

# Enhanced Hybrid Rat Diversity Panel (HRDP) resources at RGD

Mary Kaldunski

20th Annual Meeting of the Complex Trait Community | Rat Genome &  
Models



<https://rgd.mcw.edu>

# The Hybrid Rat Diversity Panel

- Includes a broad selection of classical inbred strains and two recombinant inbred panels
- Is designed to maximize genetic and phenotypic diversity
- Also maximizes the power to detect and fine-map genetic loci associated with complex traits
- At MCW is a funded program to rederive, sequence, maintain, and **distribute** the HRDP strains, including available Heterogeneous Stock (HS) founder strains



Contact us: <https://rgd.mcw.edu/rgdweb/contact/contactus.html>



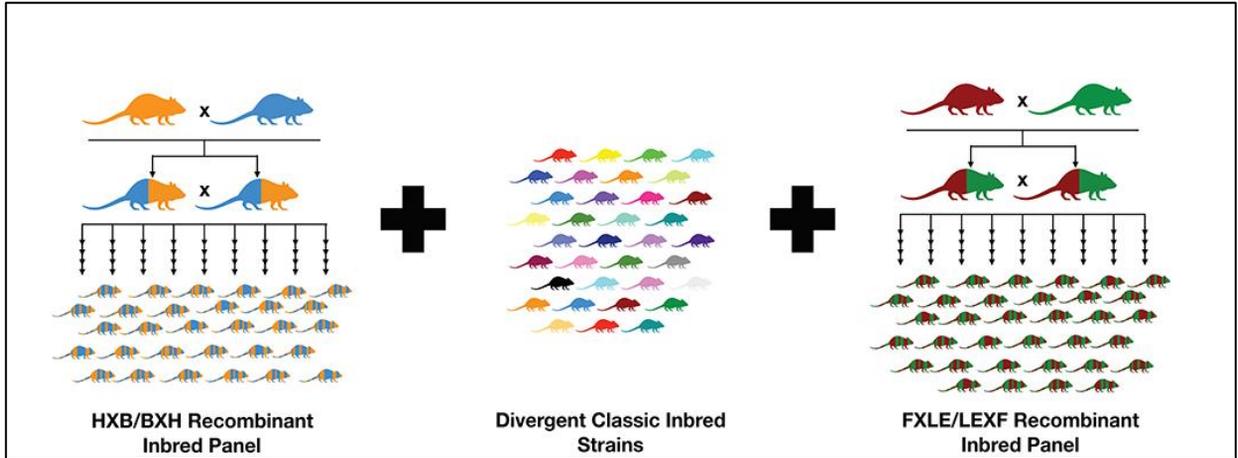
# The Hybrid Rat Diversity Panel

The screenshot displays the RGD (Rat Genome Database) homepage. The navigation menu on the left includes 'Phenotypes & Models', which is highlighted with a red box and a red arrow pointing to the 'Phenotypes & Models' dropdown menu. This dropdown menu also has 'Phenotypes & Models' highlighted with a red box. The main content area features a 'Phenotypes and Models' section with a bar chart showing various data points, also highlighted with a red box. The chart displays a distribution of values across different categories, with a y-axis ranging from 350 to 450. The chart is titled 'Phenotypes and Models' and is part of a larger dashboard of tools and resources.

The HRDP information is organized on a portal page which is accessible from either the Phenotypes & Models dropdown menu, or from the Phenotypes and Models option on the RGD homepage.



# The Hybrid Rat Diversity Panel



The HRDP portal page provides a description of the construction and format of the panel. Image courtesy of Dr. Saba.



# The Hybrid Rat Diversity Panel

Divergent Classic Inbred Strains

Strain	RGD ID	Strain	RGD ID	Strain	RGD ID
ACI/EurMcwI* †	7364991	HTX/Kyo	1302600	PD/Cub	728161
B0X/NemOda	2304285	LE/Stm*	629485	PVG/Seac*	1302722
BN/NHsdMcwI* †	61458	LEW/Cit*	737932	RCS/LavRrc	1358258
BN-Lx/Cub*	61117	LH/MavRnc*	60990	SBH/Ygl	631572
BUF/Mna* †	61118	LN/MavRnc*	68077	SBN/Ygl	631573
COP/Cit	1358153	LM/MavRnc*	61015	SHR/Olapcv*	631648
DA/OlaHsd*	734475	LOU/MNCR	9999143	SHRSP/ANCI†	2311051
F344/Du/Cit* †	734478	MS20/N* †	10024	SRJ/Hsd*	1582184
F344/Stm*	1302686	MNS/N	2307319	SSJ/HsdMcwI*	61499
FH/EurMcwI*	629509	MRN* †	70449	WAG/RJCH† †	2312498
GK/FanMcwI*	10395297	MWF/Hsd*	737986	WKY/NCr† †	1358112

SHR and BN Lx derived RI strains

Strain	RGD ID	Strain	RGD ID
B0K1/pcv RI panel	63998	H0B1/pcv RI panel	63999
B0K2/CubMcwI*	146735530	H0B1/pcv	2307064
B0K3/CubMcwI*	146735533	H0B-1-43/pcv	68049
B0K5/Cub	2307115	H0B2/pcvMcwI*	146735520
B0K6/Cub	2307136	H0B3/pcv	2307079
B0K8/Cub	2307126	H0B4/pcvMcwI*	146735518
B0K9/Cub	2307129	H0B5/pcv	2307099
B0K10/Cub	2307124	H0B7/pcv	2307088
B0K11/Cub	2307127	H0B10/pcvMcwI*	38549351
B0K12-1/Cub	2307130	H0B13/pcv	2307091
B0K12-2/Cub	2307133	H0B14/pcv	2307092
B0K13/Cub	2307123	H0B15/pcv	2307095
		H0B17/pcv	2307085
		H0B18/pcv	2307082
		H0B20/pcvMcwI*	146735521
		H0B21/pcv	2307087
		H0B22/pcv	2307088
		H0B23/pcv	2307093
		H0B24/pcv	2307084
		H0B25/pcv	2307098
		H0B27/pcv	2307078
		H0B29/pcv	2307089
		H0B31/pcvMcwI*	146735519

Long Evans and F344 derived RI strains

Strain	RGD ID	Strain	RGD ID
FXLE/Stm RI panel	7246374	LEXF-Stm RI panel	629589
FXLE12/Stm	1302602	LEXF1A/Stm*	1302641
FXLE13/Stm	1302685	LEXF1B/Stm	414043
FXLE14/Stm	1302615	LEXF1C/Stm*	1302696
FXLE15/Stm	1302673	LEXF1D/Stm	4140472
FXLE16/Stm*	1302619	LEXF2A/Stm	1302695
FXLE17/Stm	1302708	LEXF2B/Stm*	1302719
FXLE18/Stm*	1302682	LEXF2C/Stm	1302649
FXLE19/Stm	1302690	LEXF2D/Stm	7489321
FXLE20/Stm	1302633	LEXF3/Stm*	1302707
FXLE21/Stm	1302607	LEXF4/Stm*	1302684
FXLE22/Stm	1302663	LEXF5/Stm	1302723
FXLE23/Stm	1302601	LEXF6A/Stm	4140499
FXLE24/Stm	1302611	LEXF6B/Stm	1302617
FXLE25/Stm	1302603	LEXF7A/Stm	1302652
FXLE26/Stm	1302598	LEXF7B/Stm	1302649
		LEXF7C/Stm	1302687
		LEXF8A/Stm	1302653
		LEXF8B/Stm	7489322
		LEXF9C/Stm	4140498
		LEXF8D/Stm	1302699
		LEXF9/Stm	1302618
		LEXF10A/StmMcwI*	146735517
		LEXF10B/Stm	1302619
		LEXF10C/Stm	1302612
		LEXF11/Stm*	1302638

The original strains are listed on the portal page and noted (\*) for those that have been sequenced to date and loaded to Variant Visualizer (VV). Almost twice as many strains have been sequenced and will be available in VV soon. VCF files are available for download for all the sequenced strains.



# The Hybrid Rat Diversity Panel



[Strain Registration](#)

**General**

Strain: BN/NHsdMcow

Symbol: BN/NHsdMcow  
 Strain: BN  
 Substrain: N-HsdMcow  
 RGD ID: 61498  
 Citation ID: RRID:RGD\_61498  
 Ontology ID: [RS\\_0000145](#)  
 Previously known as: MDC-03-05, BN/Sa/NHsdMcow, BN/Sa/NHsdMow, Eve, Brown Norway, BN/3N-HsdMcow  
 Type: inbred  
 Source: PhysGen  
 Origin: Inbred from a single pair of SaN line rats obtained from Harlan Sprague Dawley (Alabama colony). Maintained at the Medical College of Wisconsin since 1995. To confirm homozygosity, the strain was tested with 200 microsatellite markers (genome-wide scan at 20cM) all of which were homozygous for all regions tested (Cowley et al. 2000. Physiol. Genomics. 2:107-115)  
 Coat Color: Brown  
 Inbred Generations: F21, at MCW since 1995  
 Last Known Status: Live Animals, Cryorecovery

**Annotation** [Click to see Annotation Summary View](#)

---

**RGD Manual Disease Annotations** [Click to see Annotation Summary View](#)  
 Only show annotations with direct experimental evidence (0 objects hidden)

Term	Qualifier	Evidence	With	Reference	Notes	Source	GI
<a href="#">Albuminuria</a>	MODEL: control	IAGP		<a href="#">1367409</a>	compared to FHJ and congenic	RGD	
<a href="#">glomerulosclerosis</a>	MODEL: control	IAGP	XCO:0000022	<a href="#">2300226</a>	compared to male SS/JHsdMcow	RGD	
<a href="#">hypertension</a>	MODEL: control	IAGP	XCO:0000022	<a href="#">727992</a>	compared to SS/JHsdMcow	RGD	
<a href="#">proteinuria</a>	MODEL: control	IAGP		<a href="#">1367409</a>	compared to FHJ and congenic	RGD	
<a href="#">Urinary Calculi</a>	susceptibility	IAGP	XCO:0000049	<a href="#">2313354</a>	compared to SS/JHsdMcow	RGD	

---

**Phenotype Annotations** [Click to see Annotation Summary View](#)

*Mammalian Phenotype*

1 to 18 of 18 rows | 20 | Search table

Term	Qualifier	Evidence	With	Reference	Notes	Source	Original Reference(s)
<a href="#">decreased body weight</a>		IAGP		<a href="#">2290181</a>	compared to LH/Mav	RGD	
<a href="#">decreased circulating cholesterol level</a>		IAGP		<a href="#">2290181</a>		RGD	
<a href="#">decreased incidence of tumors by chemical induction</a>	induced	IAGP	XCO:0000090	<a href="#">2301188</a>	compared to SS/JHsdMcow	RGD	
<a href="#">decreased lactate dehydrogenase</a>	induced	IAGP	XCO:0000484,XCO:0000010	<a href="#">1342462</a>	compared to SS/JHsdMcow	RGD	

Each strain has an RGD ID that links to a strain report page which contains annotations, references, QTLs, and further links to RGD tools such as Variant Visualizer (VV) and PhenoMiner.



# The Hybrid Rat Diversity Panel

Some of the information available at RGD for the HRDP strains includes:

- 228 curated references with RGDIDs, for disease and MP annotations
- 101 qualitative disease annotations for 41 HRDP strains
- 226 mammalian phenotype annotations for 45 HRDP strains
- 108 studies curated in PhenoMiner that include 65 HRDP strains
- 10,680 quantitative phenotype records for those studies
- 13,904,382 variants loaded in VV for 41 HRDP strains to date

HS Founder Strain	HRDP Best Match	Genetic Similarity
<a href="#">ACI/N</a>	<a href="#">ACI/EurMcwi</a>	0.997
<a href="#">BN/SSuN</a>	<a href="#">BN/NHsdMcwi</a>	0.999
<a href="#">BUF/N</a>	<a href="#">BUF/Mna</a>	0.736
<a href="#">F344/N</a>	<a href="#">F344/DuCrI</a>	0.995
<a href="#">M520/N</a>	<a href="#">M520/NRrrcMcwi</a>	0.997
<a href="#">MR/N</a>	<a href="#">MR/NRrrc</a>	0.998
<a href="#">WKY/N</a>	<a href="#">WKY/NHsd</a>	0.997
	<a href="#">WKY/NCrI</a>	0.971
<a href="#">WN/N</a>	<a href="#">WAG/RijCrI</a>	0.720

The genetic similarity between Heterogeneous Stock (HS) founder strains and the best match strain in the HRDP has been quantified (Drs. Chen, Palmer and colleagues).



# The Hybrid Rat Diversity Panel

**The Hybrid Rat Diversity Panel**

[Contact HRDP](#)

The diagram illustrates the composition of the Hybrid Rat Diversity Panel (HRDP). It consists of three main components: 1) HXB/BXH Recombinant Inbred Panel (30 strains), derived from a cross of a brown rat and a blue rat, followed by inbreeding. 2) Divergent Classic Inbred Strains (35 strains), represented by a collection of various colored rats. 3) FXLE/LEXF Recombinant Inbred Panel (34 strains), derived from a cross of a red rat and a green rat, followed by inbreeding. The three panels are combined to form the HRDP.

The Hybrid Rat Diversity Panel (HRDP) is a panel of 96 inbred rat strains carefully chosen to maximize power to detect specific genetic loci associated with a complex trait and to maximize the genetic diversity of inbred strains of rat and two panels of recombinant inbred rat strains, the FXLE/LEXF (33 strains) from Japan and the HXB/BXH (30 strains) from the Czech Republic. Recombinant inbred strains are derived from two inbred parental rat strains. The two parental strains are crossed to produce F1 pups. F1 pups are subsequently intercrossed to create an F2 generation. These genetically unique F2 genotypes are brother-sister mated for at least 20 generations to fix their genomes. The two RI panels used in the HRDP have been well characterized through studies focused on seizures, epilepsy, lymphoma and leukemia syndrome, and alcohol consumption.

The HXB/BXH recombinant inbred strains were derived from the Spontaneously Hypertensive Rat (SHR/Ola<sup>pcv</sup>) and the normotensive BN-Lx (BN-Lx/Cub), a Brown Norway congenic rat strain with polygenic recombinant inbred strains were derived from the Long Evans strain (LE/Stm) and the Fischer F344 strain (F344/Stm).

**Notes:**

- In the tables below, an asterisk (\*) designates that the tagged strain has been sequenced. The VCF files for these (48 strains in total) are available for download. These data have been mapped to both Rn6 and Rn7 and can be accessed here.
- The double dagger icon (‡) designates the strains that have been found by whole genome sequence comparison to be the most genetically similar to the Heterogeneous Stock (HS) Founder Strains. This data is courtesy of Dr. Abraham Palmer (University of California, San Diego) and Dr. Hao Chen (University of Tennessee Health Sciences Center). For more information about the HS Founders and the HRDP strains that are similar to them, [click here](#).
- The inbred Wistar WNN strain is no longer available and no closely related substrains are included in the HRDP panel. However, DNA from a frozen tissue sample from the original Nix strain has been sequenced and that sequence compared to WGS from the HRDP strains. Of the strains currently available from the HRDP, the one found in this analysis to be most closely related to WNN is WAC/BIC's with a sequence similarity of approximately 26%.

[Click here to use RGD's Variant Visualizer tool to explore variants in HRDP strains mapped against the mRatBN7.2 reference](#) (all HRDP strains pre-selected) or [click here to begin your own query in Variant Visualizer](#).

Quantitative phenotype measurements are available for many of the HRDP strains. [Click here to explore this data in RGD's PhenoMiner tool](#). Select a measurement or a phenotype category on the resulting page to view a graph of the data.

The strains included in the HRDP panel are:

The portal provides an email/contact link to HRDP investigators for discussions of strains available for distribution

[Click here to use RGD's Variant Visualizer tool to explore variants in HRDP strains mapped against the mRatBN7.2 reference](#) (all HRDP strains pre-selected) or [click here to begin your own query in Variant Visualizer](#).

Quantitative phenotype measurements are available for many of the HRDP strains. [Click here to explore this data in RGD's PhenoMiner tool](#). Select a measurement or a phenotype category on the resulting page to view a graph of the data.

The HRDP portal provides links to Variant Visualizer and PhenoMiner for HRDP specific data. The advantage of these links is that available strains are preselected in the tools.



# The Hybrid Rat Diversity Panel

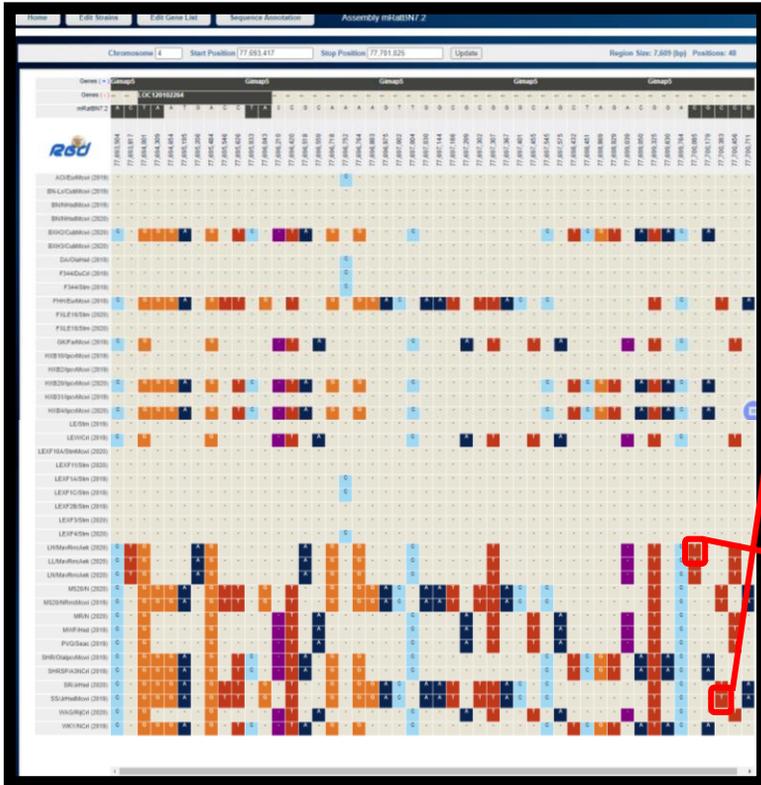
The screenshot shows the Variant Visualizer interface. At the top, there is a dropdown menu for 'Select an Assembly' set to 'mRatBN7.2 Assembly'. Below this are three buttons: 'Limit by Genomic Position', 'Search by Function', and 'Enter a Gene List' (highlighted in red). A red arrow points from the 'Enter a Gene List' button to a 'Gene Symbol List' dialog box. The dialog box contains the text 'Gimap5' and a 'Continue' button (also highlighted in red). The background of the interface shows a genomic track visualization.

The Variant Visualizer option from the HRDP portal page will open with available strains preselected. Enter a gene ID and click Continue to generate a display of variants for the input strains and gene(s).



# The Hybrid Rat Diversity Panel

Selecting a particular variant will open a Variant Details report.



**Variant Details**  
rs3320239973

Strain: SS:HerfMchI (2019)      Variant Type: smv  
 Assembly: mRatEN2      Related Variants: n/a  
 Position: Chromosome 4 - 77,700,383      Conservation: -1 (Not available)  
 Reference Nucleotide: C      Total Depts: 53  
 Variant Nucleotide: T      % Variant Reads: 100%  
 Location: CENIC      Total Alleles Read: 1  
 Zygosity: homozygous      VID: 145472427  
 Go to Variant Page

**Transcripts**

Gene Symbol: Gimap5  
 Accession: XM\_006236457  
 Location: EXON  
 Amino Acid Prediction: T to T (synonymous)  
 Amino Acid Position: 168

**Amino Acid Sequence**  
 (Calculated using NCBI transcript definition)

RDHDFEELSTTHDQVWVRLTQIDNLTSTQETVYVDSGLLTVLWVSDGVSATQICLRRPAPFSLRQGVV  
 TSHQENSTHSGFSLVVDTPPEFSLKQDQDQDQVLCVHGMHLLVTLQRYTVYDVAHWVWVGGFQWV  
 RYHVLVTHKEDLDESLEEFYTHGLDHLRLVQEGRRYCFAPKASGEGQQLAEHLVHLRQELQEWGFSFSDL  
 PWFYTVLQVGSYSEKPKYFLTKVQEVQKQRELEEGSHAWRLCRVTSLDVHAEVSLVLLVGLLTLLETHW  
 YDQNK\*

Gene Symbol: Gimap5  
 Accession: XM\_006236458  
 Location: EXON  
 Amino Acid Prediction: A to V (nonsynonymous)  
 Amino Acid Position: 61

**Amino Acid Sequence**  
 (Calculated using NCBI trans...)

RDHDFEELSTTHDQVWVRLTQIDNLTSTQETVYVDSGLLTVLWVSDGVSATQICLRRPAPFSLRQGVV  
 TSHQENSTHSGFSLVVDTPPEFSLKQDQDQDQVLCVHGMHLLVTLQRYTVYDVAHWVWVGGFQWV  
 RYHVLVTHKEDLDESLEEFYTHGLDHLRLVQEGRRYCFAPKASGEGQQLAEHLVHLRQELQEWGFSFSDL  
 PWFYTVLQVGSYSEKPKYFLTKVQEVQKQRELEEGSHAWRLCRVTSLDVHAEVSLVLLVGLLTLLETHW  
 YDQNK\*

**Polyphen Predictions**

Prediction	Stave	Effect	Site	Score	Score2	Diff	Number Observed	Structure	Protein ID	PDB ID	Inverted
probably damaging		alignment	NO	-1.215	-1.548	+0.633	47		NP_663713		+

**Amino Acid Sequence**  
 (Calculated using NCBI transcript definition)

RDHDFEELSTTHDQVWVRLTQIDNLTSTQETVYVDSGLLTVLWVSDGVSATQICLRRPAPFSLRQGVV  
 TSHQENSTHSGFSLVVDTPPEFSLKQDQDQDQVLCVHGMHLLVTLQRYTVYDVAHWVWVGGFQWV  
 RYHVLVTHKEDLDESLEEFYTHGLDHLRLVQEGRRYCFAPKASGEGQQLAEHLVHLRQELQEWGFSFSDL  
 PWFYTVLQVGSYSEKPKYFLTKVQEVQKQRELEEGSHAWRLCRVTSLDVHAEVSLVLLVGLLTLLETHW  
 YDQNK\*



# The Hybrid Rat Diversity Panel

**The Hybrid Rat Diversity Panel**

[Contact HRDP](#)

**HXB/BXH Recombinant Inbred Panel (30 strains)**      **Divergent Classic Inbred Strains (35 strains)**      **FXLE/LEXF Recombinant Inbred Panel (34 strains)**

The Hybrid Rat Diversity Panel (HRDP) is a panel of 99 inbred rat strains carefully chosen to maximize power to detect specific genetic loci associated with a complex trait and to maximize the genetic diversity among strains. The HRDP includes 33 genetically diverse inbred strains of rat and two panels of recombinant inbred rat strains, the FXLE/LEXF (33 strains) from Japan and the HXB/BXH (30 strains) from the Czech Republic. Recombinant inbred strains are panels of inbred strains derived from two inbred parental rat strains. The two parental strains are crossed to produce F1 pups. F1 pups are subsequently intercrossed to create an F2 generation. These genetically unique F2 generation rats are paired as founders and brother-sister mated for at least 20 generations to fix their genomes. The two RI panels used in the HRDP have been well characterized through studies focused on seizures, epilepsy, lymphoma and leukemia, blood pressure regulation, metabolic syndrome, and alcohol consumption.

The HXB/BXH recombinant inbred strains were derived from the Spontaneously Hypertensive Rat (SHR/Ola<sup>pcv</sup>) and the normotensive BN-Lx (BN-Lx/Dub), a Brown Norway congenic rat strain with polydactyly-luxate syndrome. The FXLE x LEXF recombinant inbred strains were derived from the Long Evans strain (LE/Stm) and the Fischer F344 strain (F344/Stm).

**Notes:**

- In the tables below, an asterisk (\*) designates that the tagged strain has been sequenced. The VCF files for these (48 strains in total) are available for download. These data have been mapped to both Rn6 and Rn7 and can be accessed here
- The double dagger (‡) designate the strains that have been found by whole genome sequence comparison to be the most genetically similar to the Heterogeneous Stock (HS) Founder Strains. This data is courtesy of Dr. Abraham Palmer (University of California, San Diego) and Dr. Hao Chen (University of Tennessee Health Sciences Center). For more information about the HS Founders and the HRDP strains that are similar to them, [click here](#)
- The inbred Wistar-Kyoto (WKY) strain is no longer available and no closely related substrains are included in the HRDP panel. However, DNA from a frozen tissue sample from the original RH strain has been sequenced and that sequence compared to WGS from the HRDP strains. Of the strains currently available from the HRDP, the one found in this analysis to be most closely related to WKY is WAG/RjCrl with a sequence similarity of approximately 70%.

[Click here to use RGD's Variant Visualizer tool to explore variants in HRDP strains mapped against the mRatBN7.2 reference \(all HRDP strains pre-selected\) or click here to begin your own query in Variant Visualizer.](#)

Quantitative phenotype measurements are available for many of the HRDP strains. [Click here to explore this data in RGD's PhenoMiner tool.](#) Select a measurement or a phenotype category on the resulting page to view a graph of the data.

The strains included in the HRDP panel are:

[Click here to use RGD's Variant Visualizer tool to explore variants in HRDP strains mapped against the mRatBN7.2 reference \(all HRDP strains pre-selected\) or click here to begin your own query in Variant Visualizer.](#)  
Quantitative phenotype measurements are available for many of the HRDP strains. [Click here to explore this data in RGD's PhenoMiner tool.](#) Select a measurement or a phenotype category on the resulting page to view a graph of the data.

Another option on the HRDP portal page was PhenoMiner.



# The Hybrid Rat Diversity Panel

PhenoMiner Database Results (7962 results)

How to display a graph

Strain	Phenotype	Conditions	Study	Experiment Name	Sex	Age	# of Animals	Formula	Average Type	Value	Units	SEM	SD	Method	Method Date	Method Duration	Post Insult Type	Post Insult Time Value	Post Insult Time Unit	Method Notes	Clinical Measurement Notes
SSJHsdMow	respiratory ventilation		PhysiGen Respiratory data	pulmonary ventilation trait	male	82 days-99 days	67			96.27	ml/min	2.83	23.16	flow flow air				0			
Prk1CrdMow	blood pH		PhysiGen Respiratory data	blood acidity/alkalinity balance trait	male	82 days-99 days	2			7.45	nat	0.02	0.03	automated blood gas				0			
SSJHsdMow	total volume		PhysiGen Respiratory data	pulmonary ventilation trait	female	82 days-99 days	7			0.37	ml	0.02	0.08	flow flow air				0			
SSJHsdMow	respiratory blood volume		PhysiGen Renal A data	arterial blood pressure trait	male	87 days-120 days	18			135.0	mmHg	5.04	21.4	noninvasive blood flow				0			

PhenoMiner will open with available strains preselected, and all available phenotype data for those strains shown in a downloadable report table. A graph cannot display phenotypes with varying units of measure, so left-side filters are available to make selections.



# The Hybrid Rat Diversity Panel

**Measurements**

**VASODILATION TRAIT (%)**

- hypoxia-induced blood vessel dilation expressed as percent reduction of the force generated in a pre-constricted blood vessel (108)
- acetylcholine-induced blood vessel dilation expressed as percent reduction of the force generated in a pre-constricted blood vessel (49)

**Strains**

BN

- BN/NHsdMcwi (12)

F344

- F344/DuCr1 (12)

FHH

- FHH/EurMcwi (27)

LEW

- LEW/Cr1 (12)

SS

- SS/JrHsdMcwi (33)

WKY

**Methods**

- wire myography using a Digi-Med tissue force analysis system with force

Phenominer Database Results (108 results) 
[Edit Query](#) [New Query](#) [Download all records](#) [Download table view records](#)

Remove Filters: ✖ hypoxia-induced blood vessel dilation expressed as percent reduction of the force generated in a pre-constricted blood vessel ✖

Colored By: Condition 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
FHH/EurMcwi	hypoxia-induced blood vessel	phenylephrine (1 umol/l) then	PhysGen Vascular data	vasodilation trait	male	70 days-84 days	5	24.6	%	3.67	8.2	<a href="#">Download Values</a>	wire myography using a		0	<a href="#">View</a> <a href="#">Edit</a> <a href="#">Share</a> <a href="#">Print</a> <a href="#">Download</a> <a href="#">Close</a> <a href="#">Help</a> <a href="#">Feedback</a> <a href="#">Log Out</a> <a href="#">Home</a> <a href="#">My Profile</a> <a href="#">My Strains</a> <a href="#">My Methods</a> <a href="#">My Reports</a> <a href="#">My Alerts</a> <a href="#">My Favorites</a> <a href="#">My Recent</a> <a href="#">My History</a> <a href="#">My Settings</a> <a href="#">My Account</a> <a href="#">My Profile</a> <a href="#">My Strains</a> <a href="#">My Methods</a> <a href="#">My Reports</a> <a href="#">My Alerts</a> <a href="#">My Favorites</a> <a href="#">My Recent</a> <a href="#">My History</a> <a href="#">My Settings</a> <a href="#">My Account</a>

For example, selecting the very first trait available in the list limits the data to a single % unit of measure, and now the graph can display. Alternatively one could select Edit Query to open the data selection page.



# The Hybrid Rat Diversity Panel

**PhenoMiner Database** Rat Phenominer  Chinchilla Phenominer  [Clear](#)

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

### Rat Strains

Search for data related to one or more rat strains.

- ACJ/EurMowj(8)
- BN-Lx/CuK(24)
- BN/NHsdMowj(1027)
- BUF/Mna(68)
- COP/CrCh(7)
- DA/OlaHsd(31)
- F344/DuCr(567)
- F344/Stm(130)
- FHM/EurMowj(1657)
- FXLE12/Stm(66)

### Clinical Measurements

Query by clinical measurement

### Measurement Methods

Filter results by Measurement method

### Experimental Conditions

Filter results by condition

[Generate Report](#)

**Clinical Measurement Selection**

Ex: heart rate, blood cell count

- BAY 60-4562-induced blood vessel dilation expressed as percent reduction of the force generated in a pre-constricted blood vessel(2)
- FAP/GG metabolin-surface area product(35)
- GS/2181236A-induced blood vessel dilation expressed as percent reduction of the force generated in a pre-constricted blood vessel(2)
- abdominal fat pad weight(1)
- absolute change in blood pH(66)
- absolute change in body temperature(69)
- absolute change in diastolic blood pressure(6)
- absolute change in heart rate(262)
- absolute change in hematocrit(2)
- absolute change in mean arterial blood pressure(273)
- absolute change in partial pressure of blood carbon dioxide(66)
- absolute change in partial pressure of blood oxygen(66)
- absolute change in plasma renin activity level(20)
- absolute change in systolic blood pressure(26)

- blood measurement(3544)
- body morphological measurement(1350)
- body movement/balance measurement(18)
- body temperature(247)
- cardiovascular measurement(3265)
- cell measurement(1036)
- chemical response/sensitivity measurement(427)
- consumption measurement(22)
- disease population measurement(58)
- disease process measurement(42)
- endocrine/exocrine system measurement(4)
- immune system measurement(621)
- liver/biliary measurement(81)
- mortality/survival measurement(8)
- musculoskeletal system measurement(21)

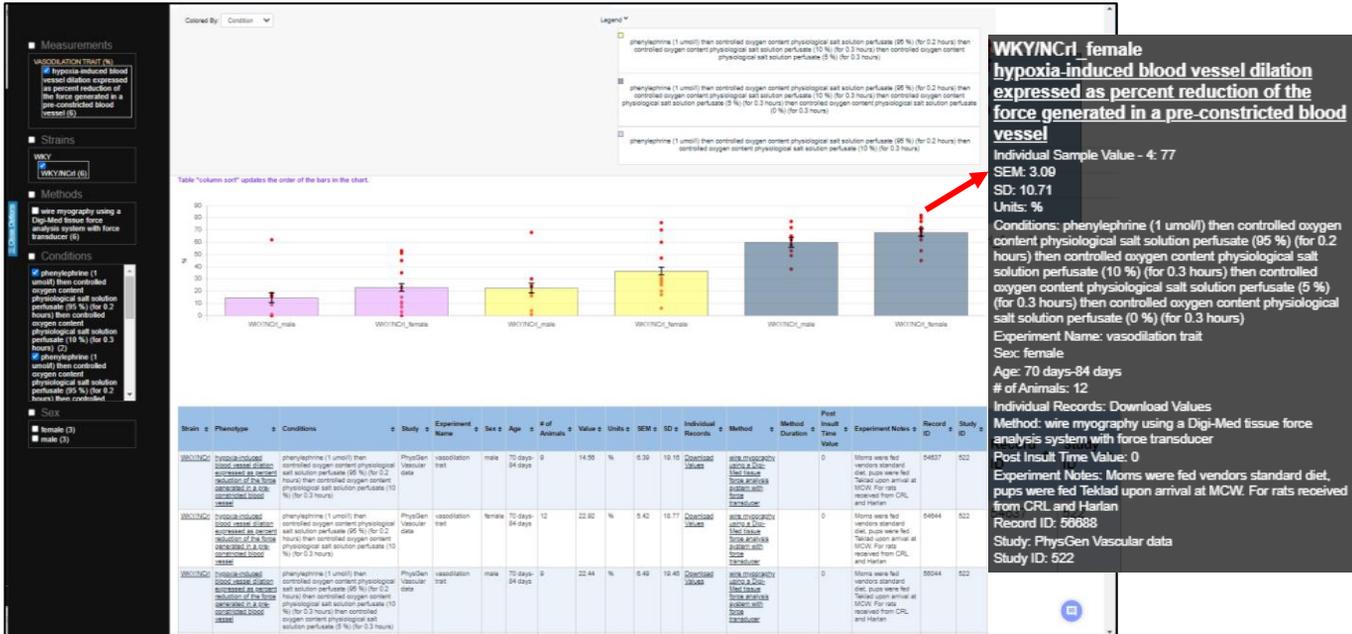
Edit Query will open the user interface for data selection and allow options for tailoring the list of strains, clinical measurements or other parameters. The Generate Report button will return the user to the data interface page with the table.



Contact us: <https://rgd.mcw.edu/rgdweb/contact/contactus.html>



# The Hybrid Rat Diversity Panel



On the graph display, composite data is shown as the bars and individual rat data is shown as red datapoints. Both data types are downloadable. Hovering over a bar or individual datapoint will display all the parameters for that data value.





# The Hybrid Rat Diversity Panel

- Has a wealth of data available at RGD.
- The HRDP portal page under Phenotypes and Models holds the lists of strains with links to strain report pages and tools.
- Strain report pages have curated and imported data.
- Variant Visualizer is loaded with the sequencing data for an increasing number of HRDP strains.
- PhenoMiner has data curated from literature, and uploaded from investigators, for a number of the HRDP strains, particularly the inbred strains.



Contact us: <https://rgd.mcw.edu/rgdweb/contact/contactus.html>



# Acknowledgments

## Rat Genome Database

### Principal Investigator

Anne Kwitek, PhD

### Co-Investigator

Mindy Dwinell, PhD

### Project Manager

Jennifer Smith, MSc

### Research Scientists and

### Curators

Wendy Demos, MSc

Tom Hayman, PhD

Mary Kaldunski, BSc

Stan Laulederkind, PhD

Monika Tutaj, PhD

Mahima VEDI, PhD

Shur-Jen Wang, PhD

### Bioinformatics

### Manager

Jeff De Pons, BSc

### Developers

Adam Gibson, BSc

Akhilnand Kundurthi,

MSc

Logan Lamers, BA

Jyothi Thota, MSc

Marek Tutaj, MSc

### Database Administrator

Stacy Zacher, MSc

### Systems Administrator

Kent Brodie, MSMI

## Funding

RGD is grateful for funding support from the National Heart, Lung, and Blood Institute (NHLBI; R01HL064541), and from the National Human Genome Research Institute (NHGRI) as part of the Alliance of Genome Resources (U24HG010859). The HRDP is funded by NIH Office of the Director (R24OD024617).

**We also thank the researchers who use our website and data!**

## Hybrid Rat Diversity Program

### Principal Investigator

Mindy Dwinell, PhD

### Co-Investigators

Anne Kwitek, PhD

Aron Geurts, PhD

### HRDP Team

Akiko Takizawa, PhD

Rebecca Schilling

Lynn Malloy

Monika Tutaj, PhD

Wendy Demos, MS

# Thank you



GLOBAL  
CORE  
BIODATA  
RESOURCE

