiLan1.0 Assembly

Position:

Chinchilla Assembly	Chr	Position (strand)	Source	Genome Browsers		
				JBrowse	NCBI	UCSC
ChiLan1.0	NW_004955476	11,021,665 - 11,049,239 (-)	NCBI	ChiLan1.0	ChiLan1.0	

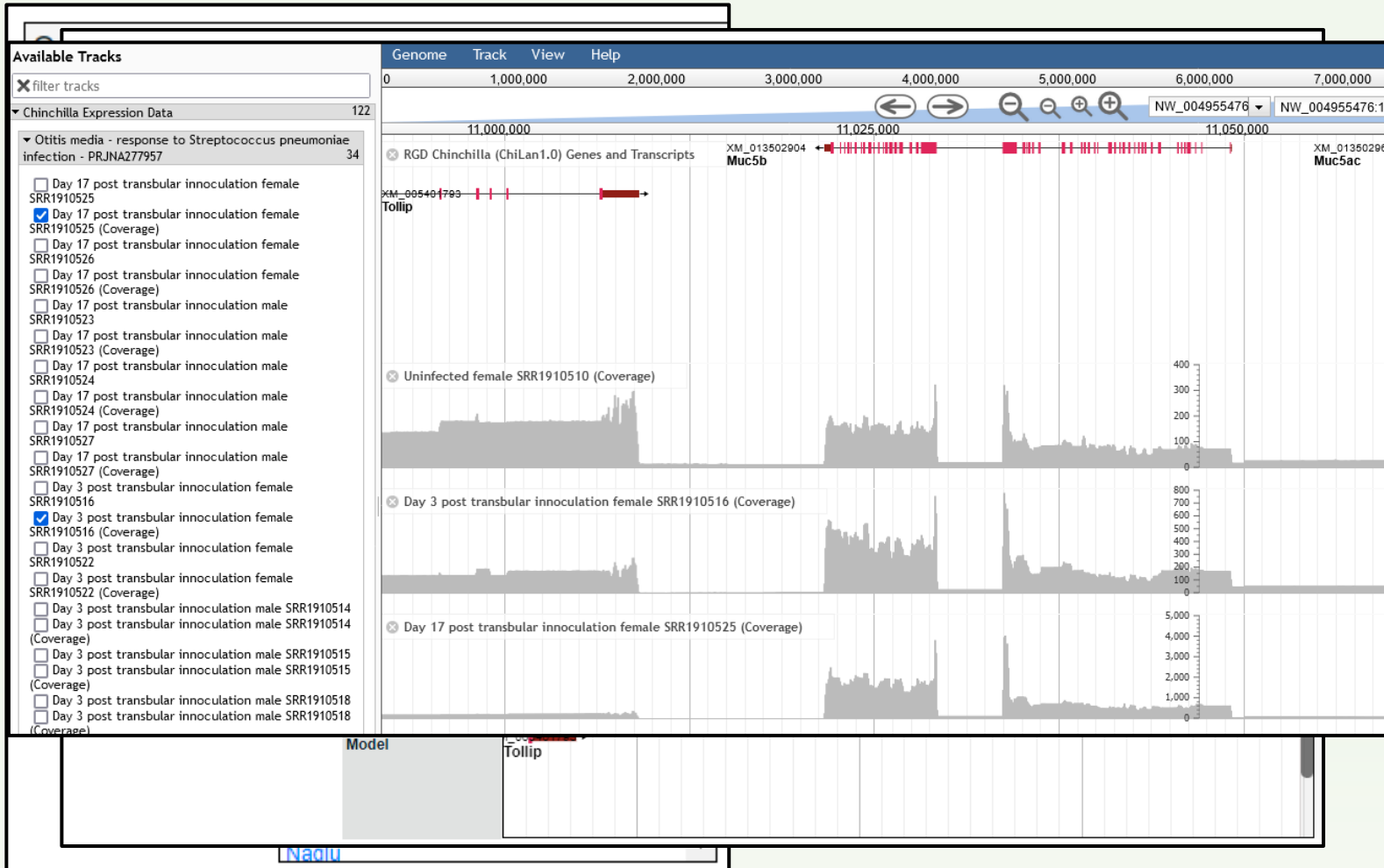
JBrowse: [View Region in Genome Browser \(JBrowse\)](#)

Model: Tollip

- Each gene in the disease portal list links to the respective gene report page, so clicking "Muc5b" takes you to the chinchilla mucin 5b gene page.
- The Muc5b gene page in turn links to that gene's position in RGD's chinchilla JBrowse genome browser.



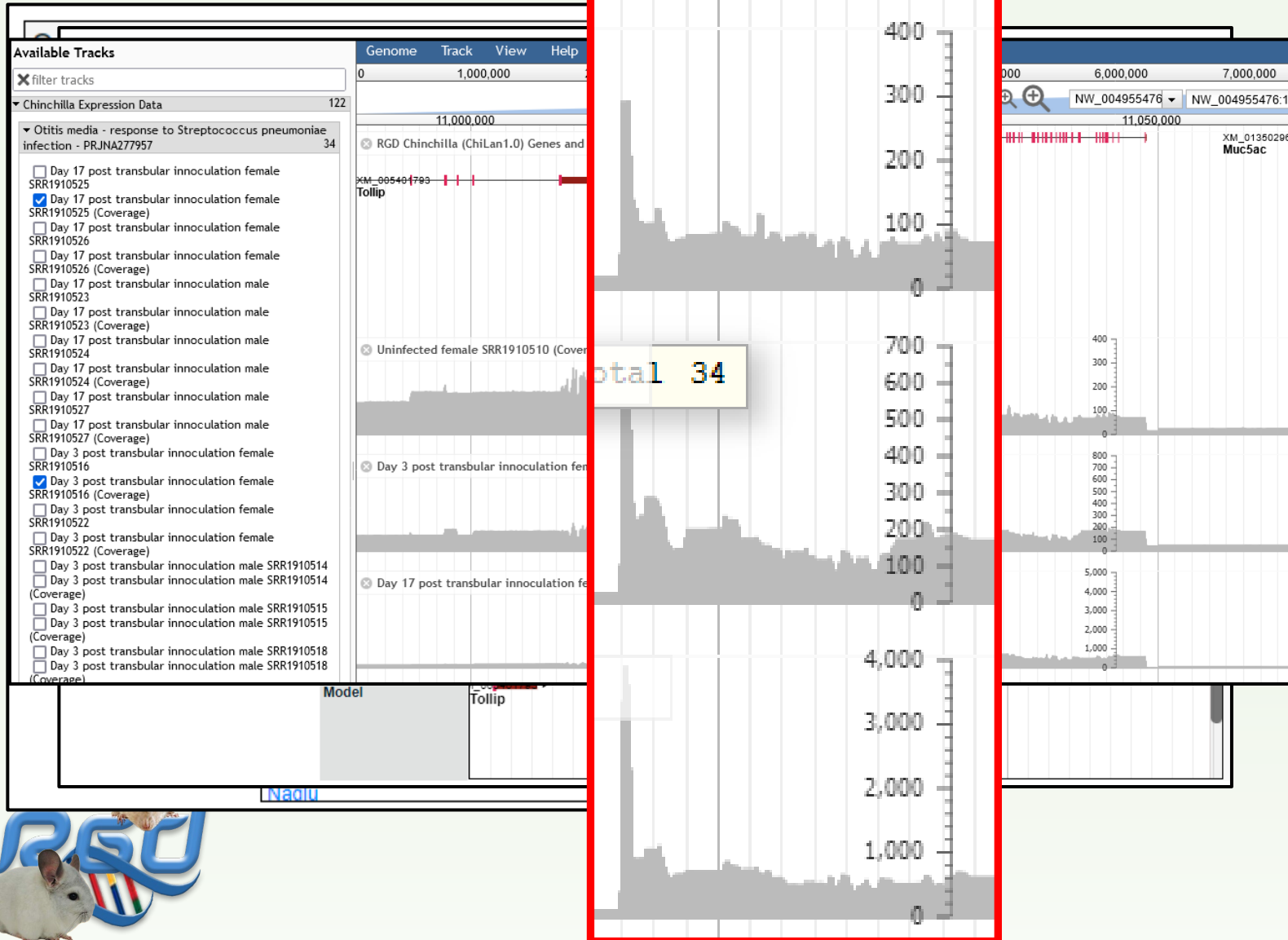
RGD's JBrowse genome browser shows genes and RNA-Seq data in their genomic context



- RGD has loaded genes from NCBI and Ensembl and RNA-Seq BAM alignments and coverage tracks from two projects:
 - Uninfected and infected middle ear mucosa from the Medical College of Wisconsin
 - 14 tissues from samples provided by Dr. Lauren Bakaletz's group at the Research Institute at Nationwide Children's Hospital



RGD's JBrowse genome browser shows genes and RNA-Seq data in their genomic context



- RGD has loaded genes from NCBI and Ensembl and RNA-Seq BAM alignments and coverage tracks from two projects:
 - Uninfected and infected middle ear mucosa from the Medical College of Wisconsin
 - 14 tissues from samples provided by Dr. Lauren Bakaletz's group at the Research Institute at Nationwide Children's Hospital
- Muc5b increases in expression from uninfected (top graph) through 3 and 17 days of Strep infection.
- Note that although the patterns are similar, the scales are different.



RGD's JBrowse genome browser shows genes and RNA-Seq data in their genomic context

Tollip

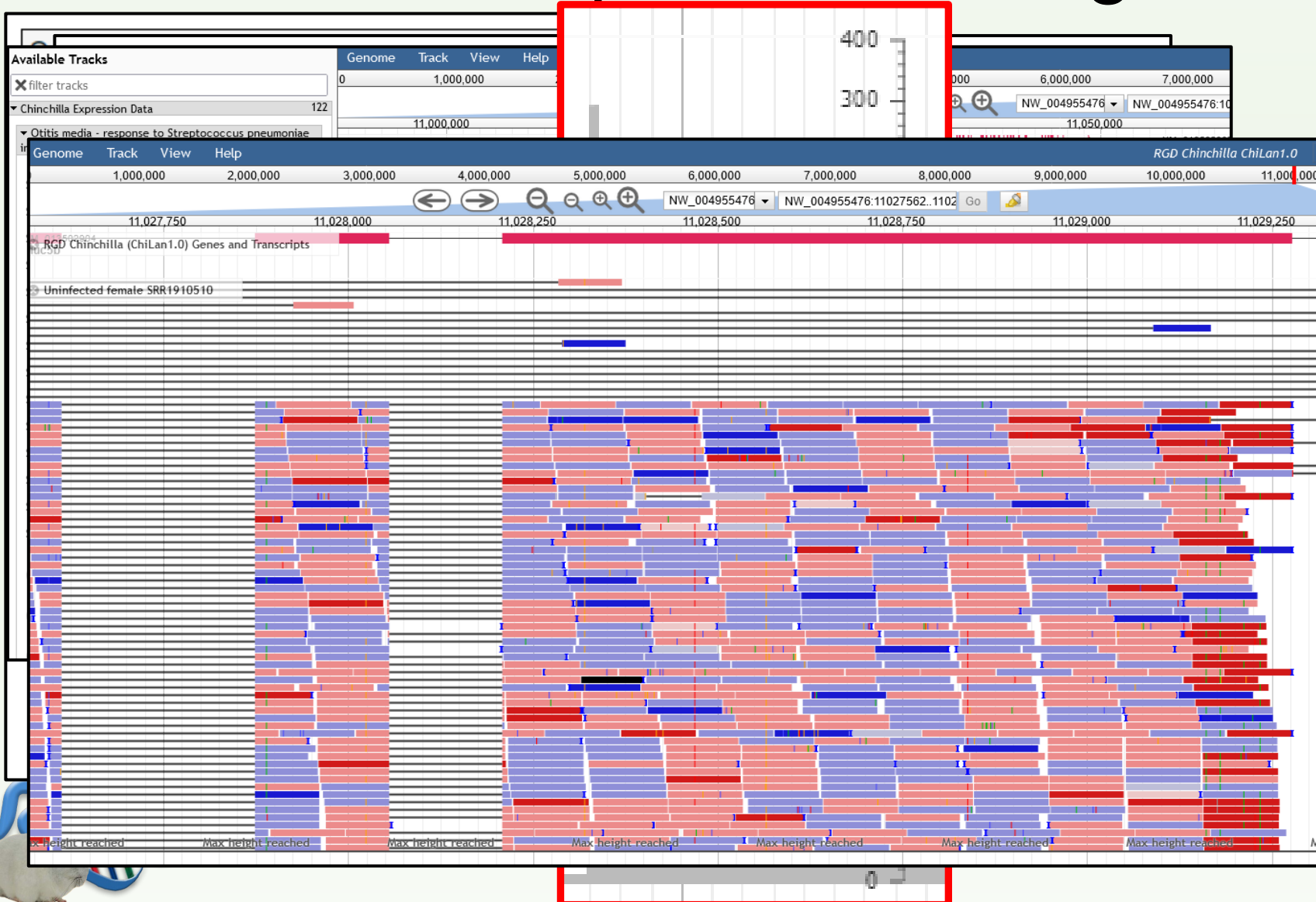
Muc5b



- Muc5b shows tissue-specific expression. As shown here, there is strong expression in the nasopharyngeal mucosa, lower expression in trachea, and little or none in tubotympanal mucosa, tympanic membrane, liver, kidney, ovaries or testes.
- Again, although the coverage patterns are similar, the levels are an order of magnitude different between nasopharyngeal mucosa and trachea



RGD's JBrowse genome browser shows genes and RNA-Seq data in their genomic context



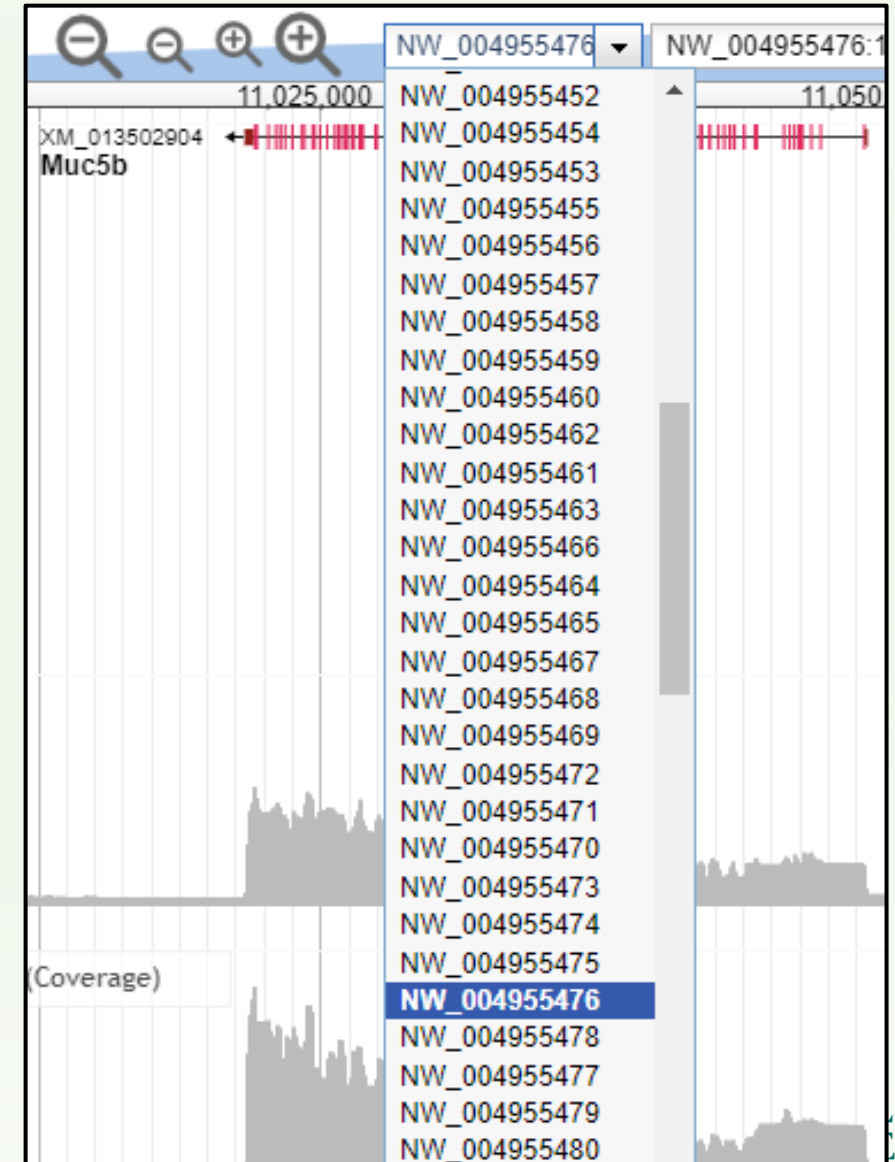
- This display shows the RNA-Seq BAM alignments for two exons of Muc5b from one of the uninfected middle ear mucosa samples.
- The RNA-Seq data from these studies was used to improve the gene model predictions during the genome annotation process by NCBI and Ensembl.

Conclusions and Questions for the research community

- This brief overview is only a subset of the rich set of data and tools that RGD provides for both clinical and translational researchers.
- If you have questions or are interested in more information, I am available to answer questions or give a more complete or targeted tour of what RGD has to offer.
- Contact me at jrsmith@mcw.edu, or through the "Contact" link at the top or the feedback link in the bottom right of most RGD pages.
- The Chinchilla genome is only assembled to the point of scaffolds. While this is sufficient for some applications, for true comparative genomics, phylogeny, etc. chromosome-level assembly would be required.

Is there interest in improving the chinchilla genome assembly?

Would groups be willing to do additional sequencing to support chromosome-level assembly?



Thank you!

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and the researchers who contribute data and who faithfully use our website and data!

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