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ENVIGO

# North America Product Guide

Research Models and Services

Effective October 1, 2021

# Positive discovery

Welcome to a world in which every research model is designed to enhance a life – a world in which animal welfare is of paramount importance and our customers are at the heart of everything we do. Working together with our customers, Envigo is contributing to a world in which human lives are improved and scientific knowledge is advanced on a daily basis.

Discover your own positive outcomes at [envigo.com](https://envigo.com) today.

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\* available from EU

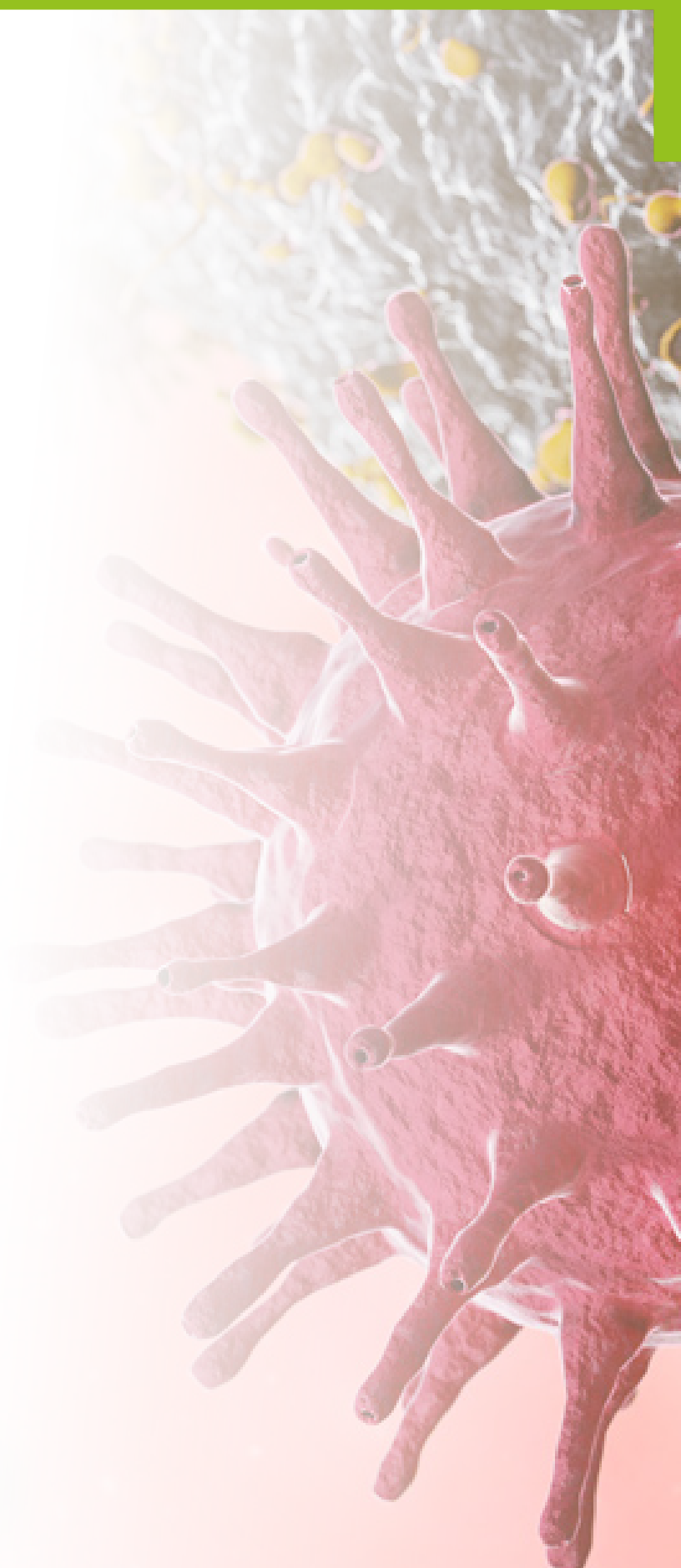
# COVID-19 capabilities

Envigo offers a portfolio of products and services for your COVID-19 research.

- + Custom genetically engineered rodent models
- + Contract breeding services (CBS)
- + Cryopreservation and rederivation
- + Research models
  - + BALB/c mice
  - + C57BL/6 mice
  - + 129S2 mice
  - + Cotton rats
  - + Golden Syrian hamsters
  - + Nonhuman primates: rhesus macaques, cynomolgus macaques
- + Surgical services
- + Bioproducts and antibody production
- + Custom diet

+  
For more information on  
our coronavirus (COVID-19)  
preparedness, please **click here**.

+ +



# Worldwide production locations



# Worldwide stocks and strains

## Production locations



COMMON NAME	NOMENCLATURE	CODE	US	UK	NED	FRA	ISR	PG#
<b>INBRED MICE</b>								
129	129S2/SvHsd	215		+				*
A	A/JOlaHsd	049	+	+	+			10
BALB/c	BALB/cAnNHsd	047	+					11
	BALB/cOlaHsd	162		+	+		+	*
C3H	C3H/HeNHsd	040	+		+		+	12
C57BL/6	C57BL/6JOlaHsd	057		+	+		+	*
	C57BL/6JRccHsd	043			+		+	*
	C57BL/6NHsd	044	+		+			13
C57BL/Ka	C57BL/KaLwRijHsd	940			+			*
CBA/Ca	CBA/CaOlaHsd	209		+	+			*
CBA	CBA/JCrHsd	055	+					14
DBA/1	DBA/1OlaHsd	105	+	+	+			15
DBA/2	DBA/2JRccHsd	343			+			*
	DBA/2NHsd	042	+				+	15
	DBA/2OlaHsd	870		+				*
FVB	FVB/NHan <sup>®</sup> Hsd	862		+	+		+	*
	FVB/NHsd	118	+					16
NIH	NIH/OlaHsd	059		+				*
NZB	NZB/OlaHsd	100		+				*
NZW	NZW/OlaHsd	102		+				*
SAMP8	SAMP8/TaHsd	954			+			*
SAMR1	SAMR1/TaHsd (control)	956			+			*
SJL	SJL/JCrHsd	052	+				+	16
<b>OUTBRED MICE</b>								
Black Swiss	Hsd:NIHBS	188					+	*
CD-1	CrHli:CD-1	435					+	*
ICR (CD-1 <sup>®</sup> )	Hsd:ICR (CD-1 <sup>®</sup> )	030	+	+	+		+	17
ND4 Swiss Webster	Hsd:ND4	032	+					17
NIH Swiss	Hsd:NIHS	035	+	+				18
NMRI	HsdWin:NMRI	275			+			*

\* Not described in this guide. We invite inquiries about items not listed. Our Customer Service and Veterinary Sciences, Research and Support representatives are ready to discuss your special requirements. We will work with you to select the stocks and strains that best suit your needs.

# Worldwide stocks and strains

## Production locations



COMMON NAME	NOMENCLATURE	CODE	US	UK	NED	FRA	ISR	PG#
<b>OUTBRED MICE</b>								
Non-Swiss Albino	Hsd:NSA (CF-1 <sup>®</sup> )	033	+					18
SABRA-M	HsdHu:SABRA-M	992					+	*
TO	HsdOla:TO	876		+				*
<b>MUTANT MICE (Spontaneous)</b>								
<i>Nudes</i>								
Athymic Nude	Hsd:Athymic Nude-Foxn1 <sup>nu</sup>	069	+	+		+	+	22
	Hsd:Athymic Nude-Foxn1 <sup>nu</sup> /Foxn1 <sup>+</sup>	070	+	+		+	+	22
BALB/c Nude	BALB/cOlaHsd-Foxn1 <sup>nu</sup>	165		+		+	+	*
	BALB/cOlaHsd-Foxn1 <sup>nu</sup> /Foxn1 <sup>+</sup>	886		+		+	+	*
CD1 Nude	HsdHli:CD1-Foxn1 <sup>nu</sup>	437					+	*
NMRI Nude	HsdCpb:NMRI-Foxn1 <sup>nu</sup>	889				+		*
	HsdCpb:NMRI-Foxn1 <sup>nu</sup> /Foxn1 <sup>+</sup>	890				+		*
<i>SCIDs</i>								
NOD.SCID	NOD.CB17-Prkdc <sup>scid</sup> /NCRHsd	170	+			+	+	23
SCID	C.B-17/IcrHan <sup>®</sup> Hsd-Prkdc <sup>scid</sup>	883		+		+		*
	C.B-17/IcrHsd-Prkdc <sup>scid</sup>	182	+				+	24
SCID/Beige	C.B-17/IcrHsd-Prkdc <sup>scid</sup> Lyst <sup>bg-J</sup>	186	+			+	+	24
<i>Diabetic/Obese</i>								
Diabetic (db/db)	BKS.Cg- + Lepr <sup>db</sup> /+Lepr <sup>db</sup> /OlaHsd	173	+		+			25
	BKS.Cg-Dock7 <sup>m</sup> /+ Lepr <sup>db</sup> /OlaHsd	H174	+		+			25
	BKS.Cg-Dock7 <sup>m</sup> /+ Lepr <sup>db</sup> /OlaHsd	H174	+		+			25
	BKS.Cg-(Lean)/OlaHsd	174	+		+			25
<i>Other</i>								
Albino C57BL/6	C57BL/6BrdCrHsd-Tyr <sup>c</sup>	103	+	+		+		26
<b>GEMS MICE</b>								
R2G2 <sup>®</sup>	B6;129-Rag2 <sup>tm1Fwa</sup> IL2rg <sup>tm1Rky</sup> /DwlHsd	021	+	+		+	+	27
B-NDG	NOD.CB17-Prkdc <sup>scid</sup> IL2rg <sup>tm1</sup> /BcgenHsd	126	+	+		+	+	28

# Worldwide stocks and strains

## Production locations



COMMON NAME	NOMENCLATURE	CODE	US	UK	NED	FRA	ISR	PG#
<b>HYBRID MICE**</b>								
B6C3F1	B6C3F1/Hsd	061	+					29
	B6C3F1/OlaHsd	946			+			*
B6CBAF1	B6CBAF1/OlaHsd	045			+			*
B6D2F1	B6D2F1/Hsd	063	+				+	29
	B6D2F1/JRccHsd	344			+			*
CB6F1	CB6F1/Hsd	065	+					30
	CB6F1/OlaHsd	949			+		+	*
CD2F1	CD2F1/Hsd	060	+					30
CSJLF1	CSJLF1/HliHsd	969					+	*
NZBNZWF1	NZBNZWF1/OlaHsd	098		+				*
<b>INBRED RATS</b>								
ACI	ACI/SegHsd	013	+					31
Brown Norway	BN/RijHsd	147	+	+	+			31
DA (Dark Agouti)	DA/OlaHsd	092	+	+	+			32
Fischer 344	F344/NHsd	010	+					33
Lewis	LEW/Han®Hsd	861			+			*
	LEW/SsNHsd	017	+	+			+	33
Spontaneously Hypertensive	SHR/NHsd	022	+	+				34
Wistar Kyoto	WKY/NHsd	023	+	+				35
<b>OUTBRED RATS</b>								
Holtzman®	HsdHot:Holtzman®	003	+					36
Lister Hooded	HsdOla:LH	119		+	+			*
Long Evans	HsdBlu:LE	140	+					36
SABRA-R	HsdHu:SABRA-R	991					+	*
Sprague Dawley®	Hsd:Sprague Dawley® SD®	002	+	+	+		+	38
Wistar	Hsd:WI	001	+					37

\* Not described in this guide. We invite inquiries about items not listed. Our Customer Service and Veterinary Sciences, Research and Support representatives are ready to discuss your special requirements. We will work with you to select the stocks and strains that best suit your needs.

\*\* This is a brief selection of available hybrids; any combination may be bred on demand. Any existing hybrid combination may be discontinued at any time without prior notice.



# Worldwide stocks and strains

## Production locations



COMMON NAME	NOMENCLATURE	CODE	US	UK	NED	FRA	ISR	PG#
<b>OUTBRED RATS</b>								
Wistar Han®	RccHan®:WIST	168	+	+	+		+	39
Wistar Unilever	HsdCpb:WU	111			+			*
<b>MUTANT RATS</b>								
<i>Nudes</i>								
Athymic Nude	Hsd:RH-Foxn1 <sup>nu</sup>	005	+			+		41
	Hsd:RH-Foxn1 <sup>nu</sup> /Foxn1 <sup>+</sup>	006	+			+		41
<i>Spontaneous Mutants</i>								
Zucker	HsdHlr:ZUCKER-Lepr <sup>fa</sup>	194	+					42
	HsdHlr:ZUCKER-Lepr <sup>fa</sup> /Lepr <sup>+</sup>	H195	+					42
	HsdHlr:ZUCKER-Lepr <sup>+</sup>	W195	+					42
<b>GEMS RATS</b>								
Pink1	HsdSage: LE-Pink1 <sup>tm1Sage</sup>	372	+					43
Park2	HsdSage: LE-Park2 <sup>tm1Sage</sup>	370	+					44
Mdr1a	HsdSage: SD-Mdr1a <sup>tm1Sage</sup>	364	+					45
Mdr1a-bcrp	HsdSage: SD-Mdr1a <sup>tm1Sage</sup> Abcg2 <sup>tm1Sage</sup>	363	+					46
<b>HYBRID RATS</b>								
Any hybrid combination may be bred on demand. Please inquire.								
<b>GUINEA PIGS</b>								
Dunkin Hartley	HsdDhl:DH	459			+			*
<b>HAMSTERS</b>								
Golden Syrian	HsdHan®:AURA	089	+					48
<b>COTTON RATS</b>								
Cotton Rat	Hsd:Cotton Rat	201	+					49
<b>RABBITS</b>								
New Zealand White	HsdHra:(NZW) SPF	221	+					50
	Hsdlf:NZW	444		+				*
	HsdOkd:NZW	081					+	*
Dutch Belted	HsdHra:DB (SPF)	222	+					51
<b>CANINES</b>								
Beagle	HsdHre:Beagle	220	+					52
<b>NONHUMAN PRIMATES</b>								
Cynomolgus macaques	<i>M. fascicularis</i>	226/228	+					53
Rhesus macaques	<i>M. mulatta</i>	224	+					53

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\*\* This is a brief selection of available hybrids; any combination may be bred on demand. Any existing hybrid combination may be discontinued at any time without prior notice.

# Inbred mice



MODEL CODE  
**049**

## A

NOMENCLATURE A/JOl<sup>a</sup>Hsd

Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$156.05	\$182.00
4-5	\$168.15	\$192.80
5-6	\$180.30	\$215.20
6-7	\$188.45	\$225.55
7-8	\$214.85	\$270.25
8-9	\$236.25	\$291.65
9-10	\$257.55	\$312.85
Over 10 weeks, add per week	\$21.25	\$21.25
Proven breeder	\$314.05	\$344.05
Retired breeder	\$295.20	\$295.20
Untimed pregnant*		\$815.75
Timed mated*		\$1,087.00
Female with litter		\$1,132.55

\* For our pregnant animal policy, refer to page 84.

**Albino.** From G.D. Searle to Harlan Olac, United Kingdom, in 1978; to Harlan, United States, in 1993. Harlan became Envigo in 2015.

# Inbred mice



MODEL CODE  
**047**



## BALB/c

NOMENCLATURE BALB/cAnNHsd

AGE (WEEKS)	Approx. Weight (g)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
3-4	Up to 12	Up to 12	\$32.20	\$33.65
4-5	13-17	12-15	\$34.35	\$35.10
5-6	17-20	15-18	\$38.40	\$37.45
6-7	18-22	15-19	\$39.20	\$38.40
7-8	20-23	17-19	\$40.15	\$41.50
8-9			\$42.50	\$45.95
9-10			\$47.05	\$48.15
Over 10 weeks, add per week			\$5.15	\$4.85
Untimed pregnant*				\$279.30
Timed mated*				\$305.50
Female with litter				\$344.90
Proven breeder			\$43.15	\$46.35
Retired breeder			\$30.75	\$33.45

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

### Characteristics

- Litter average: 6.0
- Docile disposition
- Haplotype: *H-2<sup>d</sup>*
- Experimental allergic encephalomyelitis resistant

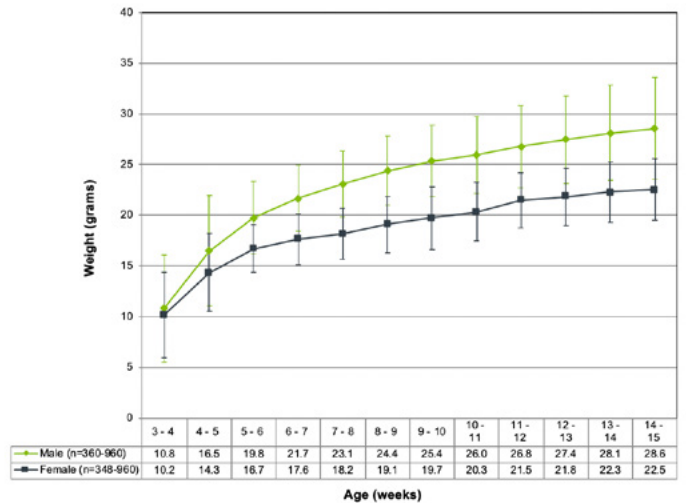
### Research use

- Cardiovascular
- Monoclonal antibody production
- Toxicology
- Oncology
- Immunology
- Pharmacology
- Aging
- Teratology
- General purpose

### Additional available data

- Hematology
- Clinical chemistry

### BALB/cAnNHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 71.5 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

# Inbred mice



MODEL CODE  
**040**

## C3H

NOMENCLATURE C3H/HeNHsd

Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$39.30	\$39.55
4-5	\$40.85	\$42.80
5-6	\$43.70	\$48.00
6-7	\$47.40	\$50.95
7-8	\$52.50	\$52.60
8-9	\$58.70	\$59.05
9-10	\$64.95	\$65.65
Over 10 weeks, add per week	\$6.25	\$6.45
Proven breeder	\$55.15	\$62.00
Retired breeder	\$34.65	\$39.55
Untimed pregnant*		\$352.30
Timed mated*		\$367.15
Female with litter		\$393.90

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

## Characteristics

- Litter Average: 5.0
- Haplotype:  $H-2^K$
- Carrier of the retinal degeneration ( $Pde6b^{rd}$ ) mutation
- Normal response to LPS
- Highly susceptible to Anthrax toxin

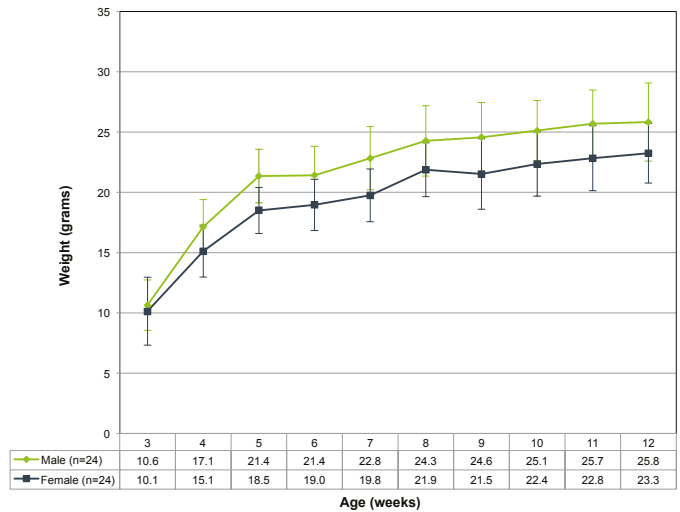
## Research use

- General Purpose
- Ocular Disease
- Immunology

## Additional available data

- Clinical chemistry
- Hematology

## C3H/HeNHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of mice.  
Growth chart includes mean  $\pm$  2 SD's representative of population distribution.

# Inbred mice



MODEL CODE  
**044**

## C57BL/6

NOMENCLATURE C57BL/6NHsd

AGE (WEEKS)	Approx. Weight (g)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
3-4	Up to 13	Up to 12	\$31.90	\$34.85
4-5	14-19	12-16	\$34.75	\$36.05
5-6	18-22	15-18	\$38.20	\$38.75
6-7	20-23	16-19	\$42.65	\$39.15
7-8	21-25	17-20	\$43.20	\$39.75
8-9			\$48.20	\$44.00
9-10			\$53.30	\$49.10
Over 10 weeks, add per week			\$5.55	\$5.50
Untimed pregnant*				\$302.40
Timed mated*				\$350.90
Female with litter				\$430.25
Proven breeder			\$51.15	\$52.75
Retired breeder			\$32.70	\$32.70

\* For our pregnant animal policy, refer to page 84.

**Black.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

### Characteristics

- Litter average: 6.0
- Haplotype: *H-2<sup>b</sup>*
- Most widely-used inbred strain
- Low tumor incidence
- High preference for alcohol
- Microphthalmia
- Incidence of microphthalmia

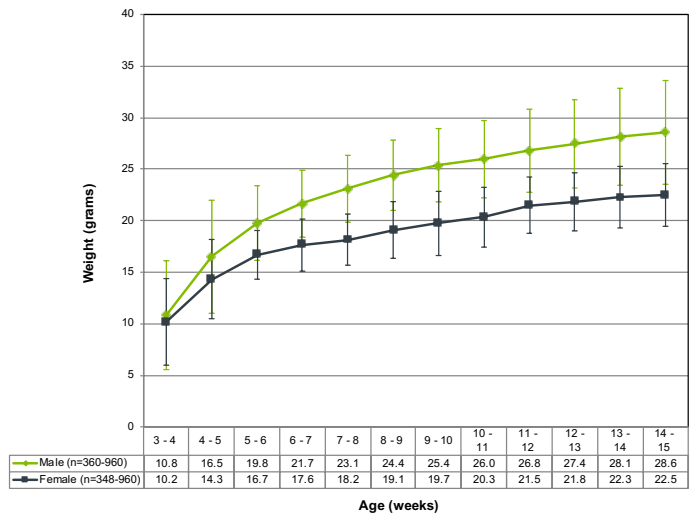
### Additional available data

- Hematology
- Clinical chemistry
- Drug addiction
- Alcoholism
- General purpose

### Research use

- Background for induced and genetically-modified models
- Diet-induced obesity
- Toxicology
- Aging
- Cardiovascular
- Superovulation
- Immunology
- Oncology

### C57BL/6NHsd



**Aging available**  
See page 75

# Inbred mice



MODEL CODE  
**055**

## CBA

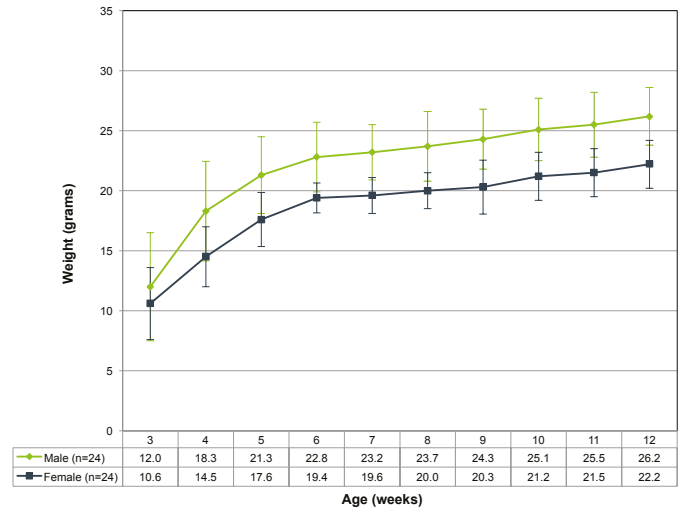
NOMENCLATURE: CBA/JCrHsd

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$48.10	\$51.70
4-5	\$51.70	\$56.25
5-6	\$56.25	\$60.90
6-7	\$60.90	\$65.65
7-8	\$65.65	\$70.10
Over 8 weeks, add per week	\$6.95	\$6.95
Untimed pregnant*		\$351.75
Timed mated*		\$489.20
Female with litter		\$390.95
Proven breeder	\$69.10	\$81.50
Retired breeder	\$51.75	\$61.20

\* For our pregnant animal policy, refer to page 84.

**Agouti.** From Jackson Laboratories, Bar Harbor, Maine, to National Cancer Institute, Frederick, Maryland, in 1983. To Harlan in 1987. Harlan became Envigo in 2015.

### CBA/JCrHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Litter average: 4.0
- Haplotype: *H-2<sup>k</sup>*
- Carrier of the retinal degeneration (*Pde6b<sup>rd1</sup>*) mutation
- Susceptible to radiation
- High incidence of mammary tumors in females

### Additional available data

- Hematology
- Clinical chemistry

### Research use

- Only approved mouse strain for use in the Local Lymph Node Assay, a refined alternative research method for evaluating the allergic contact dermatitis potential of chemicals and compounds (replaces the guinea pig maximization test)
- Immunology
- General purpose

# Inbred mice



MODEL CODE  
**105**

MODEL CODE  
**042**



## DBA/1

NOMENCLATURE: DBA/10IaHsd

## DBA/2

NOMENCLATURE: DBA/2NHsd

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$62.35	\$62.35
4-5	\$66.30	\$66.30
5-6	\$70.45	\$70.45
6-7	\$74.25	\$74.25
7-8	\$78.15	\$78.15
8-9	\$85.70	\$85.70
9-10	\$93.20	\$93.20
Over 10 weeks, add per week	\$7.50	\$7.50
Proven breeder	\$70.45	\$87.55
Retired breeder	\$43.20	\$53.85
Untimed pregnant*		\$397.05
Timed mated*		\$429.10
Female with litter		\$455.20

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$72.35	\$75.50
4-5	\$79.15	\$82.75
5-6	\$80.70	\$88.45
6-7	\$87.15	\$92.70
7-8	\$97.50	\$96.55
8-9	\$106.60	\$105.55
9-10	\$115.65	\$114.45
Over 10 weeks, add per week	\$9.15	\$8.95
Proven breeder	\$89.25	\$101.90
Retired breeder	\$60.85	\$61.10
Untimed pregnant*		\$453.90
Timed mated*		\$463.80
Female with litter		\$520.35

\* For our pregnant animal policy, refer to page 84.

**Dilute brown, non-agouti.** Originally developed by Little. Acquired by Laboratory Animals Centre, Carshalton, United Kingdom in 1955; to Olac, United Kingdom, in 1979; to Harlan, United States, in 2002. Harlan became Envigo in 2015.

\* For our pregnant animal policy, refer to page 84.

**Dilute brown, non-agouti.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

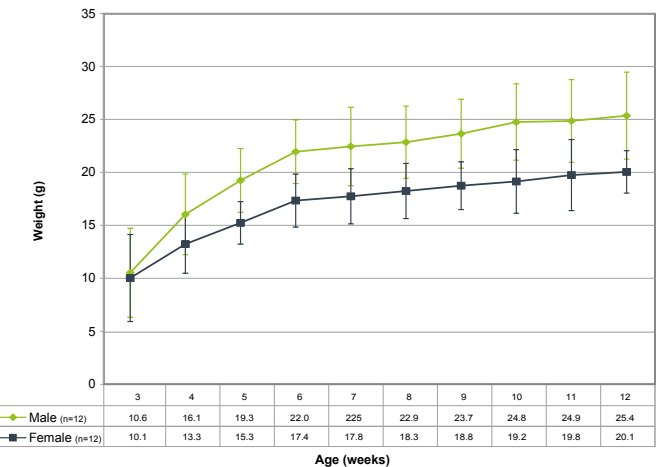
### Characteristics

- Litter average: 4.5
- Haplotype: *H-2<sup>g</sup>*

### Research use

- Adjuvant-induced arthritis
- Immunology
- Inflammation

### DBA/2NHsd



Maintained on Teklad Global Rodent Diet 2018S (18% protein)  
Cage floor space (RTT): 120.75 in<sup>2</sup>

Growth data to be used as a guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representing population distribution.

### Characteristics

- Litter average: 4.5
- Haplotype: *H-2<sup>d</sup>*
- Dystrophic myocardial calcinosis

### Research use

- Progressive hearing loss
- Audiogenic seizures

# Inbred mice



MODEL CODE  
**118**

MODEL CODE  
**052**



## FVB

NOMENCLATURE: FVB/NHsd

## SJL

NOMENCLATURE: SJL/JCrHsd

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$36.10	\$39.45
4-5	\$41.55	\$44.15
5-6	\$48.20	\$51.70
6-7	\$58.80	\$59.40
7-8	\$65.70	\$66.45
8-9	\$66.00	\$69.70
9-10	\$66.30	\$73.90
Over 10 weeks, add per week	\$3.90	\$4.30
Proven breeder	\$52.30	\$61.85
Retired breeder	\$40.60	\$48.10
Untimed pregnant*		\$415.00
Timed mated*		\$415.00
Female with litter		\$317.20

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$73.40	\$78.40
4-5	\$77.85	\$82.85
5-6	\$82.30	\$93.55
6-7	\$88.40	\$96.20
7-8	\$94.20	\$101.50
8-9	\$115.00	\$122.60
9-10	\$122.20	\$134.80
10-11	\$130.30	\$137.60
11-12	\$138.30	\$145.65
12-13	\$145.95	\$154.75
Untimed pregnant*		\$695.65
Female with litter		\$818.35

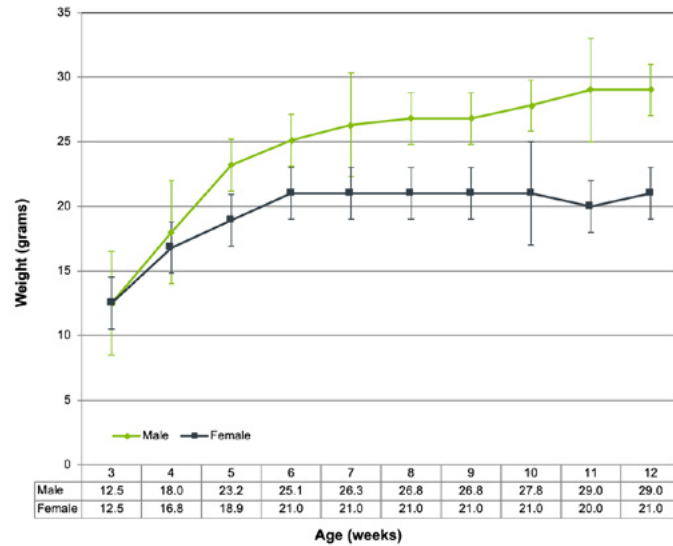
\* For our pregnant animal policy, refer to page 84.

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland, in 1988.

**Albino.** From The Jackson Laboratories, Bar Harbor, Maine, to National Institutes of Health, Frederick, Maryland, in 1983. To Harlan in 1987. Harlan became Envigo in 2015.

### FVB/NHsd



Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of mice.  
Growth chart includes mean ± 2 SD's representative of population distribution.



# Outbred mice



MODEL CODE  
**030**



MODEL CODE  
**032**

## ICR (CD-1®)

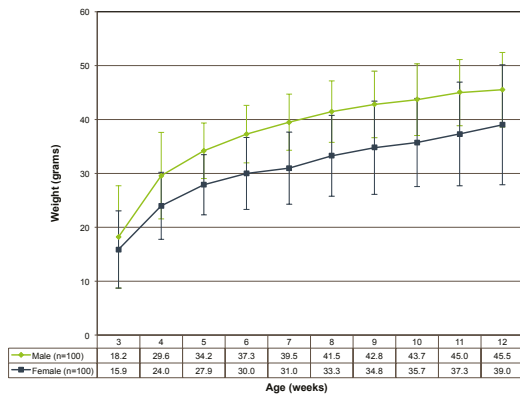
NOMENCLATURE: Hsd:ICR (CD-1®)

WEIGHT (g)	Price per animal
Up to 11	\$9.20
12-14	\$10.15
15-17	\$10.20
18-20	\$10.30
21-24	\$10.50
25-30	\$11.10
31-34	\$11.95
35+	\$13.10
Untimed pregnant*	\$57.15
Timed mated*	\$89.35
Female with litter	\$126.60
Proven breeder	\$56.80
Retired breeder	\$10.50

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from animals from Charles River Laboratories, Wilmington, Massachusetts.

### Hsd:ICR (CD-1®)



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Cage floor space: 120.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Litter average: 11.5
- Docile disposition
- Most widely-used outbred mouse
- Excellent reproductive and maternal characteristics
- High incidence of retinal degeneration (*Pde6b<sup>rd1</sup>*)

### Research use

- Oncology
- Toxicology
- Vaccines
- Aging
- Teratology
- General purpose

### Additional available data

- Hematology
- Clinical chemistry

## ND4 Swiss Webster

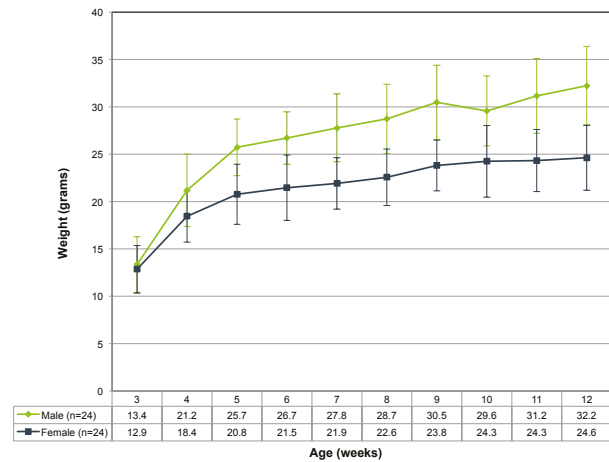
NOMENCLATURE: Hsd:ND4

WEIGHT (g)	Price per animal
Up to 11	\$11.80
12-14	\$12.90
15-17	\$13.00
18-20	\$13.15
21-24	\$13.40
25-30	\$13.80
31-34	\$15.05
35+	\$16.20
Untimed pregnant*	upon request
Timed mated*	upon request
Female with litter	upon request
Proven breeder	upon request
Retired breeder	upon request

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from animals from Swiss Webster stock derived by the University of Notre Dame, Notre Dame, Indiana.

### Hsd:ND4



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Cage floor space: 120.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

# Outbred mice



MODEL CODE  
**035**

MODEL CODE  
**033**



## NIH Swiss

NOMENCLATURE: Hsd:NIHS

## NSA (Non-Swiss Albino)

NOMENCLATURE: Hsd:NSA (CF-1®)

WEIGHT (g)	Price per animal
Up to 11	\$25.00
12-14	\$25.85
15-17	\$26.30
18-20	\$26.70
21-24	\$27.15
25-30	\$27.90
31-34	\$28.35
35+	\$29.15
Untimed pregnant*	\$110.45
Timed mated*	\$203.55
Female with litter	\$261.30
Proven breeder	\$105.90
Retired breeder	\$19.50

WEIGHT (g)	Price per animal
Up to 11	\$9.70
12-14	\$10.60
15-17	\$10.65
18-20	\$10.70
21-24	\$10.95
25-30	\$11.40
31-34	\$12.10
35+	\$13.40
Untimed pregnant*	\$58.70
Timed mated*	\$93.70
Female with litter	\$131.50
Proven breeder	\$53.70
Retired breeder	\$10.55

\* For our pregnant animal policy, refer to page 84.

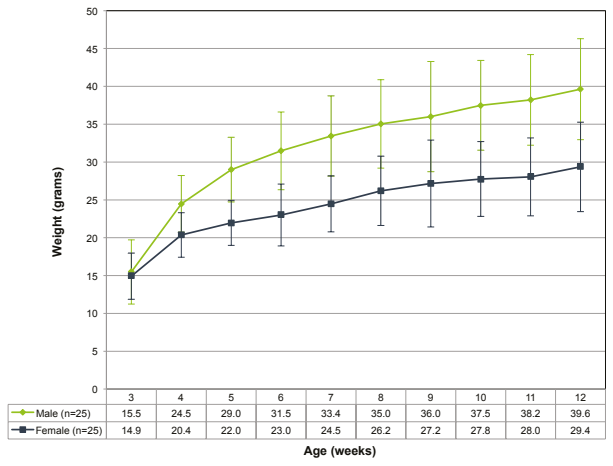
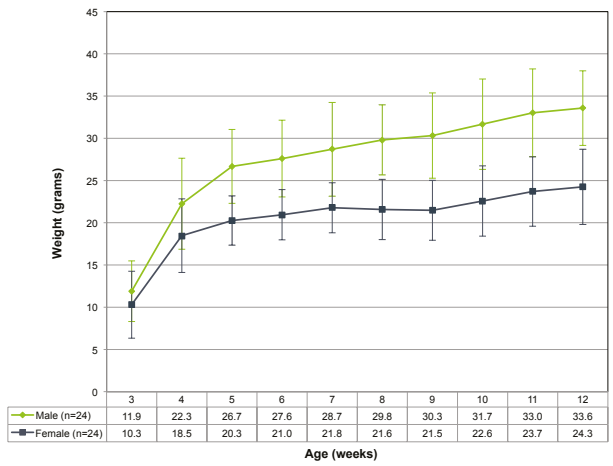
\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from animals from Charles River Laboratories, Wilmington, Massachusetts.

**Albino.** Derived from animals from Charles River Laboratories, Wilmington, Massachusetts.

### Hsd:NIHS

### Hsd:NSA (CF-1®)



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Cage floor space: 120.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Cage floor space: 141.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

# Proven performance. Globally referenced.

Researchers choose Envigo oncology models for tumor uptake and growth.

Our models have been extensively referenced by leading institutions around the world.

MODEL	PAGE	HAIR	T CELLS	B CELLS	NK CELLS
Athymic Nude Mouse	22	No	Nonfunctional	Functional	Functional
SCID Mouse	24	Yes	Nonfunctional	Nonfunctional	Functional
SCID/Beige Mouse	24	Yes	Nonfunctional	Nonfunctional	Impaired
NOD.SCID Mouse	23	Yes	Nonfunctional	Nonfunctional	Impaired
Athymic Nude Rat	42	No	Nonfunctional	Functional	Functional
Rag2 Rat	*	Yes	Nonfunctional	Nonfunctional	Functional
Rag2 Mouse (R2G2®)	27	Yes	Nonfunctional	Nonfunctional	Nonfunctional
B-NDG Mouse	28	Yes	Nonfunctional	Nonfunctional	Nonfunctional

**Models** Global availability of high-quality models with proven performance in tumor growth.  
**Pages 10-18, 22-53**

**Diets** Largest global provider of lab animal diets designed to minimize research variables.  
**Pages 54-62**

**Services** Tumor models and services, custom model generation, genetic testing, and antibody production.  
**Pages 21, 64-80**

## Oncology portfolio

# Choose the right rodent model for your oncology research.

Below is a representation of the cell lines used successfully with Envigo models.

For access to a full listing and references\* from peer-reviewed journals, please visit [envigo.com/onco](http://envigo.com/onco)

Rodent tissue	Cell lines	Nude mice	SCID mice	Nude rats	C57 mice
Brain (rat glioma)	C6 <sup>58, 59, 78, 140, 180</sup>	+	+		
Liver	MC38-Luc1 <sup>387</sup>				+
Lung (murine)	LL2 <sup>10</sup>	+			
Lymphoma	E.G7-OVA <sup>373</sup>				+
Melanoma (murine)	B16F10 <sup>35, 36, 250</sup>	+			

Patient-derived tumors (Human tissue)	Cell lines	Nude mice	SCID mice	Nude rats
Brain	(PDX) <sup>271</sup>	+		
Breast	HBCX 1 <sup>270</sup>	+		
	HBCX 6 <sup>270</sup>	+		
	HBCX 7 <sup>270</sup>	+		
	HBCX 9 <sup>270</sup>	+		
	TNBC (MC1) <sup>273</sup>		+	
	MC1 <sup>274</sup>		+	
	BMC-2147 <sup>274</sup>		+	
Liver	AKH23 <sup>307</sup>		+	
	KFJ18 <sup>307</sup>		+	
Lung	(NSCLC PDX) <sup>272</sup>		+	
Pancreatic	JH033 <sup>272</sup>	+		

Evaluate our tumor growth rates by visiting our online library of *in vivo* tumor growth data at [envigo.com/tumor](http://envigo.com/tumor)

\* Superscript numbers correspond to publication references on the online cell line reference tool.

Human tissue	Cell lines	Nude mice	SCID mice	Nude rats	Rag2
Bladder	KU-7 <sup>148, 149, 150, 151</sup>	+			
	T24 <sup>52</sup>			+	
Brain	A-172 <sup>198</sup>	+			
	G55 <sup>3</sup>			+	
	HTLA-230 <sup>5, 125</sup>	+	+		
	SH-SY5Y <sup>2</sup>			+	
	TB10 <sup>200</sup>	+			
	U251 <sup>81, 202</sup>	+			
	U251 MG <sup>198, 199</sup>	+			
	U251-NG2 <sup>1, 285</sup>	+			
	U87 <sup>71, 81, 117, 173, 196</sup>	+	+		+
	U87ΔEGFR <sup>197</sup>	+			
	U87 MG <sup>4, 78, 80, 83, 133, 134, 164, 195, 198, 201, 205, 206, 209, 224, 249</sup>	+	+	+	
	U87Fluc <sup>79, 82</sup>	+			
U87MG.wt EGFR <sup>203</sup>	+				
U87-TARTK <sup>208</sup>			+		
U138MG <sup>203, 266</sup>	+	+			
U373 <sup>207</sup>				+	

Human tissue (Cancer stem cells)	CSC designation	Nude mice	SCID mice	Nude rats
Brain	BTSC83 <sup>200</sup>	+		
	LA-N-5 <sup>231</sup>	+		
	NGC-407-GFP <sup>206</sup>			+
	U87-SC <sup>232</sup>	+		
Breast	2LMP (MDA-MB-231 subclone) <sup>234</sup>			+
	MCF-7 (CSC-like) <sup>236</sup>	+		
	MCF-7 (mammospheres) <sup>235</sup>	+		
	SUM159 <sup>234</sup>			+
Lung	A549 <sup>108</sup>	+		
	H1299 <sup>108</sup>	+		
Ovarian	SKOV-3 (spherical cells) <sup>213</sup>	+		
Prostate	DU-145 (spheroid cells) <sup>233</sup>			+

## Tumor models and services.

The requirement for accurate PDX models for preclinical efficacy studies have risen as personalized medicine becomes the approach for therapeutic solutions. Envigo sources breast cancer PDX models through Washington University in St. Louis with the Washington University Human In Mouse (WHIM) models. Also, we have a Wistar Melanoma (WM) PDX collection through the Wistar Institute. With the WHIM and WM models, we have vials of tumor cells, *in vivo* propagation, non-viable analysis materials, and drug efficacy studies available. Additionally we are able to provide tumor model services utilizing cell derived xenografts (CDX) and syngeneic models.

### Efficacy testing by Envigo

- + *In vivo* efficacy testing of PDX tumors
- + Downstream support of PK and PD analysis

### Ungrafted PDX

- + Live, frozen heterogeneous PDX cells (5-10 M/ vial)
- + For propagation in mice (or short ex vivo studies)

### Non-viable analysis materials

- + Snap-frozen material
- + FFPE material

+

For more information on our tumor models and services, please visit [envigo.com](http://envigo.com) or contact us at [GEMSOOrders@envigo.com](mailto:GEMSOOrders@envigo.com)

+

# Mutant mice – Nudes



MODEL CODE  
**069**

## Athymic Nude

NOMENCLATURE: Hsd:Athymic Nude-Foxn1<sup>nu</sup>

QUANTITY	Price per animal						
	1-100 ANIMALS		101-250 ANIMALS		251+ ANIMALS		
AGE (WEEKS)	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	
3-4	\$89.00	\$103.45	\$67.70	\$78.05	\$53.30	\$65.85	
4-5	\$89.30	\$103.55	\$67.75	\$78.60	\$55.50	\$66.45	
5-6	\$89.50	\$103.60	\$68.35	\$79.10	\$56.10	\$66.65	
6-7	\$98.95	\$115.00	\$77.50	\$91.65	\$65.15	\$79.15	
7-8	\$99.55	\$115.60	\$78.75	\$92.05	\$67.05	\$79.30	
8-9	\$108.05	\$124.20	\$87.45	\$100.65	\$79.05	\$87.95	
					MALE	FEMALE	
Over 9 weeks, add per week					\$8.45	\$8.70	
Proven breeder					\$234.15		
Retired breeder					\$74.60		
Heterozygous female with litter						Upon request	

\*\*When packing males, all animals will need to be packed as cage mates only.

**Albino.** Derived from a nucleus colony obtained from the National Cancer Institute, Frederick, Maryland.

This immunodeficient model was originally thought to be a BALB/c congenic, but was later reported by NCI to be outbred.

### Characteristics

- The *nu* allele on chromosome 11 is an autosomal recessive mutation
- Dysfunctional rudimentary thymus
- Phenotypically hairless (sparse hair growth possible)
- T-cell deficient
- B cells function normal
- No generation of cytotoxic effector cells
- No graft versus host response
- Nude-Foxn1<sup>nu</sup>/Foxn1 heterozygotes do not show partial expression of the *nu* phenotype

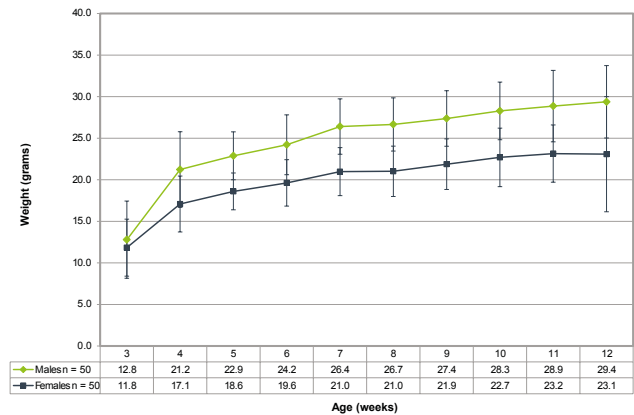
### Research use

- Oncology
- Transplantation
- Tumor cell growth
- Immunology
- Autoimmune disease
- Antibody production
- Sentinel model - Heterozygous Hsd:Athymic Nude-Foxn1<sup>nu</sup>/Foxn1<sup>+</sup>

### Additional available data

- Hematology
- Clinical chemistry
- Proven models with extensive references (see page 20)

### Hsd:Athymic Nude-Foxn1<sup>nu</sup>



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)

Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth Chart includes mean ± 2 SD's representative of population distribution.

MODEL CODE  
**070**

## Athymic Nude - heterozygous

NOMENCLATURE: Hsd:Athymic Nude-Foxn1<sup>nu</sup>/Foxn1<sup>+</sup>

AGE (WEEKS)	Price per animal
3-4	\$31.80
4-5	\$38.20
5-6	\$45.70
6-7	\$51.75
7-8	\$58.35
Over 8 weeks, add per week	\$10.05
Proven breeder	\$190.25
Retired breeder	\$37.85

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from a nucleus colony obtained from the National Cancer Institute, Frederick, Maryland.

**This animal model is heterozygous for the *nu* mutation and is haired. Since heterozygotes do not show partial expression of the *nu* phenotype, this is an immune-competent control for the homozygous nude mice.**

# Mutant mice – SCIDs



MODEL CODE  
**170**

## NOD.SCID

NOMENCLATURE: NOD.CB17-*Prkdc<sup>scid</sup>*/NCrHsd

Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$145.10	\$153.70
4-5	\$145.10	\$153.70
5-6	\$145.10	\$153.70
6-7	\$156.50	\$169.75
7-8	\$157.05	\$170.05
Over 8 weeks, add per week	\$16.90	\$15.60

\*\*When packing males, all animals will need to be packed as cage mates only.

**Albino.** Received by National Cancer Institute, Frederick, Maryland in 2004 from National Institutes of Health, Bethesda, Maryland. Harlan acquired from National Cancer Institute in 2006. Harlan became Envigo in 2015.

### Characteristics

- Autosomal-recessive, single-nucleotide polymorphism within *Prkdc* gene on chromosome 16
- Severe combined immunodeficiency affecting T- and B-cell development
- Natural Killer (NK) cell, macrophage and granulocyte cell numbers and function are reduced
- As SCID mice age, a variable percentage become "leaky" from spontaneous development of functional T- and B-lymphocytes
- Highly susceptible to opportunistic viral and bacterial infection
- Development of autoimmune diabetes does not occur due to severe combined immunodeficiency
- Spontaneous thymic lymphomas

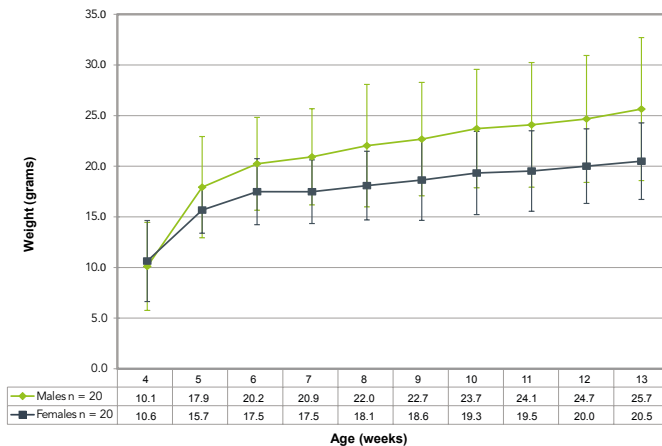
### Research use

- Oncology
- Transplantation
- Tumor cell growth
- Immunology
- Imaging

### Additional available data

- Hematology
- Proven models with extensive references (see page 20)

### NOD.CB17-*Prkdc<sup>scid</sup>*/NCrHsd



Maintained on Teklad Global Rodent Diet 2919 (19% Protein)  
Cage floor space: 71.5 in

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of mice.  
Growth Chart includes mean  $\pm$  2 SD's representative of population distribution.

# Mutant mice – SCIDs



MODEL CODE  
**182**



MODEL CODE  
**186**

## SCID

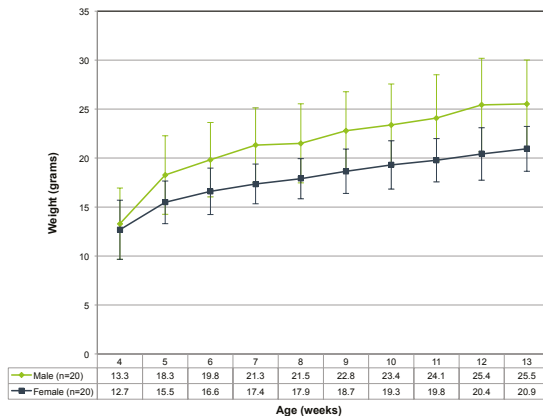
NOMENCLATURE: C.B-17/IcrHsd-Prkdc<sup>scid</sup>

AGE (WEEKS)	Price per animal
3-4	\$109.60
4-5	\$109.60
5-6	\$117.40
6-7	\$123.65
7-8	\$131.00
Over 8 weeks, add per week	\$11.00

\*\*When packing males, all animals will need to be packed as cage mates only.

**Albino.** Harlan acquired from the Fox Chase Cancer Center, Philadelphia, Pennsylvania, in 1991. Harlan became Envigo in 2015.

### C.B-17/IcrHsd-Prkdc<sup>scid</sup>



Maintained on Teklad Global Rodent Diet 2919 (19% Protein) Cage floor space: 71.5 in<sup>2</sup> Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Autosomal-recessive, single-nucleotide polymorphism within *Prkdc* gene on chromosome 16
- Severe combined immunodeficiency affecting T- and B-cell development
- Natural Killer (NK) cell, macrophage, and granulocyte cell numbers and function are normal
- As SCID mice age, a variable percentage become "leaky" from the spontaneous development of functional T- and B-lymphocytes
- Highly susceptible to opportunistic viral and bacterial infection

### Research use

- Oncology
- Transplantation
- Tumor cell growth
- Immunology
- Imaging

### Additional available data

- Proven models with extensive references (see page 20)

## SCID/Beige

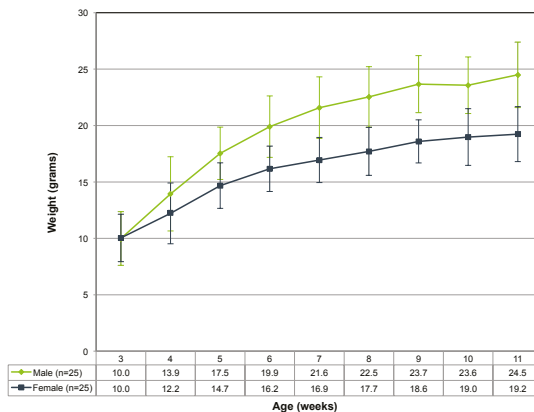
NOMENCLATURE: C.B-17/IcrHsd-Prkdc<sup>scid</sup> Lyst<sup>bg-J</sup>

AGE (WEEKS)	Price per animal
3-4	\$111.50
4-5	\$111.50
5-6	\$118.25
6-7	\$124.80
7-8	\$130.80
Over 8 weeks, add per week	\$11.15

\*\*When packing males, all animals will need to be packed as cage mates only.

**Albino.** Harlan acquired from the Fox Chase Cancer Center, Philadelphia, Pennsylvania, in 1991. Harlan became Envigo in 2015.

### C.B-17/IcrHsd-Prkdc<sup>scid</sup> Lyst<sup>bg-J</sup>



Maintained on Teklad Global Rodent Diet 2018S (18% Protein) Cage floor space: 71.5 in<sup>2</sup> Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Autosomal-recessive, single-nucleotide polymorphism within *Prkdc* gene on chromosome 16
- Autosomal-recessive *beige* (*bg-J*) mutation on chromosome 13
- Severe combined immunodeficiency affecting T- and B-cell development
- Severe lymphopenia
- Diminished Natural Killer (NK) cell activity relative to other SCID models
- Rudimentary thymus
- "Leaky" phenotype significantly suppressed relative to other SCID models
- Highly susceptible to opportunistic viral and bacterial infection

### Research use

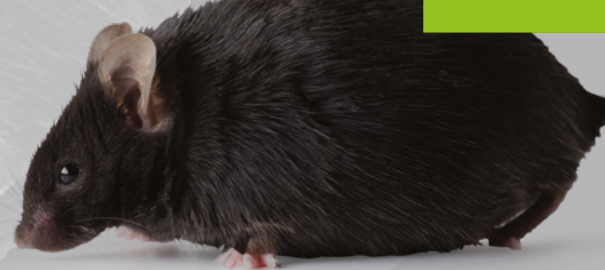
- Oncology
- Teratology
- Transplantation
- Tumor cell growth
- Immunology

### Additional available data

- Proven models with extensive references (see page 20)



# Mutant mice – Diabetic



MODEL CODES  
**173, H174\***  
**W174\*, 174**

## Diabetic (*db/db*)

### NOMENCLATURE:

BKS.Cg- + *Lepr<sup>db</sup>/+ Lepr<sup>db</sup>/OlaHsd* - fat, black, homozygous (Code 173)  
 BKS.Cg-*Dock7<sup>m</sup>/+Lepr<sup>db</sup>/OlaHsd* - lean, black, heterozygous (Code H174\*)  
 BKS.Cg-*Dock7<sup>m</sup>/+Dock7<sup>m</sup>/OlaHsd* - lean, misty, homozygous (Code W174\*)  
 BKS.Cg-(Lean)/OlaHsd - lean, not genotyped (Code 174)

Price per animal

AGE (WEEKS)	<i>db/db</i>	Lean*
3-4	\$209.95	\$140.65
4-5	\$209.95	\$140.65
5-6	\$212.45	\$143.75
6-7	\$214.95	\$147.45
7-8	\$217.45	\$150.80
Over 8 weeks, add per week	\$7.60	\$5.40
Retired Breeder	\$227.45	\$119.95

\*\*When packing males, all animals will need to be packed as cage mates only.

**Black or misty.** From Dunn Nutritional Laboratory, Cambridge, United Kingdom; to Olac, United Kingdom, in 1979; to Harlan, United States in 2000. Harlan became Envigo in 2015.

\* Our breeding scheme maintains *Dock7<sup>m</sup>* and *Lepr<sup>db</sup>* in repulsion. These genes are closely linked; however, recombination could occur. Our mice are most likely nonrecombinants, but they have not been tested. See page 52 for genotyping services available from Envigo.

### Characteristics

- *Lepr<sup>db</sup>* is an autosomal-recessive mutation on chromosome 4
- Obesity expressed at 4-5 weeks of age
- Elevation of plasma insulin demonstrated at 10-14 days
- Hyperglycemia expressed at 4-8 weeks of age
- Polyphagia
- Proteinuria
- Glycosuria
- Polyuria/Polydipsia
- Hyperinsulinemia despite severe depletion of pancreatic islet insulin-producing B-cells
- Leptin receptor deficient

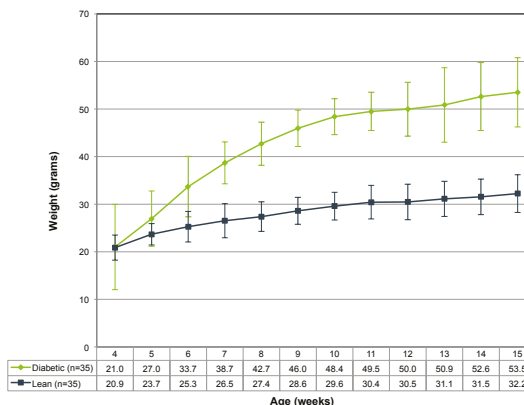
### Research use

- Type 2 Diabetes
- Peripheral neuropathy
- Myocardial disease
- Immunodeficiency
- Immunology
- Metabolism
- Obesity

### Additional available data

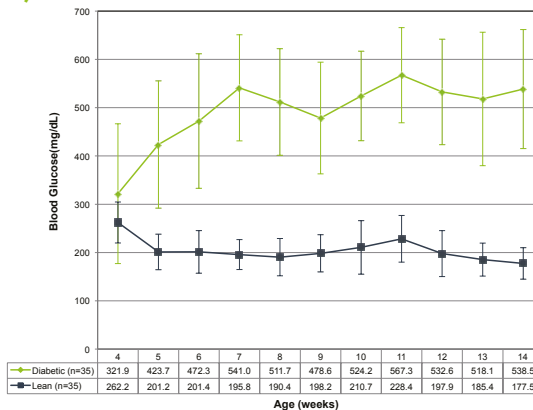
- Hematology
- Clinical chemistry
- Glucose tolerance test

### BKS.Cg- + *Lepr<sup>db</sup>/+ Lepr<sup>db</sup>/OlaHsd* (male)



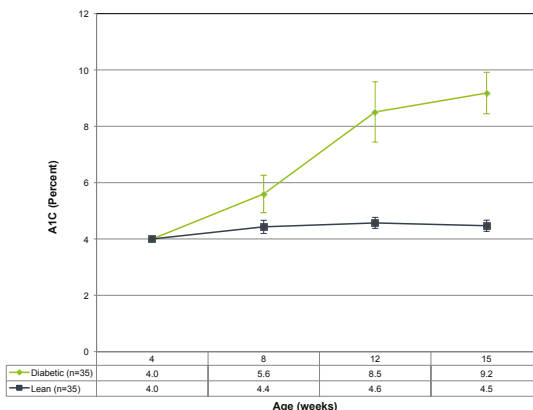
Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
 Cage floor space: 71.5 in<sup>2</sup>  
 Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD representative of population distribution. Phenotypic discrimination only. Mice were not genotyped.

### BKS.Cg- + *Lepr<sup>db</sup>/+ Lepr<sup>db</sup>/OlaHsd* Blood Glucose (male)



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
 Cage floor space: 71.5 in<sup>2</sup>  
 Non-fasted  
 Glucose data to be used as guideline only. Data can be subject to differences in maintenance of mice. Glucose chart includes mean ± 1 SD representative of population distribution. Phenotypic discrimination only. Mice were not genotyped.

### BKS.Cg- + *Lepr<sup>db</sup>/+ Lepr<sup>db</sup>/OlaHsd* A1c (male)



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
 Cage floor space: 71.5 in<sup>2</sup>  
 Non-fasted  
 A1c data to be used as guideline only. Data can be subject to differences in maintenance of mice. A1c chart includes mean ± 1 SD representative of population distribution. Phenotypic discrimination only. Mice were not genotyped.

## Mutant mice – Other



MODEL CODE  
**103**

### Albino C57BL/6

NOMENCLATURE: C57BL/6BrdCrHsd-Tyr<sup>c</sup>

Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$49.40	\$47.15
4-5	\$49.80	\$52.45
5-6	\$51.30	\$55.95
6-7	\$59.95	\$65.75
7-8	\$68.05	\$68.80
Over 8 weeks, add per week	\$8.10	\$8.10
Proven breeder	\$71.70	\$71.70
Retired breeder	\$45.80	\$44.40
Untimed pregnant*		\$394.05
Timed mated*		\$466.25
Female with litter		\$582.75

\* For our pregnant animal policy, refer to page 84.

**Albino.** From Allan Bradley at Baylor College of Medicine to National Cancer Institute (NCI) in 2000; to Harlan in 2008. Harlan became Envigo in 2015.

### Characteristics

- Contains a mutation in the c (tyrosinase) gene
- Litter average: 6.5
- Haplotype: H-2<sup>b</sup>

### Research use

- Source of albino C57BL/6 embryos for chimera generation
- Ovarian transfer

# GEMS mice



MODEL CODE  
**021**

## Rag2//l2rg Double Knockout (R2G2®)

NOMENCLATURE: B6;129-Rag2<sup>tm1Fwa</sup>Il2rg<sup>tm1Rsky</sup>/DwlHsd

**White-bellied, light chinchilla (light tan).** The R2G2® model is a double knockout mouse with an ultra immunodeficient phenotype. The model was created by backcrossing the *Il2rg* (common gamma chain) mutation on to a mixed background mouse (C57BL/6 and 129 mix) with a mutation in *Rag2*. The recombination activating gene 2 (*Rag2*) interruption causes a deficiency in T and B cells. The common gamma chain gene (*IL2RG*) interruption results in a lack of functional receptors for IL-2, IL-4, IL-7, IL-9 and IL-15. Envigo acquired from Fox Chase Cancer Center in 2016, where the model had been maintained since 2005.

### Characteristics

- Recombination activating gene 2 (*Rag2*) knocked out
- Common gamma chain gene (*Il2rg*) knocked out
- Lacks functional receptors for IL-2, IL-4, IL-7, IL-9 and IL-15
- Severe lymphocyte development impairment
- Deficient in T cells
- Deficient in B cells
- Lacks NK cells
- Decreased macrophage cells
- Decreased dendritic cells
- Decreased neutrophils

### Research use

- Oncology research
- Cancer cell transplantation
- Immunology
- Infectious disease

### Features and advantages

- **Severe immunodeficiency** => Ultra immunodeficient phenotype enhances tumor cell acceptance
- **Less radiosensitive** => Higher tolerance for radiation as compared to models with the *scid* mutation
- **Reduced leakiness** => Decreased leakiness as compared to SCID models

### Additional available data

- Hematology
- Flow cytometry data
- Tumor growth chart
- Radiation sensitivity
- Chemotherapy tolerability
- Estrogen supplement tolerability



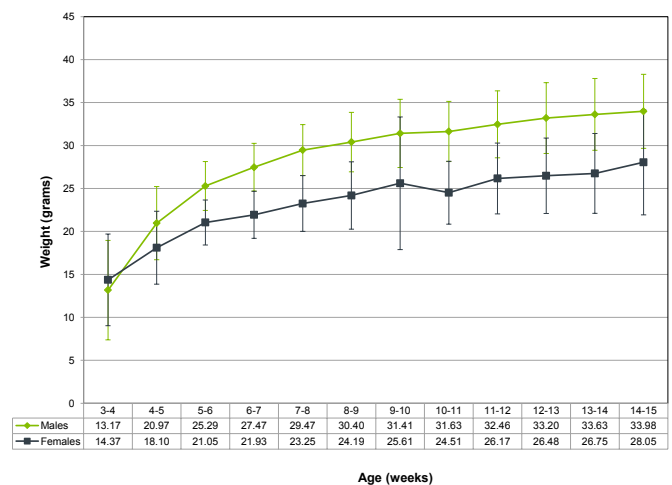
For-profit (commercial) / Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$154.75	\$163.40
4-5	\$154.75	\$163.40
5-6	\$158.20	\$166.80
6-7	\$161.65	\$170.25
7-8	\$165.05	\$173.70
Over 8 weeks, add per week	\$5.20	\$5.20

Not-for-profit (academic) / Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$103.70	\$109.85
4-5	\$103.70	\$109.85
5-6	\$110.30	\$113.35
6-7	\$113.90	\$116.85
7-8	\$117.50	\$120.35
Over 8 weeks, add per week	\$5.55	\$5.55

### B6;129-Rag2<sup>tm1Fwa</sup>Il2rg<sup>tm1Rsky</sup>/DwlHsd



Maintained on Teklad Global Rodent Diet 2918 (18% Protein)  
Cage floor space: 71.5 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

\*\*When packing males, all animals will need to be packed as cage mates only.



# B-NDG Knockout mouse

NOMENCLATURE: NOD.CB17-*Prkdc*<sup>scid</sup> *IL2rg*<sup>tm1</sup>/BcgenHsd

**Albino.** The B-NDG model is a single knockout mouse with an ultra-immunodeficient phenotype. The model was generated by Biocytogen by deleting the *IL2rg* gene from NOD.scid mice. *Prkdc* (protein kinase DNA-activated catalytic) null *scid* mutation is characterized by significantly deficient of functional T cells and B cells. The common gamma chain gene (*IL2RG*) deletion results in the lack of functional NK cells. Envigo licensed the mouse model from Biocytogen in 2019, where the model had been maintained.

## Characteristics

- Common gamma chain gene (*Il2rg*) interrupted
- Lacks functional receptors for IL-2, IL-4, IL-7, IL-9, IL-15, and IL-21
- Autosomal recessive, single nucleotide polymorphism with *Prkdc* gene on chromosome 16
- Severe lymphocyte development impairment
- Deficient in T cells
- Deficient in B cells
- Lacks NK cells
- Deficiency in cytokine signaling
- High humanization capability

## Research use

- Oncology research
- Cancer cell transplantation
- Immunology
- Infectious disease
- Humanization applications

## Features and advantages

- Severe Immunodeficiency -> Ultra immunodeficient phenotype enhances tumor cell acceptance
- Reduced leakiness -> Decreased leakiness as compared to SCID models
- High humanization capability -> Minimal rejection of human-derived cells and tissue

## Additional data

- Hematology
- Flow cytometry data
- Tumor growth charts
- PDX model data
- Humanization data

For more information on model development and characterization updates, visit: [www.envigo.com/bndg](http://www.envigo.com/bndg)

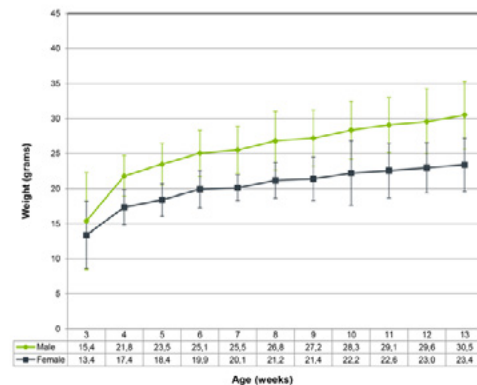
For-profit (commercial) / Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$170.00	\$210.00
4-5	\$170.00	\$210.00
5-6	\$170.00	\$210.00
6-7	\$171.00	\$211.00
7-8	\$172.00	\$212.00
8-9	\$174.00	\$214.00
9-10	\$175.00	\$215.00
Over 10 weeks, add per week	\$5.00	\$5.00

Not-for-profit (academic) / Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$78.00	\$100.00
4-5	\$78.00	\$100.00
5-6	\$78.00	\$100.00
6-7	\$78.00	\$100.00
7-8	\$78.00	\$100.00
8-9	\$83.00	\$105.00
9-10	\$88.00	\$109.00
Over 10 weeks, add per week	\$5.00	\$5.00

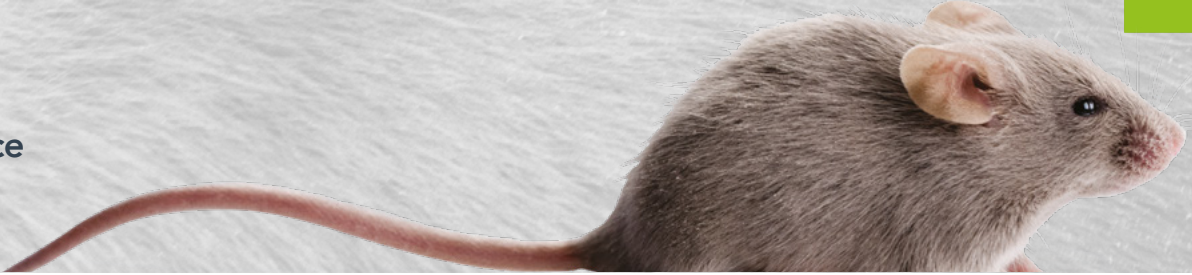
## NOD.CB17-*Prkdc*<sup>scid</sup> *IL2rg*<sup>tm1</sup>/BcgenHsd



Maintained on Teklad Global Rodent Diet 2919 (19% Protein)  
Cage floor space (MB3): 1016 cm<sup>2</sup>  
Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice.  
Growth chart includes mean + 2 SD's representative of population distribution.

\*\*When packing males, all animals will need to be packed as cage mates only.

# Hybrid mice



MODEL CODE  
**061**

MODEL CODE  
**063**



## B6C3F1

NOMENCLATURE: B6C3F1/Hsd

## B6D2F1

NOMENCLATURE: B6D2F1/Hsd

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$37.60	\$40.90
4-5	\$39.75	\$41.65
5-6	\$48.05	\$45.90
6-7	\$50.50	\$46.10
7-8	\$55.30	\$49.10
Over 8 weeks, add per week	\$6.55	\$6.65
Proven breeder	\$51.50	\$49.95
Retired breeder	\$32.45	\$31.45
Untimed pregnant*		\$217.05
Timed mated*		\$244.15
Female with litter		\$244.15

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$34.20	\$37.75
4-5	\$37.65	\$39.25
5-6	\$44.15	\$42.05
6-7	\$53.30	\$46.35
7-8	\$57.10	\$50.25
Over 8 weeks, add per week	\$7.55	\$6.40
Proven breeder	\$65.25	\$56.35
Retired breeder	\$44.45	\$35.50
Untimed pregnant*		\$229.90
Timed mated*		\$252.25
Female with litter		\$252.25

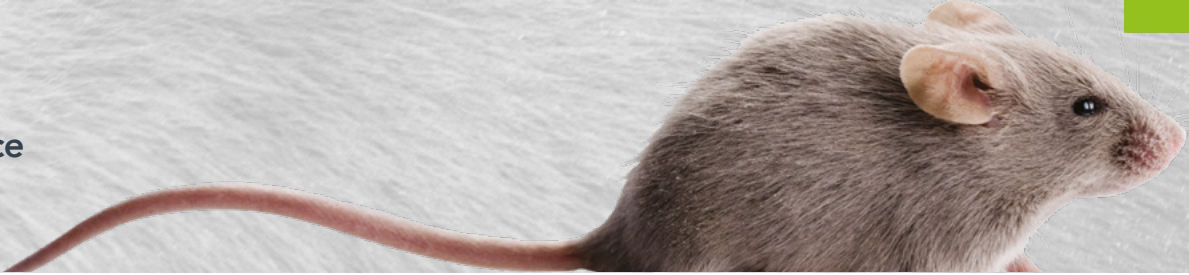
\* For our pregnant animal policy, refer to page 84.

**Agouti.** Offspring of a cross between the C57BL/6NHsd inbred female and the C3H/HeNHsd inbred male.

\* For our pregnant animal policy, refer to page 84.

**Black.** Offspring of a cross between the C57BL/6NHsd inbred female and the DBA/2NHsd inbred male.

# Hybrid mice



MODEL CODES  
**065**

MODEL CODES  
**060**



## CB6F1

NOMENCLATURE: CB6F1/Hsd

## CD2F1

NOMENCLATURE: CD2F1/Hsd

Price per animal

Price per animal

AGE (WEEKS)	MALE	FEMALE
3-4	\$55.35	\$62.40
4-5	\$59.40	\$66.20
5-6	\$62.95	\$69.60
6-7	\$68.95	\$73.65
7-8	\$71.50	\$76.50
Over 8 weeks, add per week	\$8.50	\$8.50
Proven breeder	\$66.75	\$66.75
Retired breeder	\$55.35	\$55.35
Untimed pregnant*		\$296.05
Timed mated*		\$332.90
Female with litter		\$332.90

AGE (WEEKS)	MALE	FEMALE
3-4	\$37.35	\$40.10
4-5	\$41.15	\$42.25
5-6	\$44.00	\$46.35
6-7	\$49.70	\$50.95
7-8	\$51.45	\$51.60
Over 8 weeks, add per week	\$6.65	\$6.25
Proven breeder	\$49.25	\$39.30
Retired breeder		\$34.60
Untimed pregnant*		\$189.15
Timed mated*		\$230.70
Female with litter		\$207.65

\* For our pregnant animal policy, refer to page 84.

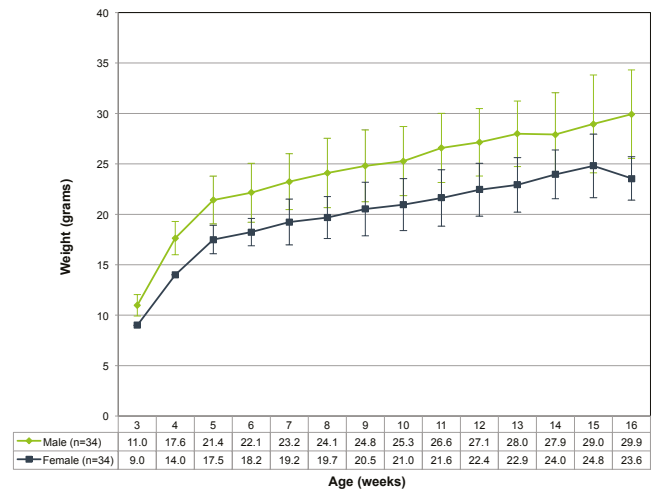
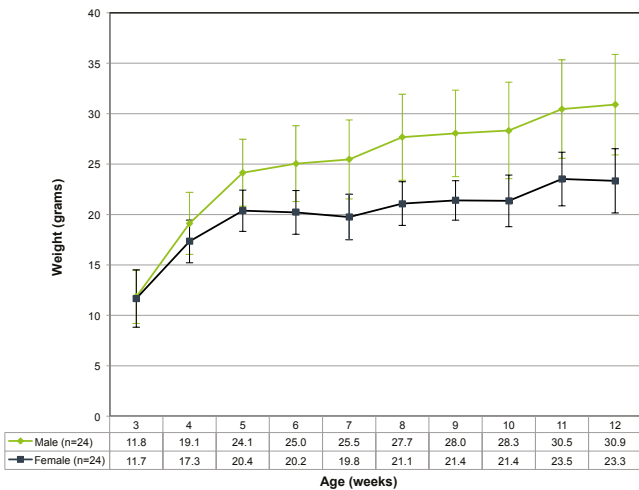
\* For our pregnant animal policy, refer to page 84.

**Agouti.** Offspring of a cross between the BALB/cAnNHsd inbred female and the C57BL/6NHsd inbred male.

**Agouti.** Offspring of a cross between the BALB/cAnNHsd inbred female and the DBA/2NHsd inbred male.

### CB6F1/Hsd

### CD2F1/Hsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 71.5 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of mice. Growth chart includes mean ± 2 SD's representative of population distribution.

# Inbred rats



MODEL CODE  
**013**



MODEL CODE  
**147**

## ACI

NOMENCLATURE: ACI/SegHsd

AGE (WEEKS)	Approx weight (g)		Price per animal
	MALE	FEMALE	
3-4	Up to 50	Up to 50	\$232.50
4-5	51-75	51-70	\$257.10
5-6	76-110	71-100	\$278.60
6-7	111-135	101-115	\$308.50
7-8	136-155	116-125	\$337.25
8-9	156-180	126-135	\$369.05
9-10	181-195	136-145	\$402.60
10-11	196-210	146-155	\$431.15
Untimed pregnant*			\$975.90
Timed mated*			\$1,134.95
Female with litter			\$1,190.80
Proven breeder			\$531.80
Retired breeder			\$268.85

\* For our pregnant animal policy, refer to page 84.

**Black agouti.** Derived from a nucleus colony obtained from Dr. A. Segaloff's colony at the Ochsner Medical Center, Jefferson, Louisiana.

### Characteristics

- Coat: Black Agouti, with white belly and feet
- Haplotype: *RT1<sup>av1</sup>*
- High incidence of congenital malformations including renal agenesis, hypoplasia, hydronephrosis or cystic kidney, unilateral, that may be associated with ipsilateral defective uterine horn or testis
- High incidence of testicular tumors
- Litter average: 6.0
- Poor reproductive performance and low litter size due to high in-utero mortality

### Research use

- Carcinogenesis
- Estrogen-induced pituitary growth
- Transplant immunology

## Brown Norway

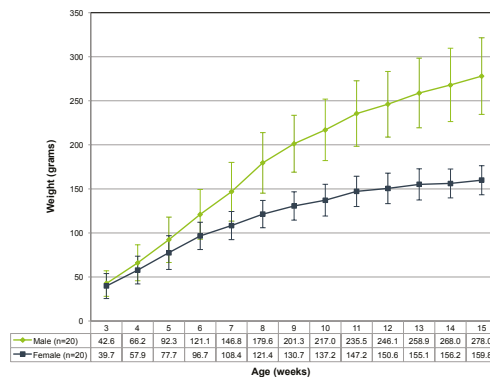
NOMENCLATURE: BN/RijHsd

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
Less than 49g	21 - 22	21 - 22	\$168.75	\$177.30
50-74	23 - 30	23 - 35	\$181.85	\$194.10
75-99	31 - 37	36 - 43	\$194.10	\$215.50
100-124	38 - 43	44 - 55	\$207.95	\$258.40
125-149	44 - 50	56 - 72	\$232.55	\$303.15
150-174	51 - 54	73 - 84	\$265.85	\$389.90
175-199	55 - 63	85+	\$285.45	\$430.10
200-224	64 - 71		\$306.30	\$459.25
225-249	72 - 82		\$325.70	\$477.30
250-299	83+		\$360.35	
Proven breeder			\$389.95	\$517.05
Retired breeder			\$156.55	\$206.90
Untimed pregnant*				\$893.75
Timed mated*				\$976.35
Female with litter				\$1,151.80

\* For our pregnant animal policy, refer to page 84.

**Brown, non-agouti.** BN/RijHsd rats were derived from a nucleus colony obtained directly from the TNO Institute, the Netherlands.

### BN/RijHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Cage floor space: 120.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Litter average: 4.5
- Haplotype: *RT1<sup>n</sup>*
- Hyper-responsive lungs
- High incidence of bladder tumors in males

### Research use

- Allergic respiratory disease
- Oncology
- Aging
- Leukemia
- Nephrology

# Inbred rats



MODEL CODE  
**092**

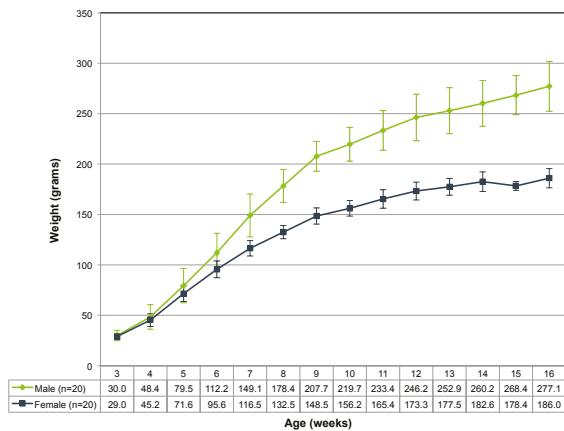
## DA (Dark Agouti)

NOMENCLATURE: DA/OlaHsd

AGE (WEEKS)	Price per animal	
	MALE	FEMALE
3-4	\$183.50	\$183.50
4-5	\$183.50	\$183.50
5-6	\$183.50	\$183.50
6-7	\$232.55	\$232.55
7-8	\$232.55	\$232.55
8-9	\$232.55	\$232.55
9-10	\$293.65	\$293.65
10-11	\$293.65	\$293.65
11-12	\$293.65	\$293.65
12-13	\$367.10	\$367.10
13-14	\$367.10	\$367.10
14-15	\$367.10	\$367.10
15-16	\$367.10	\$367.10

**Agouti.** From A.R.C. Cambridge, United Kingdom; to Olac, United Kingdom, in 1979; to Harlan, United States, in 1992. Harlan became Envigo in 2015.

### DA/OlaHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of rats.  
Growth chart includes mean  $\pm$  2 SD's representative of population distribution.

### Characteristics

- Litter average: 6.0
- Haplotype: *RT1<sup>av1</sup>*
- Females have a defective bile acid transport

### Research use

- Experimental allergic encephalomyelitis
- Induced rheumatoid arthritis
- Oncology
- Cardiovascular
- Transplantation



# Inbred rats



MODEL CODE  
**010**



MODEL CODE  
**017**

## Fischer 344

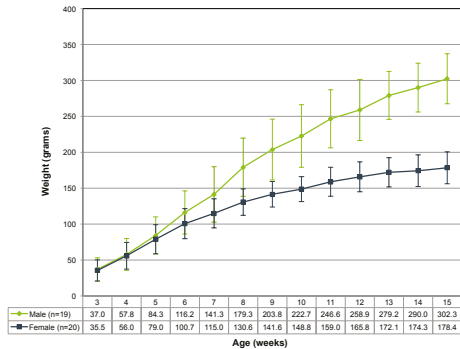
NOMENCLATURE: F344/NHsd

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
35-49	26-31	26-33		\$46.95
50-74	32-38	34-43	\$47.10	\$51.60
75-99	39-44	44-54	\$54.55	\$63.45
100-124	45-51	55-72	\$65.25	\$71.00
125-149	52-58	73-84	\$71.55	\$86.15
150-174	59-64	85+	\$80.50	\$111.40
175-199	65-72		\$85.75	\$140.65
200-224	73-81		\$100.30	\$150.45
225-249	82-84		\$107.85	
250-299	85+		\$115.35	
300+			\$122.65	
Untimed pregnant*				Upon request
Timed mated*				Upon request
Female with litter				Upon request
Proven breeder			Upon request	Upon request
Retired breeder			Upon request	Upon request

\* For our pregnant animal policy, refer to page 84.

**Albino.** Descended from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

### F344/NHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Cage floor space: 120.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Litter average: 7.5
- Haplotype: *RT1<sup>lv1</sup>*
- Hydrocephalic resistant

### Additional available data

- Hematology
- Clinical chemistry
- Two-year growth

### Research use

- Experimental allergic encephalomyelitis
- Carcinogenicity
- Oncology
- Toxicology
- Aging
- Ophthalmology
- Autoimmunity
- General purpose

## Lewis

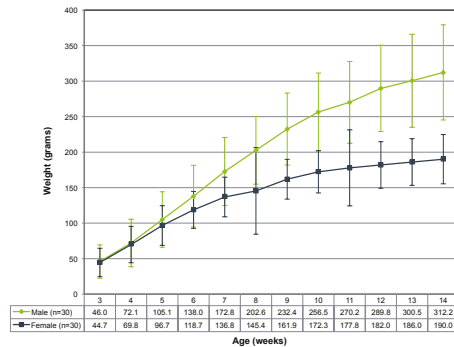
NOMENCLATURE: LEW/SsNHsd

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
Less than 49	19 - 20	19 - 22	\$46.05	\$45.40
50-74	21 - 28	23 - 28	\$52.35	\$51.45
75-99	29 - 33	29 - 32	\$57.70	\$58.00
100-124	34 - 36	33 - 40	\$61.90	\$64.20
125-149	37 - 39	41 - 49	\$75.80	\$74.35
150-174	40 - 43	50 - 69	\$86.80	\$83.40
175-199	44 - 48	70+	\$93.40	\$92.40
200-224	49 - 54		\$98.15	\$96.55
225-249	55 - 58		\$106.50	Upon request
250-299	59 - 70		\$113.70	
300+	71+		\$124.80	
Untimed pregnant*				\$261.80
Timed mated*				\$337.10
Female with litter				\$389.30
Proven breeder			\$91.65	\$206.05
Retired breeder			\$61.30	\$67.75

\* For our pregnant animal policy, refer to page 84.

**Albino.** Descended from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

### LEW/SsNHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Cage floor space: 120.75 in<sup>2</sup>. Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Litter average: 7.5
- Docile disposition
- Haplotype: *RT1<sup>l</sup>*
- Inbred recipient for several congenic strains
- Increased levels of serum thyroxine, insulin, and growth hormone
- Susceptible to induction of autoimmune disease

### Research use

- Adjuvant-induced arthritis
- Experimental allergic encephalomyelitis
- Transplantation

### Additional available data

- Clinical chemistry

**Aging available for F344 rats** See page 75

# Inbred rats



MODEL CODE  
**022**

## Spontaneously Hypertensive

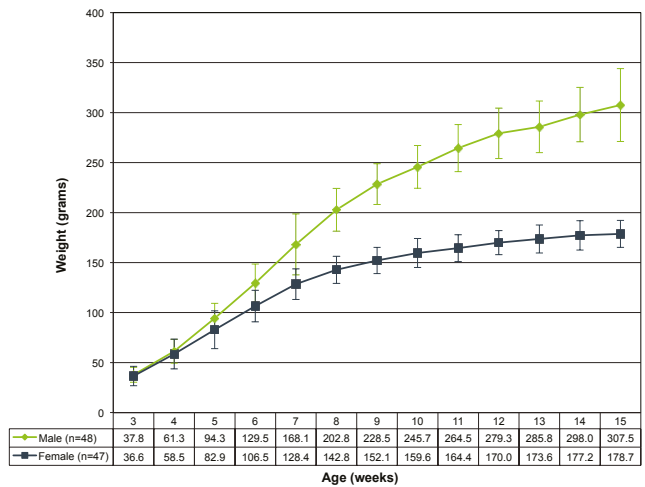
NOMENCLATURE: SHR/NHsd

AGE (WEEKS)	Price per animal
3-4	\$185.40
4-5	\$200.50
5-6	\$217.30
6-7	\$244.75
7-8	\$268.20
8-9	\$291.50
9-10	\$314.25
10-11	\$336.20
11-12	\$365.50
12-13	\$399.15
13-14	\$426.05
14-15	\$464.25
Untimed pregnant*	\$1,224.50
Timed mated*	\$1,295.50
Female with litter	\$1,664.55
Proven breeder	\$527.30
Retired breeder	\$305.65

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

### SHR/NHsd



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Growth chart includes mean ± 2 SD's representative of population distribution.

# Inbred rats



MODEL CODE  
**023**

## Wistar Kyoto

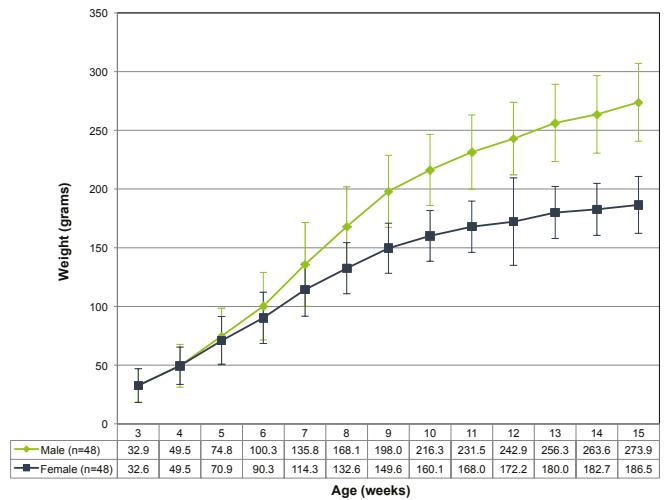
NOMENCLATURE: WKY/NHsd

AGE (WEEKS)	Price per animal
3-4	\$162.05
4-5	\$175.05
5-6	\$187.75
6-7	\$214.90
7-8	\$250.00
8-9	\$269.70
9-10	\$301.25
10-11	\$314.50
11-12	\$353.80
12-13	\$388.25
13-14	\$419.40
14-15	\$458.85
Untimed pregnant*	\$1,146.60
Timed mated*	\$1,229.00
Female with litter	\$1,573.90
Proven breeder	\$449.70
Retired breeder	\$296.40

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from a nucleus colony obtained from the National Institutes of Health, Bethesda, Maryland.

### WKY/NHsd



Maintained on Teklad Global Rodent Diet 2018S  
(18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of rats.  
Growth chart includes mean ± 2 SD's representative of population distribution.

# Outbred rats



MODEL CODE  
**003**



MODEL CODE  
**140**

## Holtzman®

NOMENCLATURE: HsdHot:Holtzman® SD®

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
35-49	18 - 20	18 - 20	\$117.25	\$119.20
50-74	21 - 24	21 - 24	\$142.40	\$144.50
75-99	25 - 28	25 - 30	\$154.65	\$157.60
100-124	29 - 33	31 - 34	\$169.50	\$171.85
125-149	34 - 37	35 - 40	\$187.85	\$194.40
150-174	38 - 41	41 - 46	\$201.25	\$209.20
175-199	42 - 45	47 - 52	\$218.20	\$227.15
200-224	46 - 48	53 - 58	\$232.15	\$242.35
225-249	49 - 51	59 - 63	\$247.50	\$265.05
250-274	52 - 54	64 - 70	\$267.55	\$280.10
275-299	55 - 59	71 - 90	\$295.90	\$303.85
300-324	60 - 64	91+	\$313.55	
325-349	65 - 70		\$328.75	
350-374	71 - 74		\$347.30	
375-399	75 - 80		\$359.70	
Untimed pregnant*				Upon request
Timed mated*				Upon request
Female with litter				Upon request
Proven breeder			Upon request	Upon request
Retired breeder			Upon request	Upon request

\* For our pregnant animal policy, refer to page 84.

**Albino.** Originally developed by the Holtzman Company in Madison, Wisconsin, from Sprague Dawley® stock in 1947; to Harlan through acquisition in 1986. Harlan became Envigo 2015.

## Characteristics

- Litter average: 11.0

## Long Evans (Blue Spruce)

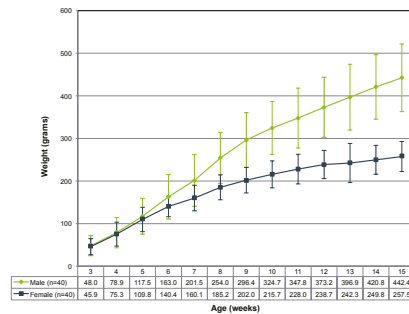
NOMENCLATURE: HsdBlu:LE

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
35-49	20 - 23	20 - 24	\$28.30	\$29.00
50-74	24 - 29	25 - 30	\$33.05	\$36.05
75-99	30 - 33	31 - 35	\$40.05	\$42.25
100-124	34 - 37	36 - 41	\$44.85	\$47.00
125-149	38 - 41	42 - 49	\$48.95	\$51.35
150-174	42 - 45	50 - 56	\$53.10	\$59.30
175-199	46 - 49	57 - 69	\$57.75	\$63.35
200-224	50 - 57	70 - 89	\$62.70	\$69.75
225-249	58 - 64	90 - 110	\$70.95	\$75.70
250-274	65 - 70	111+	\$76.65	\$85.80
275-299	71 - 79		\$81.20	\$91.70
300-324	80 - 90		\$85.90	
325-349	91 - 100		\$95.50	
350-374	101 - 110		\$102.05	
Untimed pregnant*				\$324.90
Timed mated*				\$396.85
Female with litter				\$427.80
Proven breeder			\$151.60	\$169.25
Retired breeder			\$100.45	\$96.05

\* For our pregnant animal policy, refer to page 84.

**Black-hooded.** From the University of Rochester, Rochester, New York; to Blue Spruce Farms, Altamont, New York, in 1964; to Harlan through acquisition in 1988. Harlan became Envigo in 2015.

## HsdBlu:LE



Maintained on Tosted Global Rodent Diet 20185 (18% Protein) Cage floor space: 120.75 in<sup>2</sup> Growth data to be used as guideline only. Data can be subject to differences in maintenance of care. Growth chart includes mean ± 2 SD's representative of population distribution.

## Characteristics

- Litter average: 10.0
- Individual housing of males recommended
- Good maternal characteristics

## Research use

- Diet-induced obesity
- Nutrition
- Behavior
- General purpose

## Additional available data

- Hematology
- Clinical chemistry

# Outbred rats



MODEL CODE  
**001**

## Wistar

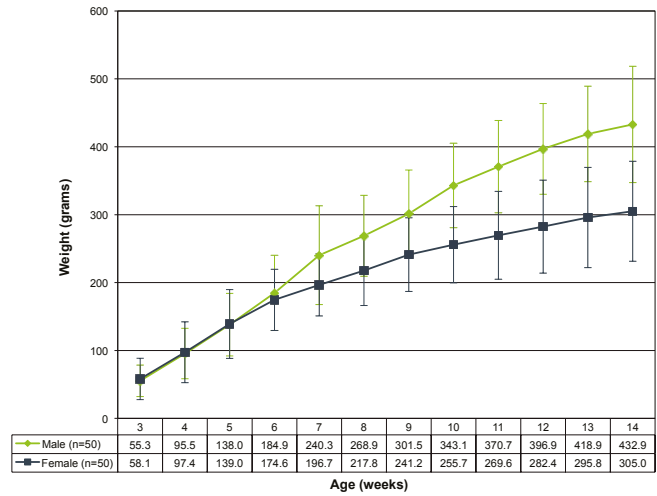
NOMENCLATURE: Hsd:WI

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
50-74	21 - 25	21 - 26	\$27.50	\$29.95
75-99	26 - 28	27 - 30	\$33.40	\$35.40
100-124	29 - 32	31 - 34	\$38.95	\$41.00
125-149	33 - 35	35 - 38	\$43.40	\$46.25
150-174	36 - 40	39 - 41	\$46.20	\$51.55
175-199	41 - 42	42 - 49	\$53.50	\$55.40
200-224	43 - 44	50 - 56	\$57.70	\$59.20
225-249	45 - 48	57 - 63	\$62.45	\$63.85
250-274	49 - 52	64 - 76	\$67.10	\$71.40
275-299	53 - 55	77+	\$70.10	\$81.30
300-324	56 - 58		\$73.15	
325-349	59 - 63		\$82.30	
350-374	64 - 69		\$92.10	
375-399	70 - 75		\$93.45	
400+	76+		Upon request	
Untimed pregnant*				\$213.40
Timed mated*				\$255.35
Female with litter				\$269.45
Proven breeder			\$100.40	\$113.15
Retired breeder			\$63.25	\$64.65

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived from animals from the Wistar Institute, Philadelphia, Pennsylvania

### Hsd:WI



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Growth chart includes mean ± SD representative of population distribution.

### Characteristics

- Litter average: 9.5
- Docile disposition
- Spontaneous corneal degeneration

### Research use

- Teratology
- Nutrition
- Aging
- Oncology
- General purpose

### Additional available data

- Hematology
- Clinical chemistry

# Outbred rats



MODEL CODE  
**002**

## Sprague Dawley®

NOMENCLATURE: Hsd:Sprague Dawley® SD®

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
35-49	20 - 21	20 - 21	\$21.30	\$21.45
50-74	22 - 26	22 - 29	\$27.05	\$28.40
75-99	27 - 31	30 - 34	\$33.75	\$35.10
100-124	32 - 35	35 - 39	\$38.25	\$40.10
125-149	36 - 40	40 - 44	\$44.70	\$49.65
150-174	41 - 43	45 - 53	\$47.05	\$54.35
175-199	44 - 48	54 - 64	\$55.15	\$58.00
200-224	49 - 52	65 - 75	\$59.25	\$62.30
225-249	53 - 58	76+	\$64.40	\$67.75
250-274	59 - 63		\$69.60	\$76.15
275-299	64 - 69		\$72.75	\$82.20
300-324	70 - 75		\$77.00	
325-349	76 - 85		\$84.65	
350-374	86 - 95		\$90.20	
375-399	96 - 115		\$93.80	
400+	116+		Upon request	
Untimed pregnant*				\$197.60
Timed mated*				\$233.00
Female with litter				\$250.00
Proven breeder			\$106.80	\$110.90
Retired breeder			\$66.60	\$63.70

\* For our pregnant animal policy, refer to page 84.

**Albino.** Originated by the Sprague-Dawley Company in 1925 through a series of crosses begun with a single-hooded male and six albino females of unknown origin. Current Envigo colonies are direct descendants of this original colony.

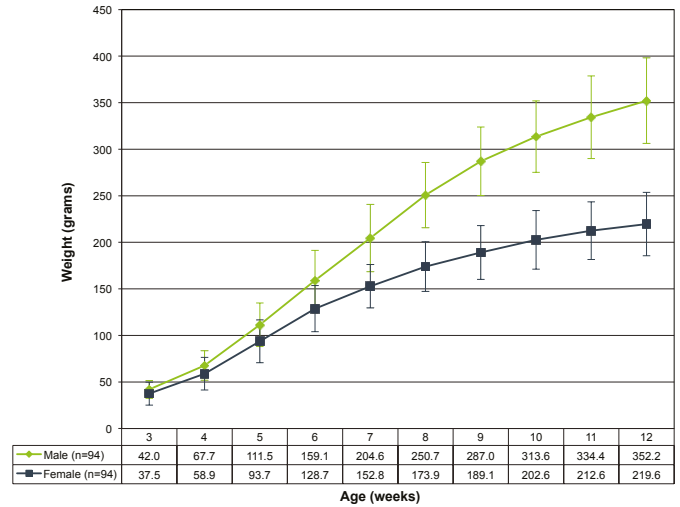
### Characteristics

- Most widely-used outbred rat in animal research
- Litter average: 11.0
- Docile disposition
- Excellent reproductive performance and maternal characteristics

### Research use

- Toxicology
- Aging
- Teratology
- Oncology
- Nutrition
- Diet-induced obesity
- General purpose

### Hsd:Sprague Dawley® SD®



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of rats.  
Growth chart includes mean ± 2 SD's representative of population distribution.

**Aging available for Sprague Dawley rats**

See page 75

# Outbred rats



MODEL CODE  
**168**

## Wistar Han®

NOMENCLATURE: RccHan®:WIST

WEIGHT (g)	Approx age (days)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
35-49	21 - 24	21 - 24	\$23.05	\$24.70
50-74	25 - 30	25 - 31	\$29.85	\$32.45
75-99	31 - 36	32 - 43	\$35.15	\$38.30
100-124	37 - 42	44 - 54	\$40.05	\$43.45
125-149	43 - 47	55 - 65	\$44.25	\$50.70
150-174	48 - 54	66 - 76	\$46.60	\$53.90
175-199	55 - 60	77 - 85	\$53.05	\$61.05
200-224	61 - 66	86+	\$59.95	\$64.60
225-249	67 - 73		\$64.85	\$74.75
250-274	74 - 79		\$70.00	Upon request
275-299	80 - 85		\$72.75	Upon request
300-324	86+		\$78.95	
325-349			\$86.20	
350-374			\$89.20	
375-399			\$93.45	
Untimed pregnant*				\$175.60
Timed mated*				\$196.75
Female with litter				\$211.30
Proven breeder			\$90.40	\$105.80
Retired breeder			\$58.35	\$57.60

\* For our pregnant animal policy, refer to page 84.

**Albino.** Derived at Biological Research Laboratories Limited (BRL), formerly RCC Ltd., Füllinsdorf, Switzerland, from original colony at Zentralinstitute für Versuchstierzucht, Hannover, in 1989. Transferred to Harlan Sprague-Dawley, Inc. in 1993 (nomenclature HsdHan®:WIST). In 2004, Harlan acquired RCC Ltd. and new breeding stock was transferred in 2008 (nomenclature RccHan®:WIST). Harlan became Envigo in 2015. Unlike competitive models, the RccHan®:WIST rat has been maintained from the original nucleus of 156 breeding pairs in Hannover, Germany.

### Characteristics

- Litter average: 9.5
- Docile disposition

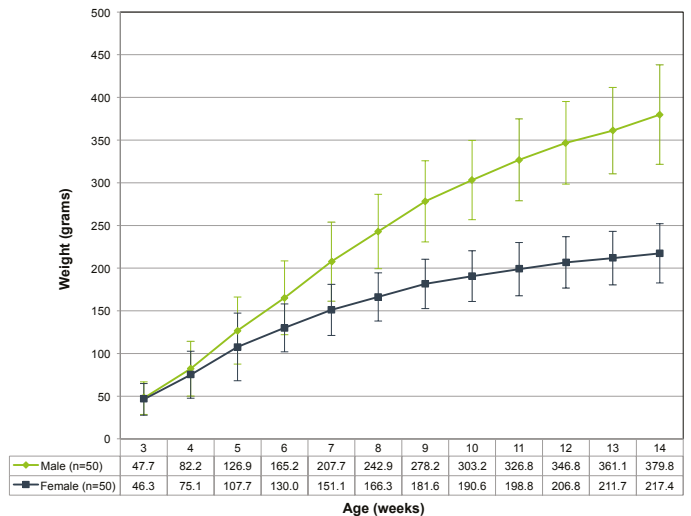
### Research use

- Toxicology
- Oncology
- Teratology
- Aging
- General purpose

### Additional available data

- Hematology
- Clinical chemistry

### RccHan®:WIST



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Growth chart includes mean ± 2 SD's representative of population distribution.

## 20 years of stable control data at [envigo.com/toxicology](http://envigo.com/toxicology)

### Acute to Oncogenicity studies - 3, 6, 12, and 24 months

- Survival rates
- Growth
- Food and water consumption
- Clinical observations
- Functional observation battery
- Ophthalmoscopy
- Clinical pathology
- P450 enzymes
- Gross lesions and organ weights
- Bone marrow differentiation
- Incidence and images of spontaneous neoplastic and non-neoplastic changes
- Reproductive and developmental data

# Outbred rats



## + Key advantages

- + Reduced body size
  - + Reduced compound use
  - + More efficient housing
  - + Reduced food consumption
  - + Diet restriction not required
- + Increased longevity compared with the Crl:CD(SD)
  - + Ensures study completion with confidence
  - + Fewer animals required to start the study, meeting the 3Rs
- + Reduced tumor incidence
  - + Fewer background tumors



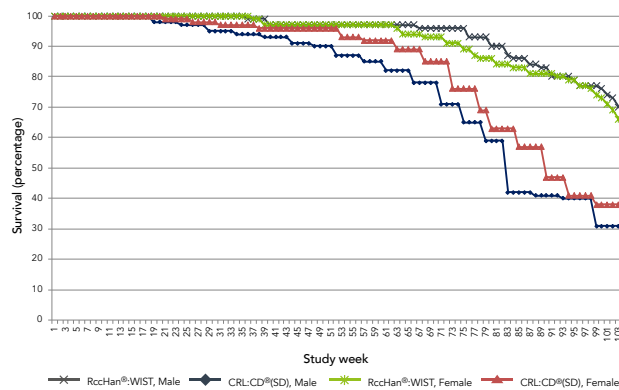
### Latest 103-week data available

- Growth and survival
- Food consumption
- Clinical observations

For all available data, go to [envigo.com/toxicology](http://envigo.com/toxicology)

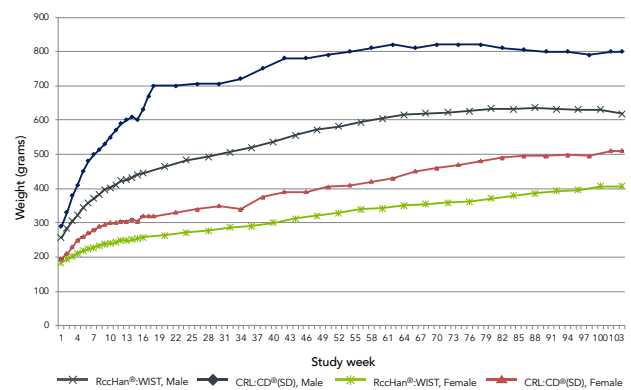
#### RccHan®:WIST 103-week growth curve

Figure 3: Comparing Wistar Han® and CRL:CD(SD) survival data



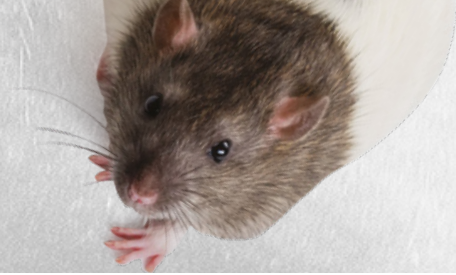
#### RccHan®:WIST 103-week survival curve

Figure 2: Growth curve for Wistar Han® and CRL:CD® rats





# Mutant rats



MODEL CODES  
**005, 006**

## Athymic Nude

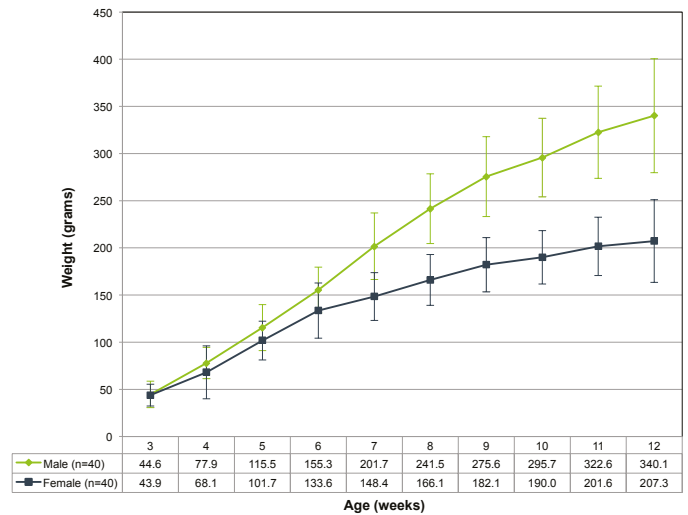
NOMENCLATURE: Hsd:RH-Foxn1<sup>mu</sup> (Code 005)

NOMENCLATURE: Hsd:RH-Foxn1<sup>mu</sup>/Foxn1<sup>+</sup> (Code 006)

AGE (WEEKS)	Price per animal	
	<i>rmu/rmu</i>	<i>rmu/+</i>
3-4	\$193.65	\$137.10
4-5	\$238.50	\$185.20
5-6	\$286.90	\$238.40
6-7	\$331.70	\$281.40
7-8	\$380.15	\$327.40
8-9	\$424.30	\$373.00
9-10	\$474.15	\$418.25
Over 10 weeks, add per week	\$54.30	\$54.75

**Hooded (pigmented).** Derived from animals obtained from the Rowett Research Institute, Aberdeen, Scotland.

### Hsd:RH-Foxn1<sup>mu</sup>



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 141.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of rats.  
Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- The *rmu* allele on chromosome 10 is an autosomal recessive mutation associated with hairlessness and thymic aplasia
- The thymus-dependent lymph node areas are depleted of lymphocytes (T-cells)
- Phenotypically hairless (sparse hair growth possible)
- Rudimentary thymic tissue
- Increased Natural Killer (NK) cell population
- *Foxn1<sup>mu</sup>/Foxn1<sup>+</sup>* heterozygotes do not show partial expression of *rmu* phenotype

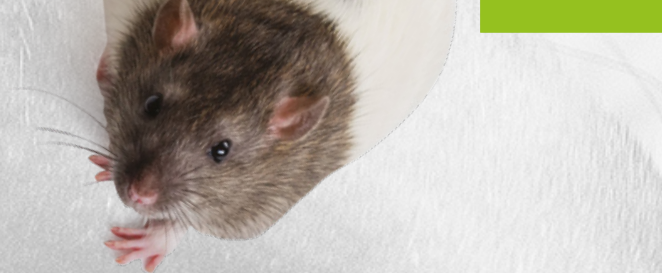
### Research use

- Oncology
- Immunology
- Xenograft and allograft transplantation

### Additional available data

- Proven model with extensive references (see page 20)

# Mutant rats



MODEL CODES  
**194, H195\***  
**W195\*, 195**

## Zucker

HsdHlr.ZUCKER-*Lepr<sup>fa</sup>* - fat, homozygous (Code 194)  
 HsdHlr.ZUCKER-*Lepr<sup>fa</sup>/Lepr<sup>+</sup>* - lean, heterozygous (Code H195\*)  
 HsdHlr.ZUCKER-*Lepr<sup>+</sup>* - lean, homozygous wildtype (Code W195\*)  
 HsdHlr.ZUCKER-(Lean) - lean, not genotyped (Code 195)

AGE (WEEKS)	Price per animal	
	<i>fa/fa</i>	Lean*
3-4	\$340.95	\$90.75
4-5	\$356.35	\$93.80
5-6	\$373.70	\$98.70
6-7	\$394.05	\$109.80
7-8	\$423.15	\$122.50
8-9	\$446.30	\$135.00
9-10	\$468.65	\$141.30
Over 10 weeks, add per week	\$32.65	\$18.25

### Black, brown, brown/white, black/white.

Derived from a colony obtained in 1992 from Hoffmann-La Roche, Nutley, New Jersey.

\* Genetic testing is required to determine *Lepr<sup>fa</sup>/Lepr<sup>+</sup>* or *Lepr<sup>+</sup>/Lepr<sup>+</sup>* genotype. See page 69 for genotyping services available from Envigo.

### Characteristics

- *Lepr<sup>fa</sup>/Lepr<sup>+</sup>* heterozygotes do not show partial expression of *fa* phenotype
- *fa* is an autosomal-recessive mutation on chromosome 5
- Exhibit obesity at 4 to 5 weeks of age
- Animals have not been selectively bred to induce hyperglycemia
- Insulin resistant
- Adipocyte hypertrophy and hyperplasia
- Hyperphagia
- Muscle atrophy
- Hyperlipemic
- Hypercholesterolemia
- Hyperinsulinemia

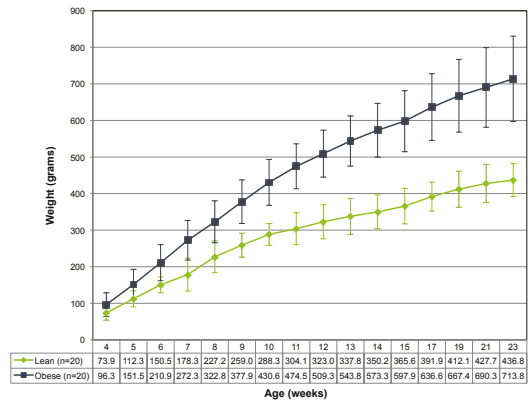
### Research use

- Genetic obesity
- Type 2 Diabetes

### Additional available data

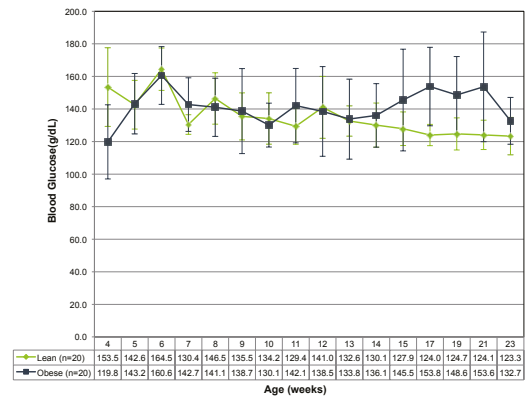
- Hematology
- Clinical chemistry

### ZUCKER-*Lepr<sup>fa</sup>* (male)



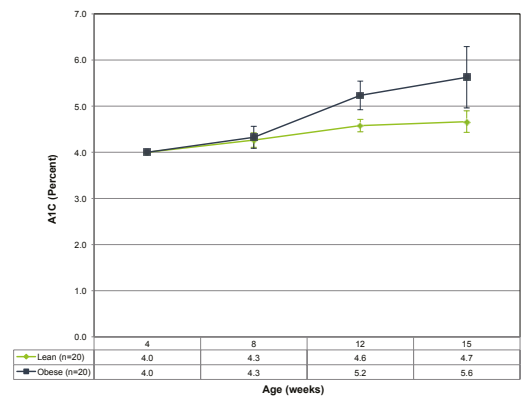
Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Cage floor space: 120.75 in<sup>2</sup>. Growth data to be used as guideline only. Data can be subject to differences in maintenance of rats. Growth chart includes mean ± 2 SD's representative of population distribution. Phenotypic discrimination only. Rats were not genotyped.

### ZUCKER-*Lepr<sup>fa</sup>* Blood Glucose (male)



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Cage floor space: 120.75 in<sup>2</sup>. Non-fasted. Glucose data to be used as guideline only. Data can be subject to differences in maintenance of rats. Glucose chart includes mean ± 1 SD representative of population distribution. Phenotypic discrimination only. Rats were not genotyped.

### ZUCKER-*Lepr<sup>fa</sup>* A1c (male)



Maintained on Teklad Global Rodent Diet 2018S (18% Protein). Cage floor space: 120.75 in<sup>2</sup>. Non-fasted. A1c data to be used as guideline only. Data can be subject to differences in maintenance of rats. A1c chart includes mean ± 1 SD representative of population distribution. Phenotypic discrimination only. Rats were not genotyped.

## GEMS rats



# Pink1 knockout rat - Park6

NOMENCLATURE: HsdSage: LE-Pink1<sup>tm1Sage</sup>

Developed in collaboration with The Michael J. Fox Foundation, this model contains a deletion of the Pink1 (PTEN-induced putative kinase 1) gene, encoding for a serine/threonine protein kinase. Mutations in Pink1 are implicated in early-onset Parkinson's disease. Pink1 knockout rats show both motor impairments and dopaminergic cell loss, making this a useful model of Parkinson's disease.

Pink1 protein kinase localizes to the mitochondria and is thought to protect cells from stress-induced mitochondrial dysfunction. Mutations within this gene result in one form of autosomal recessive early-onset Parkinson's.

In humans, loss of function of Park7 leads to a form of early-onset Parkinson's disease. This occurs due to the role Park7 plays in protecting neurons from oxidative stress and cell death, making this an ideal model for the study of Parkinson's disease.

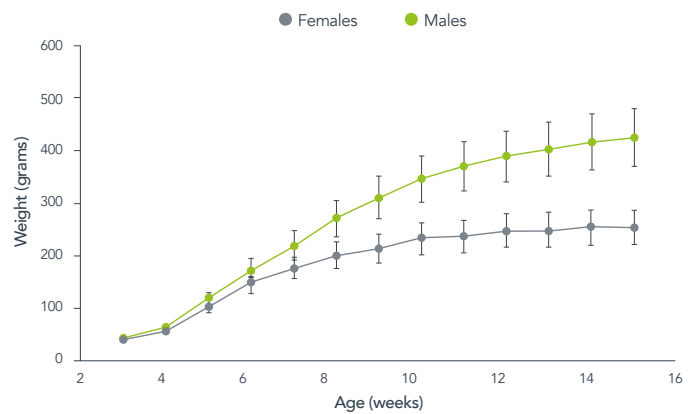
## Characteristics

- Homozygous knockout rats exhibit complete loss of target protein
- Approximately 30% of Pink1 knockout rats display a hindlimb-dragging phenotype at 5 months of age
- Pink1 knockout rats show increased hindlimb fatigue at 7 weeks of age
- Pink1 knockout rats show increased number of hindlimb foot slips at 5 and 9 weeks of age as assessed by tapered balance beam
- Preliminary reports have suggested Pink1 knockout rats show a ~50% reduction in dopaminergic neurons in the substantia nigra at 8 months of age
- Background strain: Long Evans Hooded

## Research use

- Parkinson's disease
- Stress-induced neurological dysfunction

## HsdSage: LE-Pink1<sup>tm1Sage</sup>



\*\* When packing males, all animals will need to be packed as cage mates only. Otherwise, males will be packed separately.

## GEMS rats



# Park 2 Parkin knockout rat

NOMENCLATURE: HsdSage: LE-*Park2*<sup>tm1Sage</sup>

Developed in collaboration with The Michael J. Fox Foundation, this model contains a deletion of the *Park2* (Parkinson disease [autosomal recessive, juvenile] 2) gene, encoding for the protein Parkin. Mutations in Parkin have been linked to early-onset Parkinson's disease (PD), making this model useful to further understand the role of Parkin in PD.

In humans, loss of function of *Park2* leads to a form of familial Parkinson's disease. The Parkin protein is part of the ubiquitin-proteasomal enzyme pathway and may help degrade other proteins that are toxic to neurons. Roughly 20% of patients with Parkinson's disease onset before age 40 have mutations within *Park2*, making this an ideal model for the study of Parkinson's disease.

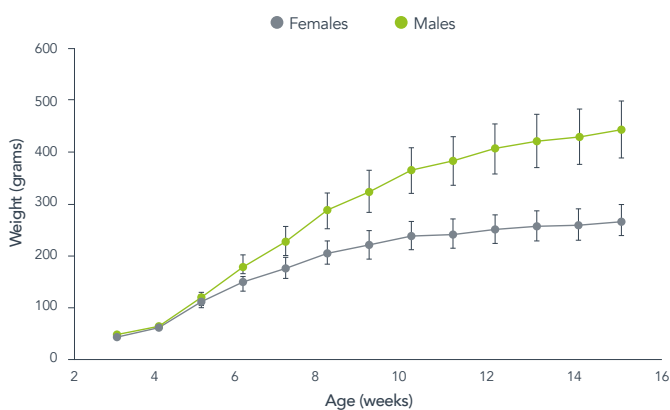
## Characteristics

- Homozygous knockout rats exhibit complete loss of target protein as demonstrated by Western blot
- *Park2* knockout rats show normal motor performance on rotarod
- Background strain: Long Evans Hooded

## Research use

- Parkinson's disease
- Dopaminergic cell toxicity

## HsdSage: LE-*Park2*<sup>tm1Sage</sup>



\*\* When packing males, all animals will need to be packed as cage mates only. Otherwise, males will be packed separately.



# Mdr1a knockout rat

NOMENCLATURE: HsdSage: SD-Mdr1a<sup>tm1Sage</sup>

P-glycoprotein plays a critical role in efflux for both brain and liver. Homozygous null Mdr1a rats display increased exposure to CNS drugs in the brain, as well as increased bioavailability in the plasma for P-gp-specific substrates.

MDR1 encodes for P-glycoprotein and is a membrane-bound drug transporter expressed in the brain and intestine. It effectively blocks drugs from crossing the blood-brain barrier. P-gp can confer multiple drug resistance to tumor cells. Absence of P-gp creates a functional deficiency in the blood-brain barrier and results in elevated drug levels in many tissues, making this a useful model for efflux assay, efficacy, formulation, tissue distribution, studying neurotoxicology and chemotherapeutic agents.

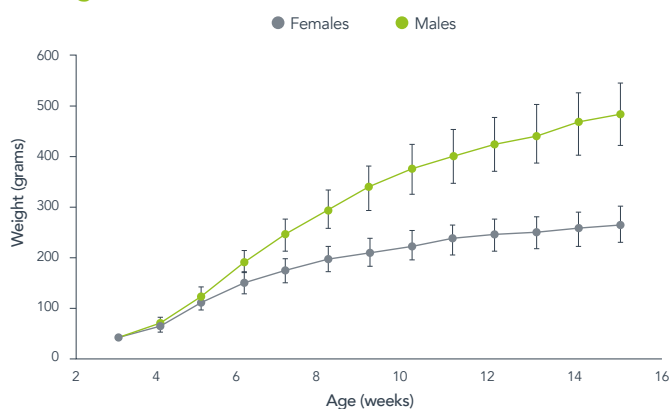
## Characteristics

- Biallelic 20 bp deletion within Abcb1 gene
- Increased oral bioavailability of P-gp-specific substrates
- Homozygous knockout rats display total loss of protein via Western blot
- Background strain: Sprague Dawley

## Research use

- DMPK assay
- PK-PD efflux assay
- Neurotoxicology
- Formulation drug-drug interactions
- Drug resistance
- Blood brain barrier efflux
- Efficacy

## HsdSage: SD-Mdr1a<sup>tm1Sage</sup>



\*\* When packing males, all animals will need to be packed as cage mates only. Otherwise, males will be packed separately.

## GEMS rats



# Mdr1a - Bcrp knockout rat

NOMENCLATURE: HsdSage: SD-Mdr1a<sup>tm1sage</sup> Abcg2<sup>tm1sage</sup>

P-gp and Bcrp both play a critical role in efflux for brain. Double homozygous null Mdr1a-Bcrp rats display increased exposure to CNS drugs in the brain, as well as increased bioavailability in the plasma for P-gp and Bcrp specific substrates.

MDR1 and BCRP are membrane-bound drug transporters expressed in the brain. Each effectively blocks specific drugs from crossing the blood-brain barrier. P-gp and Bcrp can confer multiple drug resistance to tumor cells. Absence of P-gp and Bcrp creates a functional deficiency in the blood-brain barrier and results in elevated drug levels in many tissues, making this a useful model for efflux assay, efficacy, formulation, tissue distribution, studying neurotoxicology and chemotherapeutic agents.

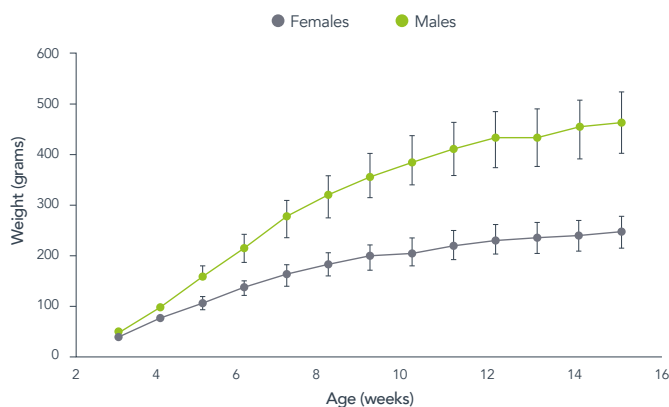
## Characteristics

- Biallelic 20 bp deletion within Abcb1 gene and 588 bp deletion within the Abcg2 gene
- Increased oral bioavailability of P-gp and Bcrp specific substrates
- Homozygous knockout rats display total loss of both proteins via Western blot
- Background strain: Sprague-Dawley

## Research use

- DMPK Assay
- PK/PD Efflux Assay
- Neurotoxicology; Formulation
- Drug-drug interactions
- Drug resistance
- Blood brain barrier efflux
- Efficacy

## HsdSage: SD-Mdr1a<sup>tm1sage</sup> Abcg2<sup>tm1sage</sup>



\*\* When packing males, all animals will need to be packed as cage mates only. Otherwise, males will be packed separately.

## Transgenic rat models

# Pre-developed transgenic rat models.

Advance your drug discovery research with predictive and translational models. Our pre-developed models cover various therapeutics, such as neuroscience, ADMET, cardiovascular, respiratory, and oncology. Our breadth of pre-developed knockout and knockin models are available to provide the scientific community access to popular models for use in basic and preclinical research applications.

Our portfolio of pre-developed transgenic models includes over 70 rat models. The table below details our available portfolio of both off-the-shelf and cryopreserved models for the research community.

Model name		
5Ht3a-Cre knockin rat	Ldlr knockout rat	Pink1 (Park6) knockout rat
AHR knockout rat	Leptin knockout rat	Pink1-Park2 knockout rat
Alpha-Synuclein A53T SNCA knockin rat	Lgals1 (Gal1) knockout rat	Ppara knockout rat
Alpha-Synuclein-SNCA knockout rat	Lrrk1 knockout rat	Prkdc knockout rat
ApoE knockout rat	Lrrk1-Lrrk2 knockout rat	Pten knockout rat
APP knockout rat	Lrrk2 knockout rat	PXR knockout rat
Bcrp knockout rat	Mdr1a knockout rat	PXR-CAR knockout rat
BDNF knockout rat	Mdr1a-1b knockout rat	PXR-CAR-AHR knockout rat
BSEP knockout rat	Mdr1a-Bcrp knockout rat	Rag1 knockout rats (Fischer 344)
CACNA1c knockout rat	MeCP2 knockout rat	Rag1 knockout rats (Sprague Dawley)
CamKIIa-Cre knockin rat	Met knockout rat	Rag2 knockout rats (Fischer 344)
CAR knockout rat	mGluR5 knockout rat	Rag2 knockout rats (Sprague Dawley)
CFTR knockout rat	Mrp1 knockout rat	Rbfox1 knockout rat
CHD8 knockout rat	Mrp2 knockout rat	Sst-Cre knockin rat
CHRNA7 knockout rat	Neurexin1-Nrxn1 knockout rat	Tbx21 (T-beta) knockout rat
CNTNAP2 knockout rat	Neuroigin 3 (Nlgn3) knockout rat	TdTomato reporter knockin rat
COX1 knockout rat	Oat1 knockout rat	TH-Cre knockin rat
Cox2 knockout rat	Oat3 knockout rat	Tph2-Cre knockin rat
DAT-Cre knockin rat	Oct1 knockout rat	Trpv1 knockout rat
DAT-Cre knockin rat	Oct2 knockout rat	VGAT-Cre knockin rat
Disc1 knockout rat	Oprm1 knockout rat	VIP-Cre knockin rat
Faah knockout rat	p53 knockout rat	
Fmr1 knockout rat	p75NTR knockout rat	
Gabrb3 knockout rat	Park2 (Parkin) knockout rat	
hApoE2 knockin rat	Park7 (DJ-1) knockout rat	
hApoE3 knockin rat	Parvalbumin-Cre knockin rat	
hApoE4 knockin rat	Pde4b knockout rat	



For more information on our pre-developed transgenic models, please visit [envigo.com](http://envigo.com) or contact us at [GEMSOOrders@envigo.com](mailto:GEMSOOrders@envigo.com)



# Hamsters



MODEL CODE  
**089**

## Golden Syrian Hamster

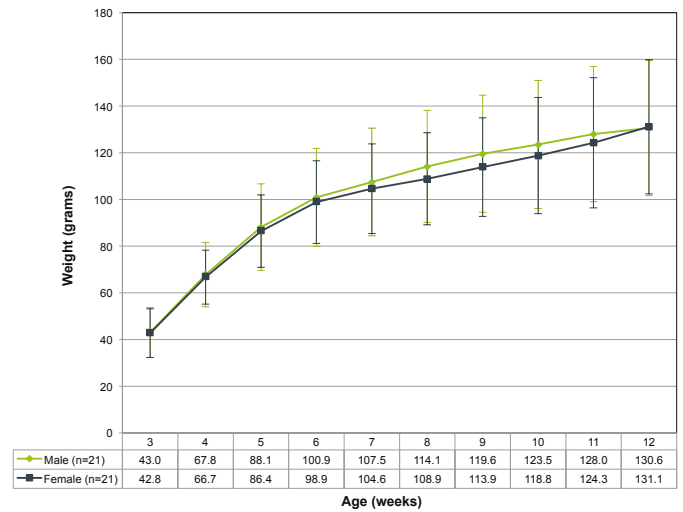
NOMENCLATURE: HsdHan<sup>®</sup>:AURA

AGE (WEEKS)	Approx weight (g)		Price per animal	
	MALE	FEMALE	MALE	FEMALE
3-4	40 - 75	40 - 75	\$48.80	\$48.80
4-5	65 - 90	65 - 90	\$53.50	\$53.50
5-6	75 - 100	75 - 100	\$61.30	\$61.30
6-7	85 - 105	85 - 105	\$68.80	\$68.80
7-8	90 - 110	85 - 110	\$77.90	\$77.90
8-9	90 - 115	90 - 115	\$84.25	\$84.25
9-10	95 - 120	90 - 120	\$93.35	\$93.35
10-11	100 - 130	95 - 130	\$118.60	\$118.60
Pregnant female*				\$237.70
Female with litter				\$213.10
Proven breeder			\$99.95	\$106.75

\* For our pregnant animal policy, refer to page 84.

**Golden brown and white.** Colony established in 1994 with stock originating from Zentralinstitut für Versuchstiere, Hannover, Germany. The source for the Hannover colony was the Sprague-Dawley Company in 1973.

### HsdHan<sup>®</sup>:AURA



Maintained on Teklad Global Rodent Diet 2018S (18% Protein)  
Cage floor space: 141.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of hamsters.  
Growth chart includes mean  $\pm$  2 SD's representative of population distribution.

### Characteristics

- Litter average: 9.0
- Excellent reproductive performance

### Additional available data

- Hematology
- Clinical chemistry
- 12-week growth

### Research use

- Syrian Hamster Embryo (SHE) Cell Transformation Assay
- Toxicology
- Carcinogenesis Behavior
- Hypercholesterolemia
- Infectious disease (*Clostridium difficile*, SARS-CoV2)
- Hibernation

Sia, S. F., Yan, L. M., Chin, A. W., Fung, K., Choy, K. T., Wong, A. Y., ... & Peiris, M. (2020). Pathogenesis and transmission of SARS-CoV-2 in golden hamsters. *Nature*, 1-7. [https://www.researchgate.net/profile/Limeng\\_Yan/publication/341378309\\_Pathogenesis\\_and\\_transmission\\_of\\_SARS-CoV-2\\_in\\_golden\\_hamsters/links/5ebd9dd4458515626ca8376c/Pathogenesis-and-transmission-of-SARS-CoV-2-in-golden-hamsters.pdf](https://www.researchgate.net/profile/Limeng_Yan/publication/341378309_Pathogenesis_and_transmission_of_SARS-CoV-2_in_golden_hamsters/links/5ebd9dd4458515626ca8376c/Pathogenesis-and-transmission-of-SARS-CoV-2-in-golden-hamsters.pdf)



# Cotton rats



MODEL CODE  
**201**

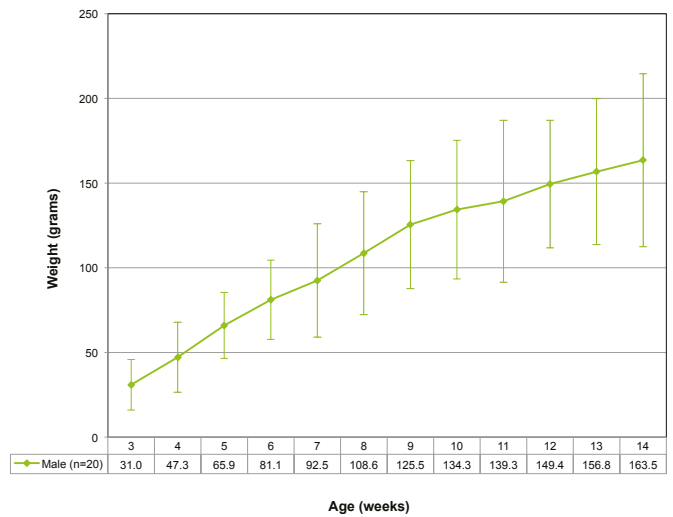
## Cotton Rat

NOMENCLATURE: Hsd:Cotton Rat

AGE (WEEKS)	Price per animal
3-4	\$369.00
4-5	\$409.85
5-6	\$446.05
6-7	\$490.50
7-8	\$521.00
8-9	\$572.40
9-10	\$595.90
Over 10 weeks, add per week	\$33.85

**Color combination varies: gray, brown, black.** *Sigmondon hispidus* (Cotton Rat) is a New World rodent that was developed by the National Institutes of Health, Bethesda, Maryland, and Virion Systems, Inc. In 1996, Harlan obtained a breeding nucleus from Virion Systems, Inc. Harlan became Envigo in 2015.

### Hsd:Cotton Rat



Maintained on Teklad Global Rodent Diet 2019S (19% Protein)  
Cage floor space: 120.75 in<sup>2</sup>

Growth data to be used as guideline only.  
Data can be subject to differences in maintenance of rats.  
Growth chart includes mean ± 2 SD's representative of population distribution.

### Characteristics

- Litter average: 5.5
- Susceptible to a wide range of human infectious disease agents

### Research use

- Adenoviral vector-based gene therapy
- Infectious disease pathogenesis
  - Respiratory Syncytial Virus
  - Herpes Simplex
  - Parainfluenza Type 3
  - Polio
  - Measles
  - Monkeypox
- Infectious disease immune response
  - SARS-CoV2

# Rabbits



## New Zealand White

NOMENCLATURE: HsdHra:(NZW) SPF

Price per animal - available on request

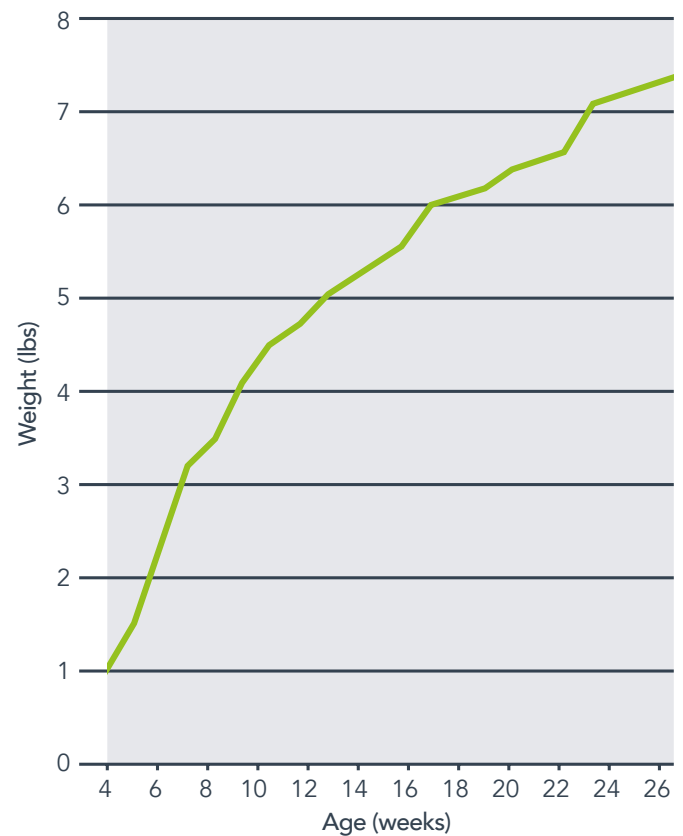
### Characteristics

- Body temperature 100°–103° F
- Respiration rate 35–65 BPM
- Weight: newborn 50–60 gm
- Gestation period 31 days
- Average litter size 7–10
- Age at weaning 6 weeks
- Environmental temperature range 61°–72° F
- Relative humidity 30–70%
- Photo period (light/dark) 14/10
- Water consumption (automated watering system) 150 mL per day
- Food consumption 60 gm 6–8 weeks 125 gm over 8 weeks
- Sexual maturity Male: 6–9 months
- Sexual maturity Female: 5–8 months
- Breeding life Male: 24–30 months
- Breeding life Female: 24–30 months
- Identification methods Ear tags, tattoos, implants

### Additional service offerings

- Ocular screening solutions – Pre-shipment eye screening solutions identify optimal models for your ocular studies
- Social housing solutions – Social housing capabilities promote the compatibility and sociability of your rabbits
- Pre-implanted telemetry solutions – Partnered with Data Sciences International, Inc. (DSI), we're able to offer large models that are pre-implanted with telemetry devices to enable efficient and fast study start
- Health monitoring program – At least once per month, a minimum of four representative rabbits from each production building are sent to a third-party laboratory for a complete health assessment

### Weight chart



# Rabbits



## Dutch Belted

NOMENCLATURE: HsdHra:DB (SPF)

Price per animal - available on request

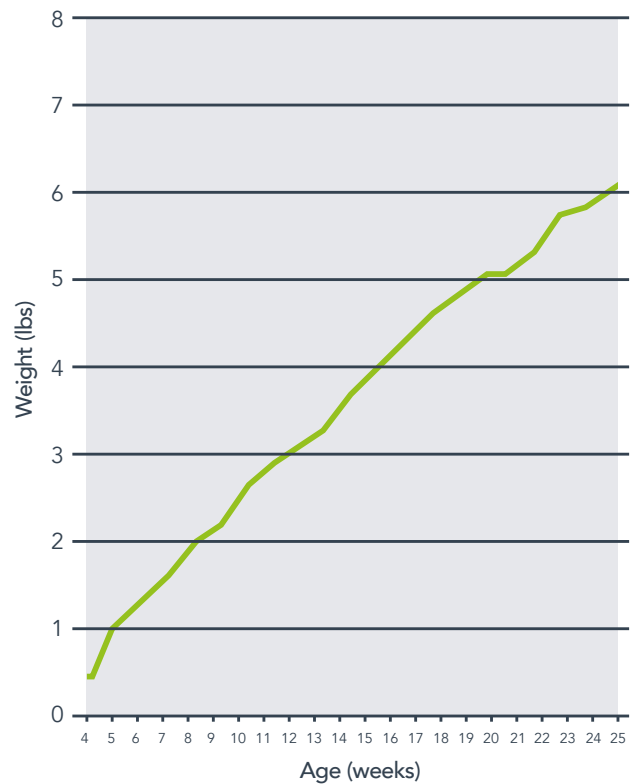
### Characteristics

- Body temperature 100°–103° F
- Respiration rate 35–65 BPM
- Weight: newborn 50–60 gm
- Gestation period 31 days
- Average litter size 6–8
- Age at weaning 6 weeks
- Environmental temperature range 58°–82° F
- Relative humidity Ambient environment
- Photo period (light/dark) 14/10
- Water consumption (automated watering system) 150 mL per day
- Food consumption 55 gm 6–9 weeks 85–90 gm over 9 weeks
- Sexual maturity Male: 6–9 months
- Sexual maturity Female: 5–8 months
- Breeding life Male: 24–30 months
- Breeding life Female: 24–30 months
- Identification methods Ear tags, tattoos, implants

### Additional service offerings

- Ocular screening solutions – Pre-shipment eye screening solutions identify optimal models for your ocular studies
- Social housing solutions – Social housing capabilities promote the compatibility and sociability of your rabbits
- Pre-implanted telemetry solutions – Partnered with Data Sciences International, Inc. (DSI), we're able to offer large models that are pre-implanted with telemetry devices to enable efficient and fast study start
- Health monitoring program – At least once per month, a minimum of four representative rabbits from each production building are sent to a third-party laboratory for a complete health assessment

### Weight chart



# Canines



## Beagle

NOMENCLATURE: HsdHre:Beagle

Price per animal - available on request

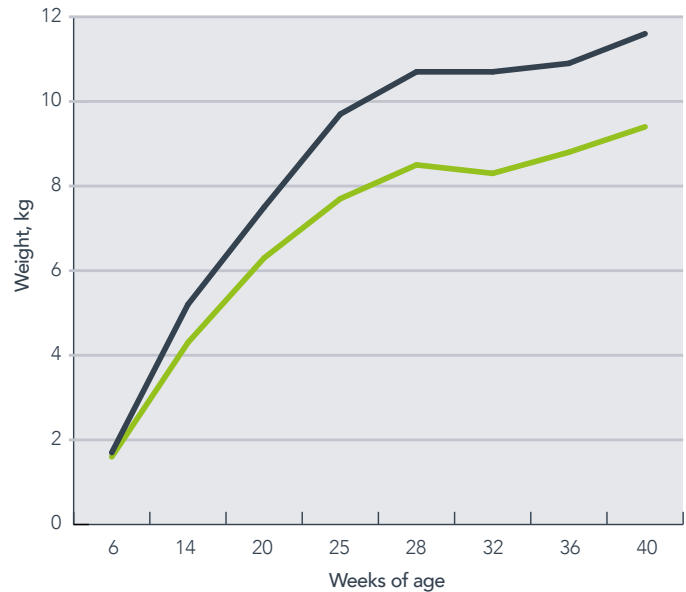
### Characteristics

- Properly socialized and acclimated so you can start your research immediately
- Our socialization program begins at 3 days of age with our biosensor program. This not only improves behavior of the dogs, but increases overall health.
- Thorough preventive health program from 5 weeks to 15 weeks of age covering bacteriology, parasitology, blood chemistry and hematology
- External parasite control and prophylactic programs

### Additional service offerings

- Ocular screening solutions – Pre-shipment eye screening solutions identify optimal models for your ocular studies
- Social housing solutions – Social housing capabilities promote the compatibility and sociability of your canines
- Pre-implanted telemetry solutions – Partnered with Data Sciences International, Inc. (DSI), we're able to offer large models that are pre-implanted with telemetry devices to enable efficient and fast study start
- Acclimation services – Treadmill training, inhalation cone training, oral dosing, and more.

### Weight chart



### Baseline data

Hematology and clinical chemistry data is analyzed every other year from 4-, 6- and 8-month-old beagles. Samples are collected from 20 beagles of each gender and age. Other types of data may be collected and vary depending upon client request, SOP and animal presentation.

Analysis is performed by reputable diagnostic laboratories and in-house resources, and includes serology, bacteriology and parasitology data. Frequency dictated by SOP and colony health.

# Nonhuman primates



## Cynomolgus macaques

NOMENCLATURE: *M. fascicularis*

Price per animal - available on request

### Characteristics

- Various models of different origin: Asian (Chinese, Vietnamese, and Cambodian) and Mauritian
- Sexually mature models available
- Mauritius cynomolgus macaques are socially housed entirely indoor to preserve the Specific Pathogen Free (SPF) status of the model
- Primate holding facilities in Camarny, Spain and Strasburg, France

### Quality breeding farms

We work with the only high-quality breeding farm partners in Mauritius, China, Vietnam and Cambodia. Our global veterinary group routinely conducts extensive audits of each farm to ensure supplier facilities are well maintained, the animals are well-cared for and healthy, and the export facilities are of high quality.

### Pre-shipment and testing solutions

Our large inventory and comprehensive pre-shipment and testing solutions support a wide range of pre-testing specifications.

- **Documentation:**  
We maintain detailed and accurate records on the health of each animal, including sexual maturity
- **Enrichment:**  
Our training and socialization programs include cage-to-transfer box training, pole and collar training, social housing and environmental enrichment for NHPs better prepared to meet your needs
- **Screening exams:**  
We offer a wide range of available pre-shipment screening exams, including ocular and pathogen, to meet your study specifications, enhance your study success rate and potentially reduce the number of models to meet your 3Rs goals

### Additional service offerings

- Ocular screening solutions – Pre-shipment eye screening solutions identify optimal models for your ocular studies
- Social housing solutions – Social housing capabilities promote the compatibility and sociability of your nonhuman primates
- Pre-implanted telemetry solutions – Partnered with Data Sciences International, Inc. (DSI), we're able to offer large models that are pre-implanted with telemetry devices to enable efficient and fast study start
- Buy and board – provides top-level care for your NHP models to give you peace of mind while you focus on other phases of your study.
- Microbiology laboratory – on-site microbiology laboratory produces results faster than if samples were sent to a reference lab – recovering pathogens more readily by reducing the potential for loss or degradation
- Pole and collar acclimation solutions – The proven pole and collar acclimation solution can remove critical days from your animal receipt to study initiation window



## Rhesus macaques

NOMENCLATURE: *M. mulatta*

Price per animal - available on request

### Characteristics

- Model origin: Chinese
- Sexually mature models available

Teklad

DIETS, BEDDING AND ENRICHMENT



# Innovation and consistency

Diet should *reduce*, rather than introduce, variation.

Teklad Global Diets® are the world's leading laboratory animal diets.

It's not enough to meet basic nutritional criteria. Diets should *reduce*, rather than introduce, variation. Innovatively designed for biomedical research, Teklad Global Diets® are an integrated range of natural ingredient diets for specific life stages.

## Teklad Global Diets® – your formula for success

- + Diets for multiple laboratory animal species
- + Fixed formulation
- + High-quality ingredients from approved regional suppliers
- + Life stage and application appropriate
- + Industry-recognized certified quality systems
- + Global supply chain

By combining fixed formulation with rigorous ingredient control, the variation in nutrient and non-nutrient levels is minimized, meaning consistent results for you.



# Teklad

DIETS, BEDDING AND ENRICHMENT

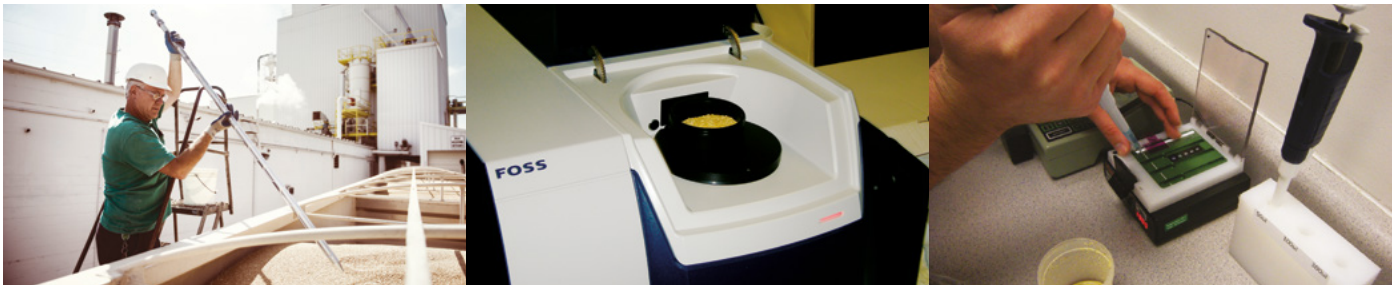


## Quality Processes drive consistency

Fixed formula diets contain the **same ingredients, in the exact same quantities, in every batch of diet.**

- + Diet is a critical variable in any study
- + Our fixed formulation philosophy and quality practices translate to consistent research results for you
- + Other manufacturers may use variable formula diets in which both ingredients and inclusion rates are changed to an extent unknown to the investigator

TEKLAD DIETS: A FIXED FORMULATION APPROACH	
<b>Method</b>	Ingredients from approved suppliers are tested prior to acceptance and use.
<b>Rationale</b>	Both nutrients and non-nutrients can have important effects.
<b>Result</b>	Minimize nutrient variation and manage non-nutrient variation while maintaining formula integrity.



- + Bulk ingredients are sampled across the depth and length of the load and tested for macronutrients and mycotoxins



Teklad Diet sites in Madison, WI received recertification to the ISO9001:2015 standard





# Teklad Global Rodent Diets

A related family of diets for specific life stages and research purposes

TEKLAD GLOBAL RODENT DIETS					
Diet	2014	2016	2018	2019	2020X
<b>Primary ingredients (Order of inclusion)</b>	Wheat midds Wheat Corn Corn gluten meal Soy oil	Wheat Corn Wheat midds Corn gluten meal Soy oil	Wheat Corn Wheat midds <b>Soybean meal</b> Corn gluten meal Soy oil	Wheat Corn Corn gluten meal Wheat midds Soy oil	Wheat Corn Corn gluten meal Wheat midds Soy oil
CALCULATED NUTRIENT PROFILE (AS FORMULATED)					
<b>Protein %</b>	14.3	16.4	18.6	19.0	19.1
<b>Fat %</b>	4.0	4.0	6.2	9.0	6.5
<b>Metabolizable energy</b>	2.9 kcal/g 12.1 kJ/g	3.0 kcal/g 12.6 kJ/g	3.1 kcal/g 13.0 kJ/g	3.3 kcal/g 13.8 kJ/g	3.1 kcal/g 13.0 kJ/g
<b>Isoflavone content*</b>	<20 mg/kg	<20 mg/kg	<b>150-340 mg/kg</b>	<20 mg/kg	<20 mg/kg
USE AND FEATURES					
<b>Life stage</b>	Long-term maintenance	Growth, maintenance	Breeding, growth	Breeding, higher energy	Breeding, growth
<b>Purpose and benefits</b>	+ Prolonged maintenance + Aging + Toxicology + Oncology	+ Growth + Maintenance + Toxicology + Oncology	+ Breeding + Growth + Maintenance + General purpose	+ Breeding + Genetically - engineered mice + Poorly performing strains + Oncology	+ Breeding + General purpose + Estrogen-sensitive breeding studies + Reproductive toxicology + Oncology

\* Expected range of genistein + daidzein (aglycone) based on quarterly measurement of diet

## Teklad Global Rodent Diets – designed to reduce experimental variability

- + Modern formulations
- + Levels of protein, energy, vitamins and minerals more closely align with nutritional requirements
- + Reduce or eliminate soybean meal, and exclude alfalfa meal, the major sources of phytoestrogens in rodent diets
- + Vegetarian diets eliminate nitrosamines as a research variable
- + Available globally to promote protocol consistency

## Variations in product code nomenclature

- + '9' in the second digit - the diet has been irradiated
- + 'S' - the autoclavable version, supplemented with vitamins to account for presumed losses
- + 'X' - extruded form; exception is 2019 which is extruded
- + 'C' - certified; a representative sample is tested for a panel of contaminants
- + 'M' - meal form

*Not all product combinations are produced regularly or stocked locally.*

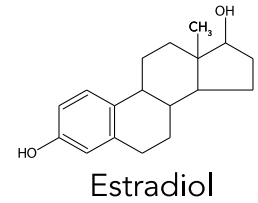
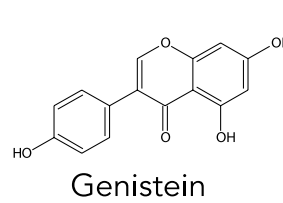




# Ingredient selection

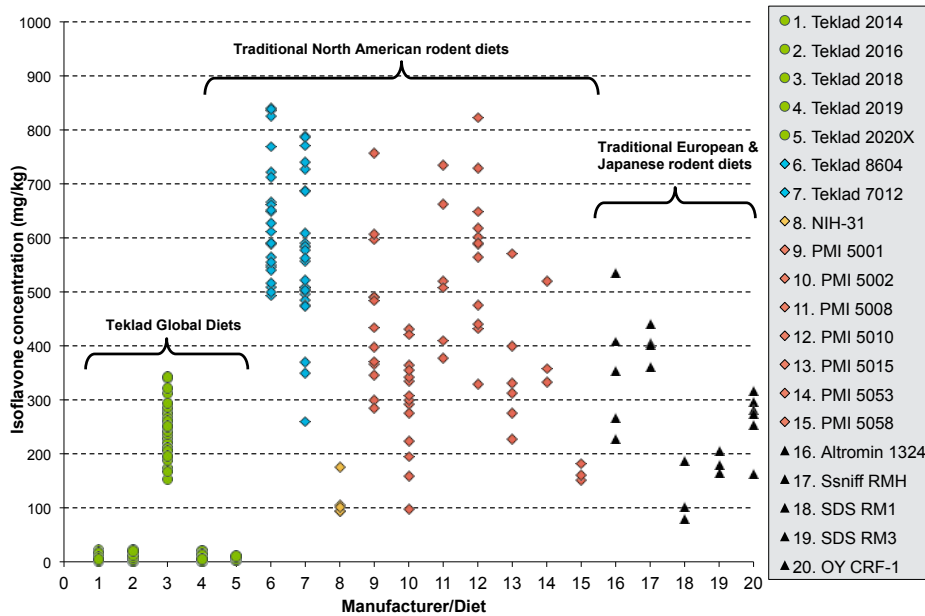
The key to reducing rather than introducing variation

INGREDIENT	COMPONENT	SIGNIFICANCE
Soybean meal	Isoflavones: Genistein, Daidzein	Selective Estrogen Receptor Modulator
Alfalfa meal	Coumestrol	Selective Estrogen Receptor Modulator
	Chlorophyll	Interferes with fluorescent imaging
Fish meal Meat meal	Nitrosamines	Potential carcinogen



## Variation in isoflavone levels (genistein + daidzein) between diets and within batches of the same diet

Plot shows isoflavone levels for traditional diets from North America (blue, yellow, red), Europe and Japan (black) and Teklad Global Rodent Diets (green). Data is compiled from published literature and commercial laboratory analysis. Each symbol is one value; symbols within a column denote multiple values for that diet.



For experimental endpoints sensitive to isoflavones, batch-to-batch variation can lead to inconsistency, confounding your interpretation of results.

# Teklad

DIETS, BEDDING AND ENRICHMENT



## Key principles

- + Isoflavone range in rodent diets that contain soybean meal is 100-700 mg/kg
- + Estrogen receptors (ER) are widely distributed in tissues
- + Isoflavones have considerable access to ER by virtue of high serum levels

### References:

[envigo.com/phytoestrogen-references](http://envigo.com/phytoestrogen-references)

## Challenge:

### Isoflavones impact research

- + No simple absolute threshold for the physiological effects of phytoestrogens
- + Difficult to predict magnitude and direction of response
- + Their action reduces effectiveness of animal model
- + Preclinical research in rodent models fed diets containing soybean meal may not translate to human populations due to differences in consumption levels and metabolism

## Ways in which isoflavones impact research

RESEARCH AREA	EFFECTS DESCRIBED IN THE LITERATURE
Oncology	Modulate tumor growth, latency, multiplicity, metastasis; diminish action of drugs such as tamoxifen and letrozole.
Reproductive	Increase uterine weight; accelerate vaginal opening; affect response to exogenous estrogens/xenobiotics.
Endocrine	Differences in body composition (weight, adiposity), glucose and insulin homeostasis, bone density, and blood pressure.
Neuroscience	Performance differences on tests measuring anxiety behaviors and response to pain stimuli.
Immunology	Modulate immune organ development; display anti-inflammatory and antioxidant actions.

+

+

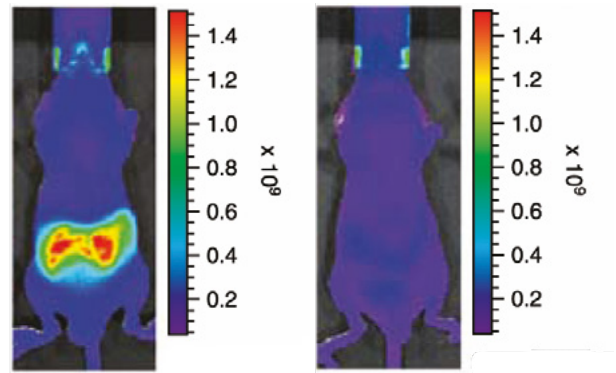
**Solution: Envigo's minimal isoflavone Teklad diets lead to reliable, repeatable research results.**

+

+

## Teklad Global Rodent Diets for fluorescent imaging

- + Exclusion of alfalfa meal practically eliminates chlorophyll, the source of autofluorescence in the gut region
- + Teklad Global Rodent Diets significantly reduce background autofluorescence and are suitable for many imaging applications

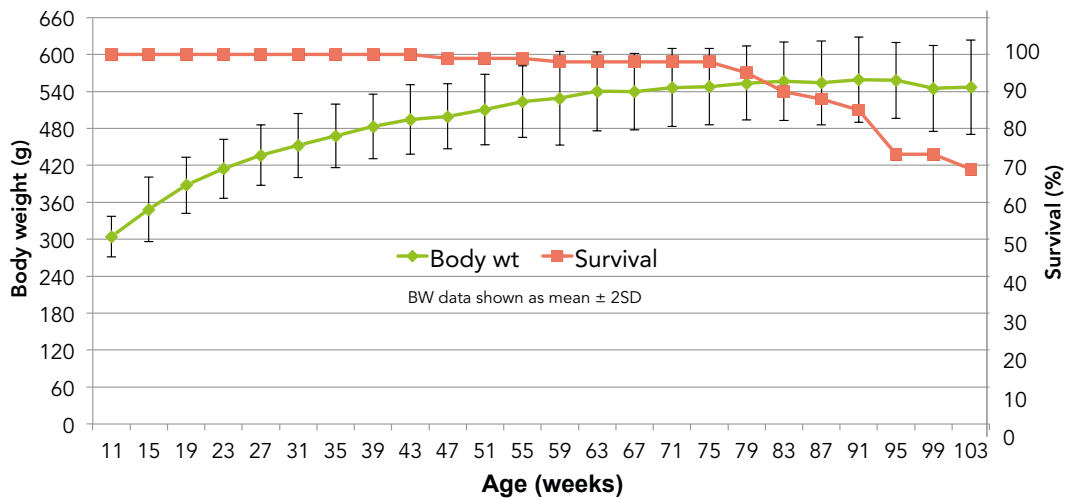




# Teklad Global Rodent Diets Designed to improve animal welfare

- + Other commonly used diets supply protein well in excess of requirements and can contribute to early mortality
- + There are benefits to lower protein, lower energy standard diets for toxicology and safety studies

## Growth and survival curves



**Model:** + Hsd:Sprague Dawley® SD® males (n=200)

**Diet:** + Teklad 2014 (14% protein) starting at 8 weeks of age

**Results:** + Body weight plateaus at ~550 grams without diet restriction; compare to CD® IGS rat which are 100-200 grams heavier when fed more typical standard diets  
+ Survival at 2 years ~68%; compare to typical 2 year survival in CD® IGS rat of ~35-40%





# Teklad Global Diets® at a glance

SPECIES	RODENT					DOG		
Product	2014	2016	2018	2019	2020X	2021	2025	2027
Irradiated (29xx)	2914	2916	2918	2919	2920X			
Certified (C)	2014C	2016C	2018C			2021C	2025C	2027C
Autoclavable (S)	2014S	2016S	2018S 2018SX	2019S	2020SX			
Extruded (X)			2018SX	Standard	Standard	Standard	Standard	Standard
KEY FEATURES								
	14% Protein 4% Fat	16% Protein 4% Fat	18% Protein 6% Fat + Moderate phytoestrogen	19% Protein 9% Fat	19% Protein 6% Fat	21% Protein 6% Fat	25% Protein 9% Fat	27% Protein 16% Fat
	+ Vegetarian (no nitrosamines) + Minimal phytoestrogens (2014, 2016, 2019, 2020X) + Suitable for imaging studies (no alfalfa meal) + Extruded versions dramatically reduce clumping and hardening after autoclaving and reduce waste					+ High-quality poultry by-products + Smooth transition between diets + Options for all life stages + All options stocked as certified		
PURPOSE AND BENEFITS								
	+ Prolonged maintenance + Aging + Toxicology + Oncology	+ Growth + Maintenance + Toxicology + Oncology	+ Breeding + Growth + Maintenance + General purpose	+ Breeding + Genetically engineered mice + Poorly performing strains + Oncology	+ Breeding + General purpose + Estrogen-sensitive breeding studies + Reproductive toxicology + Oncology	+ Maintenance	+ Gestation + Lactation + Growth + Maintenance	+ Gestation + Lactation + Growth
CALCULATED AVERAGE NUTRIENT PROFILE								
Protein %	14.3	16.4	18.6	19.0	19.1	21.0	26.0	28.6
Fat %	4.0	4.0	6.2	9.0	6.5	7.1	10.5	16.3
Crude Fiber %	4.1	3.3	3.5	2.6	2.7	4.0	3.0	2.5
NDF % <sup>1</sup>	18.0	15.2	14.7	12.1	12.3	13.7	11.5	9.5
Metabolizable energy	2.9 kcal/g 12.1 kJ/g	3.0 kcal/g 12.6 kJ/g	3.1 kcal/g 13.0 kJ/g	3.3 kcal/g 13.8 kJ/g	3.1 kcal/g 13.0 kJ/g	3.2 kcal/g 13.4 kJ/g	3.5 kcal/g 14.6 kJ/g	3.8 kcal/g 15.9 kJ/g
FIXED FORMULA - achieving high consistency of nutrients coupled with the same ingredient inclusions in every batch								
	+	+	+	+	+	+	+	+

<sup>1</sup> Neutral detergent fiber (NDF) is an estimate of insoluble fiber, including cellulose, hemicellulose, & lignin. Crude fiber methodology underestimates total fiber.

### Product

- + Not all product combinations are produced regularly or stocked locally; extended lead times and additional fees may apply
- + Most products available in meal (M) form; extended lead time and additional fees may apply

### Irradiated

- + The irradiated version is identical to the standard version, with the exception of packaging
- + The '9' in the second position of the product code denotes the product has been irradiated

### Autoclavable

- + The autoclavable version (S) differs in the level of vitamin supplementation, which is increased to account for presumed losses due to autoclaving



# Teklad Global Diets® at a glance

SPECIES	RABBIT		GUINEA PIG		PRIMATE		CAT	FERRET
Product	2030	2031	2040	2041	2050	2055	2060	2072
Irradiated (29xx)	2930	2931	2940	2941				
Certified (C)	2030C	2031C	2040C		2050C	2055C	2060C	2072C
Autoclavable (S)								
Extruded (X)					Standard	Standard	Standard	Standard
KEY FEATURES								
	16% Protein 3% Fat + Vegetarian	14% Protein 2% Fat + Vegetarian + Higher fiber	18% Protein 3% Fat	17% Protein 4% Fat + Higher fiber	20% Protein 4% Fat + Higher fiber	25% Protein 5% Fat	32% Protein 12% Fat + Includes a urinary acidifier	36% Protein 18% Fat + Highly digestible + Low ash poultry by-products
			Global Guinea Pig Diets are fortified with stabilized vitamin C.		Global Primate Diets are fortified with stabilized vitamin C.			
PURPOSE AND BENEFITS								
	+ Gestation + Lactation + Growth	+ Maintenance + Long term studies	+ Gestation + Lactation + Growth	+ Maintenance	+ Gestation + Lactation + Growth + Maintenance	+ Gestation + Lactation + Growth + Maintenance	+ Gestation + Lactation + Growth + Maintenance	+ Gestation + Lactation + Growth + Maintenance
CALCULATED AVERAGE NUTRIENT PROFILE								
Protein %	17.7	14.8	18.7	17.6	20.0	25.6	34.0	39.0
Fat %	3.3	2.3	3.3	4.4	5.4	5.9	12.5	19.0
Crude Fiber %	13.7	21.8	11.9	14.8	8.1	3.5	1.7	1.2
NDF % <sup>1</sup>	29.2	39.4	25.2	32.0	18.4	9.2	6.7	4.4
Metabolizable energy	2.4 kcal/g 10.0 kJ/g	2.0 kcal/g 8.4 kJ/g	2.5 kcal/g 10.5 kJ/g	2.4 kcal/g 10.0 kJ/g	2.8 kcal/g 11.7 kJ/g	3.2 kcal/g 13.4 kJ/g	3.5 kcal/g 14.6 kJ/g	3.8 kcal/g 15.9 kJ/g
FIXED FORMULA - achieving high consistency of nutrients coupled with the same ingredient inclusions in every batch								
	+	+	+	+	+	+	+	+

### Extruded

+ For rodent diets, the combination of the extruded form and appropriate fortification allows for superior autoclaving quality (decreased hardness and clumping) where problems are experienced with the autoclavable pellet form

### Certified

- + There are no differences in the formula, ingredients, manufacturing standards, and quality control processes between non-certified and certified diets
- + A representative sample is tested for a panel of contaminants. This panel varies by region (US vs. Europe) reflecting differences in regulatory standards; contact local representatives for more information
- + If diet is not stocked as certified, certification can be made available by request; expect minimum order size and additional charges to apply



## Teklad

DIETS, BEDDING AND ENRICHMENT



# Custom research diets, medicated diets

## Custom research diets

Custom diets are developed for a specific purpose and benefit from your input and our expertise. With more than 20,000 formulas in our database attained over 40 years, Envigo nutritionists have vast experience to draw upon. We are committed to developing and maintaining long-term customer relationships.

### Use custom research diets to:

#### + Control nutrients

- Vitamin or mineral adjusted
- Protein or amino acid adjusted
- Lipid or fatty acid adjusted

#### + Induce disease

- Atherogenic (cholesterol, fat, cholate)
- Diet-induced obesity (40-60% fat kcal)
- High carbohydrate (fructose, sucrose)
- NaCl adjusted
- Cuprizone demyelination

#### + Dose animals

- Control of gene expression - doxycycline or tamoxifen containing diets
- Addition of customer-supplied ingredients/compounds



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ENVIGO

# Teklad

## Medicated diets

Several medicated diets are available from stock. Use as directed by a veterinarian.

**TD.01432** Sterilizable Fenbendazole Diet (2018S, 150 ppm)

**TD.01432.I** Irradiated Fenbendazole Diet (2018S, 150 ppm)

**TD.06596** Irradiated Uniprim Diet (2018, 4100 ppm)

**TD.130755** Irradiated Ivermectin Diet (2018, 12 ppm)

Other medicated diets can be available in small-scale or large-scale production. Contact us for more details.

## Ask a nutritionist!

Chat with one of our nutritionists online to discuss lab animal diet options, get technical support and product codes.

[envigo.com/products-services/tekklad](http://envigo.com/products-services/tekklad)

[askanutritionist@envigo.com](mailto:askanutritionist@envigo.com)

**Ask a nutritionist**  
Our nutritionists are available to chat live

## Teklad

DIETS, BEDDING AND ENRICHMENT

# Bedding

Your animals are in continuous contact with bedding, yet its importance is often overlooked.

Envigo offers a full line of Teklad bedding, including corn cob, wood and paper products, with these advantages:

- + Most have been thoroughly tested in our animal barriers
- + Several are produced in a bedding plant, uniquely dedicated to production for the research community
- + Many certified options are available
- + Most beddings are also available in irradiated format

### Bedding – Paper

- + 7070C Certified Diamond Dry Bedding
- + 7084 Pelleted Paper Bedding
- + 7089C Certified Diamond Soft Bedding
- + 7099 TEK-Fresh™ Bedding
- + 7099W White TEK-Fresh™ Bedding

### Bedding – Wood ⚠

- + 7090A Sani-Chips® Bedding - Aspen
- + 7090M Sani-Chips® Bedding - Maple
- + 7090C Certified Sani-Chips® Bedding
- + 7093 Shredded Aspen Bedding

### Bedding – Corncob

- + 7092 1/8" Corncob Bedding
- + 7097 1/4" Corncob Bedding
- + 7087C Certified Soft Cob Enrichment Bedding

### Custom Cut Liners

- + Diamond-TEK white dimpled cage board
- + Diamond Pad white multi-ply tissue liners with poly backing

### Enrichment

In addition to our diet and bedding lines, Teklad provides a number of enrichment products, including:


- + 7087C Certified Soft Cob Enrichment Bedding
- + 7979C.CS Certified Irradiated Diamond Twists
- + 6105.CS iso-PADS™ Environmental Enrichment Pads (6" x 10")
- + 6060.CS iso-BLOX™ Environmental Enrichment squares (2" x 2")

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ENVIGO

# Teklad

## Bedding



 **WARNING:** This product can expose you to wood dust, a chemical which is known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## Custom genetically engineered rodent models

# Genetically engineered rat and mouse models to your specification in as few as 4 months

### Looking for an animal model to fit your specific research needs?

First, we reimagined the possibilities of genetic engineering in rat. Now, we've introduced the world's fastest custom *in vivo* model generation service, powered by CRISPR-Cas9 genome editing technology. Go from idea to rat or mouse model in under half the time of traditional ES-cell based methods.

### How it works

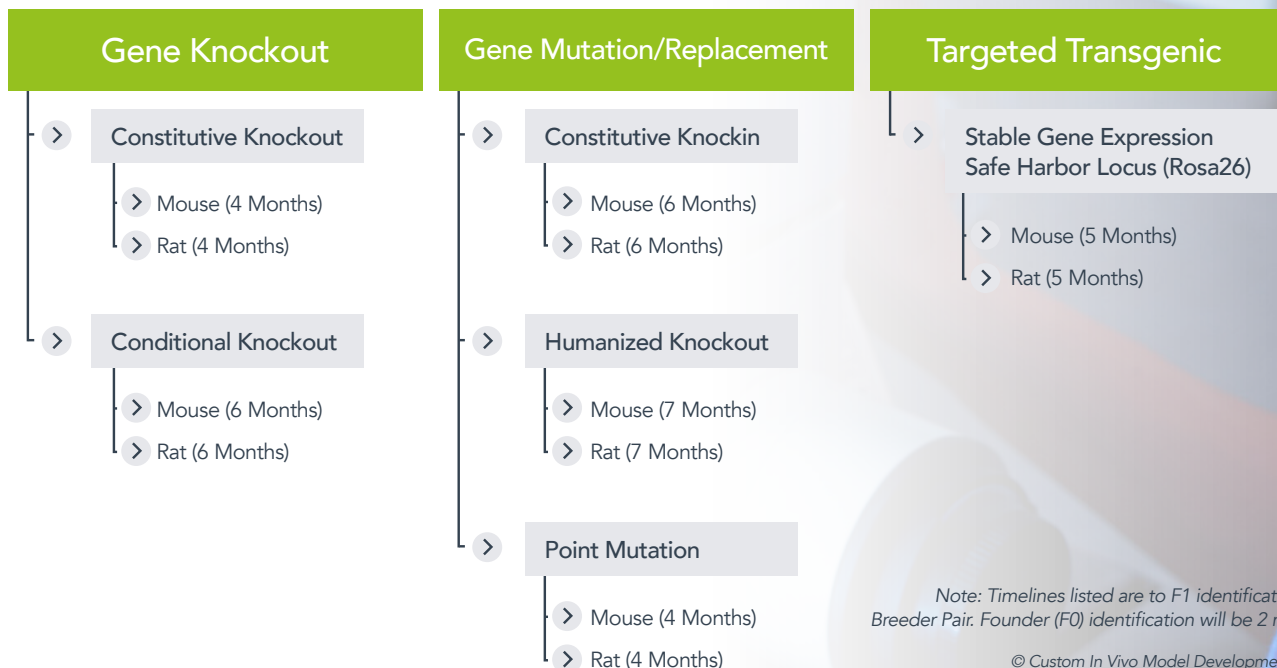
#### Looking for a knockout rat or mouse not included in our standard model portfolio?

Your Envigo *in vivo* model development specialist will work with you to design a custom model to your exact specifications, using our CRISPR/Cas9 (licensed by The Broad Institute, ERS Genomics and Harvard) or Zinc Finger Nuclease technologies licensed by Sigma-Aldrich, in as few as 4 months.

Using our Custom Model Builder, simply select your species, strain, gene of interest and desired mutation, and we'll do the rest.

### Advantages of our animal model creation

- + Exclusive options—mice and rats, any strain
- + F1 breeding pair delivered in as few as 4 months
- + Guaranteed germline transmission
- + Donor plasmid design, construction and validation
- + Comprehensive project management
- + Detailed, formal project reports





## Contract breeding services

### Contract breeding services

Envigo has performed contract breeding services – rederivation, cryopreservation, revitalization, colony management, contract breeding, and quarantine services – for many years. Originally developed to support our internal breeding operations, we began providing these services to customers. Experience gained through these customer engagements and our continuous investment in capabilities, facilities, and personnel, have enabled us to refine and formalize a comprehensive set of contract breeding service offerings.

Because these capabilities are core to supporting our own breeding operations, we fully understand the importance of high quality breeding services to colony management and to the integrity of the research process. We bring both a provider and customer perspective to the table when working with our customers to develop a plan of action.

Our contract breeding services employees are dedicated to providing high quality, reliable, and consistent results. By continuously striving to achieve this level of performance, we deliver not only what matters to our customers, but we aim to be the most dependable supplier of contract breeding services in the industry. All contract breeding services are managed by a dedicated group of project managers who will work closely with you to develop a customized program to address your needs and requirements. You will always have a knowledgeable expert to liaise on your behalf with Envigo's operation teams and provide you with regular reports on your project's progress.

[contractbreeding.us@envigo.com](mailto:contractbreeding.us@envigo.com)

### Rederivations and speed rederivations – rat and mouse

Rederivation is a procedure used to establish pathogen free animals and to improve the overall animal health status of a colony. Envigo uses embryo transfer or caesarean section to generate small cohorts of pups.

#### REDERIVATIONS AND SPEED REDERIVATIONS

Service	Description
Mouse Rederivation with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Rederivation to generate a small cohort (minimum of 10 offspring) of mice at SOPF Health Status using wt mice. Includes donor animal housing, rederivation services, recipient and offspring housing and health monitoring. (hom x wt; het x wt)
Rat Rederivation with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Rederivation to generate a small cohort (10 offspring) of rats at SOPF Health Status using wt rats. Includes donor animal housing, rederivation services, recipient and offspring housing and health monitoring
Mouse Rederivation with Health Screening, preexpansion breeding using customer females (your line can remain at Envigo for colony maintenance and breeding)	Rederivation to generate a small cohort (10 offspring) of mice at SOPF Health Status. Includes donor animal housing, rederivation services, recipient and offspring housing and health monitoring. (hom x hom; hom x het; het x het; het x hom)
Rat Rederivation with Health Screening, preexpansion breeding using customer females (your line can remain at Envigo for colony maintenance and breeding)	Rederivation to generate a small cohort (10 offspring) of rats at SOPF Health Status. Includes donor animal housing, rederivation services, recipient and offspring housing and health monitoring.
Speed Rederivation with Shipment of Pregnant Recipient Female Mice (pregnant recipients are shipped back to customer, no health screening included)	Rederivation where Envigo will deliver a minimum of 2-3 pregnant recipient females 7-14 days post embryo transfer. No health screening is included in this package. Shipping and shipping container fees are additional.

## Contract breeding services

### Cryopreservation – rat and mouse

Envigo provides both embryo and sperm cryopreservation services. Embryo and sperm cryopreservation provides a means to permanently preserve the genetic integrity of an animal colony. It also provides a cost effective means to safeguard your valuable model lines in the event of a catastrophic colony disaster. Sperm cryopreservation also provides a cost effective way to preserve a mouse line that generally requires fewer donor animals. Although sperm cryopreservation requires fewer animals to complete a project, it only preserves a haploid genome. Our team is trained in state of the art IVF and freezing technologies and conduct permanent development and quality control to guarantee you the highest cryopreservation safety.

### CRYOPRESERVATION - EMBRYO OR SPERM

Service	Description
Mouse Embryo Cryopreservation using wild type females (Envigo wild type or provided by customer) - 300 embryos	Cryopreservation of approximately 300 embryos produced from your male animals and either Envigo wild type females or wild type females you provide. Does not require expansion breeding to generate females for embryo donors. Typically produces heterozygous embryos from mating scheme. Includes in vitro culture quality control of cryopreserved embryos and dual site storage for first year.
Mouse Embryo Cryopreservation using customer genetic line (homozygous / heterozygous) females - 150 embryos	Cryopreservation of approximately 150 embryos produced from your male and female animals. Generally requires expansion breeding to generate females for embryo donors. Typically produces heterozygous or homozygous embryos from mating scheme. Includes in vitro culture quality control of cryopreserved embryos and dual site storage for first year.
Rat Embryo Cryopreservation using wild type females (Envigo wild type or provided by customer) - 300 embryos	Cryopreservation of approximately 300 embryos produced from your male animals and either Envigo wild type females or wild type females you provide. Does not require expansion breeding to generate females for embryo donors. Typically produces heterozygous embryos from mating scheme. Includes in vitro culture quality control of cryopreserved embryos and dual site storage for first year.
Rat Embryo Cryopreservation using customer genetic line (homozygous / heterozygous) females - 150 embryos	Cryopreservation of approximately 150 embryos produced from your male and female animals. Generally requires expansion breeding to generate females for embryo donors. Typically produces heterozygous or homozygous embryos from mating scheme. Includes in vitro culture quality control of cryopreserved embryos and dual site storage for first year.
Mouse Sperm Cryopreservation	Cryopreservation of mouse sperm. Approximately 22 straws of mouse sperm are provided. Included in vitro fertilization (2 cell embryos production) quality control of cryopreserved sperm and dual site storage for first year.
Dual Site Storage Fee (embryo) / year	Dual site storage of customer embryos in two different locations, separated by 15 km - up to 500 embryos total.
Dual Site Storage Fee (sperm) / year	Dual site storage of client sperm - up to 50 straws of sperm
Live Birth Quality Control - Mouse (embryo cryopreservation)	Alternative quality control in which a subset of embryos is thawed and transferred into recipient animals to generate live offspring to confirm embryo viability.
Live Birth Quality Control - Rat (embryo cryopreservation)	Alternative quality control in which a subset of embryos is thawed and transferred into recipient animals to generate live offspring to confirm embryo viability.
Live Birth Quality Control - Mouse (sperm cryopreservation)	Alternative quality control in which 2-3 straws of cryopreserved sperm is thawed in which embryos produced during in vitro fertilization quality control are transferred into recipient animals to generate live offspring.



Envigo utilizes LabTracks(TM) software system, by Locus Technology, Inc., which provides a fully integrated on-line colony management system that supports daily inventory data, cryopreserved materials, animal husbandry and information on cage capacity for each project via a secured web portal. Our customers have secured access to only their project information at their own convenience, 24/7.

## Contract breeding services

### Revitalization of embryo or sperm – rat and mouse

Revitalization is a procedure used to establish a small cohort of specific pathogen free animals from cryopreserved material (embryos or sperm). Envigo offers several revitalization options:

#### REVITALIZATION - EMBRYO OR SPERM

Service	Description
Mouse Revitalization from <b>customer-frozen embryos</b> with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Revitalization to generate a small cohort (10 offspring) of mice at SOPF Health status from customer cryopreserved embryos. Includes rederivation services, recipient and offspring housing and health monitoring.
Rat Revitalization from <b>customer-frozen embryos</b> with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Revitalization to generate a small cohort (10 offspring) of rats at SOPF Health Status from customer cryopreserved embryos. Includes rederivation services, recipient and offspring housing and health monitoring.
Mouse Revitalization from <b>Envigo-frozen embryos</b> with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Revitalization to generate a small cohort (10 offspring) of mice at SOPF Health status from Envigo cryopreserved embryos. Includes rederivation services, recipient and offspring housing and health monitoring.
Rat Revitalization from <b>Envigo-frozen embryos</b> with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Revitalization to generate a small cohort (10 offspring) of rats at SOPF Health Status from Envigo cryopreserved embryos. Includes rederivation services, recipient and offspring housing and health monitoring.
Mouse Revitalization from a discontinued <b>Envigo line (frozen embryos)</b> with Health Screening	Revitalization to generate offspring at SOPF Health Status from cryopreserved embryos of a discontinued line. Includes rederivation services, recipient and offspring housing and health monitoring.
Mouse Revitalization from <b>frozen sperm</b> with Health Screening (your line can remain at Envigo for colony maintenance and breeding)	Revitalization to generate a small cohort (10 offspring) of mice at SOPF Health status from cryopreserved sperm. Includes rederivation services, recipient and offspring housing and health monitoring.
Mouse <b>Speed Revitalization</b> from <b>frozen sperm</b> or embryos with Shipment of Pregnant Recipient Females. (pregnant recipients are shipped back to customer, no health screening included)	Revitalization where Envigo will deliver a minimum of 2-3 pregnant recipient females, 14 days post embryo transfer from cryopreserved sperm or embryos. No health screening is included in this package. Shipping and shipping container fees are additional.

## Contract breeding services

### Cryo / rederivation COMBO – rat and mouse

In some situations it is practical to combine the rederivation effort with cryopreservation (embryos or sperm) of the same line. Envigo offers the following cost effective options.

#### CRYO / REDERIVATION COMBO

Service	Description
Mouse Embryo Cryopreservation in combination with Rederivation (using wildtype females) and Health Screening	Rederivation to generate a small cohort (10 offspring) of mice at SOPF Health Status (hom x wt; het x wt) in combination with 150 embryos cryopreserved. Includes donor animal housing, recipient and offspring housing, health monitoring, in vitro culture quality control of cryopreserved embryos and dual site storage for the first year.
Mouse Embryo Cryopreservation in combination with Rederivation (using customer females) and Health Screening	Rederivation to generate a small cohort (10 offspring) of mice at SOPF Health Status (hom x hom; hom x het; het x het; het x hom) in combination with 100 embryos cryopreserved. Includes donor animal housing, recipient and offspring housing, health monitoring, in vitro culture quality control of cryopreserved embryos and dual site storage for the first year.
Rat Embryo Cryopreservation in combination with Rederivation (using wildtype females) and Health Screening	Rederivation to generate a small cohort (10 offspring) of mice at SOPF Health Status (hom x wt; het x wt) in combination with 150 embryos cryopreserved. Includes donor animal housing, recipient and offspring housing, health monitoring, in vitro culture quality control of cryopreserved embryos and dual site storage for the first year.
Rat Embryo Cryopreservation in combination with Rederivation (using customer females) and Health Screening	Rederivation to generate a small cohort (10 offspring) of rats at SOPF Health Status (hom x hom; hom x het; het x het; het x hom) in combination with 100 embryos cryopreserved. Includes donor animal housing, recipient and offspring housing, health monitoring, in vitro culture quality control of cryopreserved embryos and dual site storage for the first year.
Mouse Sperm Cryopreservation in combination with Rederivation (using wildtype females) and Health Screening	Rederivation to generate a small cohort (10 offspring) of mice at SOPF Health Status (hom x wt; het x wt) in combination with 10-12 straws of sperm cryopreserved. Includes donor animal housing, recipient and offspring housing, health monitoring, in vitro culture quality control of cryopreserved embryos and dual site storage for the first year.
Mouse Sperm Cryopreservation in combination with Rederivation (using customer females) and Health Screening	Rederivation to generate a small cohort (10 offspring) of mice at SOPF Health Status (hom x hom; hom x het; het x het; het x hom) in combination with 10-12 straws of sperm cryopreserved. Includes donor animal housing, recipient and offspring housing, health monitoring, in vitro culture quality control of cryopreserved embryos and dual site storage for the first year.

### Contract breeding isolator services – rat and mouse

For situations in which it is not practical for you to breed and maintain your colonies within your own facility, Envigo provides colony breeding and maintenance services within our isolator operations. Our team of experts will work closely with you to understand your needs and develop a customized colony management plan and health surveillance program. These services allow you to concentrate on your research and save space in your animal facility.

Service	Description
Isolator breeding for mice in M20 / M50 or for rats in a R24	Routine Husbandry + breeding / reporting / HM / fee per isolator per cage per week
Isolator Breeding - M50 / R72 (50 mouse cages / 72 rat cages)	Routine Husbandry + breeding / reporting / HM / fee per isolator per cage per week
Isolator Breeding - M40 (40 mouse cages)	Routine Husbandry + breeding / reporting / HM / fee per isolator per cage per week
Quarantine Isolator	Routine Husbandry / isolator or IVC / week - extended housing for donor animals after completed derivation
Implantable Transponder ID Chip - Animal Identification	ISO Transponder Chip for animal identification - per individual chip

## Genetic testing services

# Envigo genetic testing services

The Envigo genetic services operations in North America provide global DNA and RNA analysis services. For more than 15 years, Envigo has partnered with Infinity BiologiX (formerly Bionomics Research Technology Center at Rutgers University) to offer a full spectrum of quality genetic testing services. This strategic partnership allows access to the worldwide experts in functional genomics.



## Features

**DNA/Mutation Analyses** – investigate the structure of the genetic architecture in your model with the following services:

- + Genotyping
- + Zygosity Testing
- + SNP Profiling for Speed Congenics
- + Whole Genome Array-Based Analysis
- + Methylation Analysis
- + Whole Exome Sequencing
- + Whole Genome Sequencing

**RNA/Expression Analyses** – investigate the function of the gene or genes of interest in your model with the following services:

- + Quantitative PCR (qPCR)
- + Whole Transcriptome Microarray Analysis
- + RNAseq

## Advantages

- + Reduces testing variables due to sourcing from one high-quality vendor
- + Offers customized testing for maximum flexibility and value
- + Supports your project with technical and bioinformatics specialists
- + Provides experimental design consultation
- + Delivers quick turnaround times
- + Archives data securely for up to five years

Contact your Envigo representative or visit [envigo.com](http://envigo.com)

# Surgical services

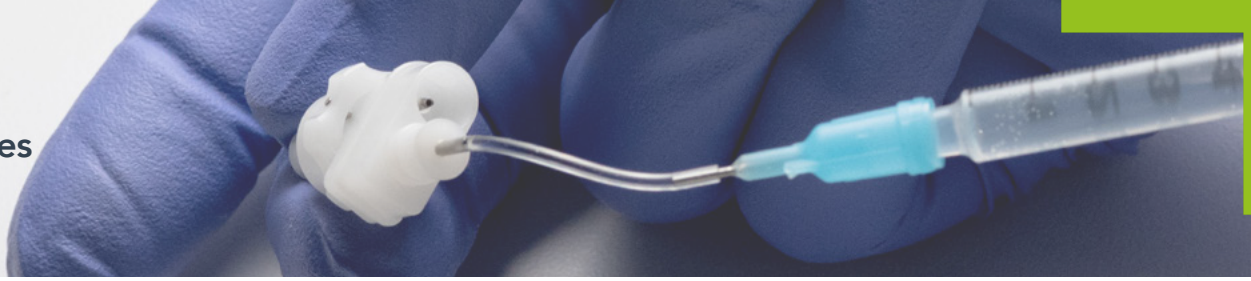
Envigo's state of the art surgical facilities are dedicated to providing the highest quality surgical models to our customers from our advanced surgery center and our barrier-dedicated surgical facilities. We are committed to enhancing and enriching your research, through quality, collaboration, development, and animal welfare.

Under close veterinary supervision, our AAALAC accredited facilities offer multiple rodent surgical models from experienced and highly-trained, certified surgical technicians.

Envigo offers many standard surgical models and has the flexibility to collaborate with customers to create custom surgical models from third-party or Envigo-bred models. Please contact us if your model isn't listed on the following pages.



## Surgical services



### + Quality

- + Consistent quality across all surgical facilities
- + Continuous training, evaluation and certification for all surgical personnel
- + Customer feedback is documented and reviewed by a team consisting of Quality, Veterinary Sciences, and Surgical Management
- + Innovative software system to track and monitor surgical model development

### + Development

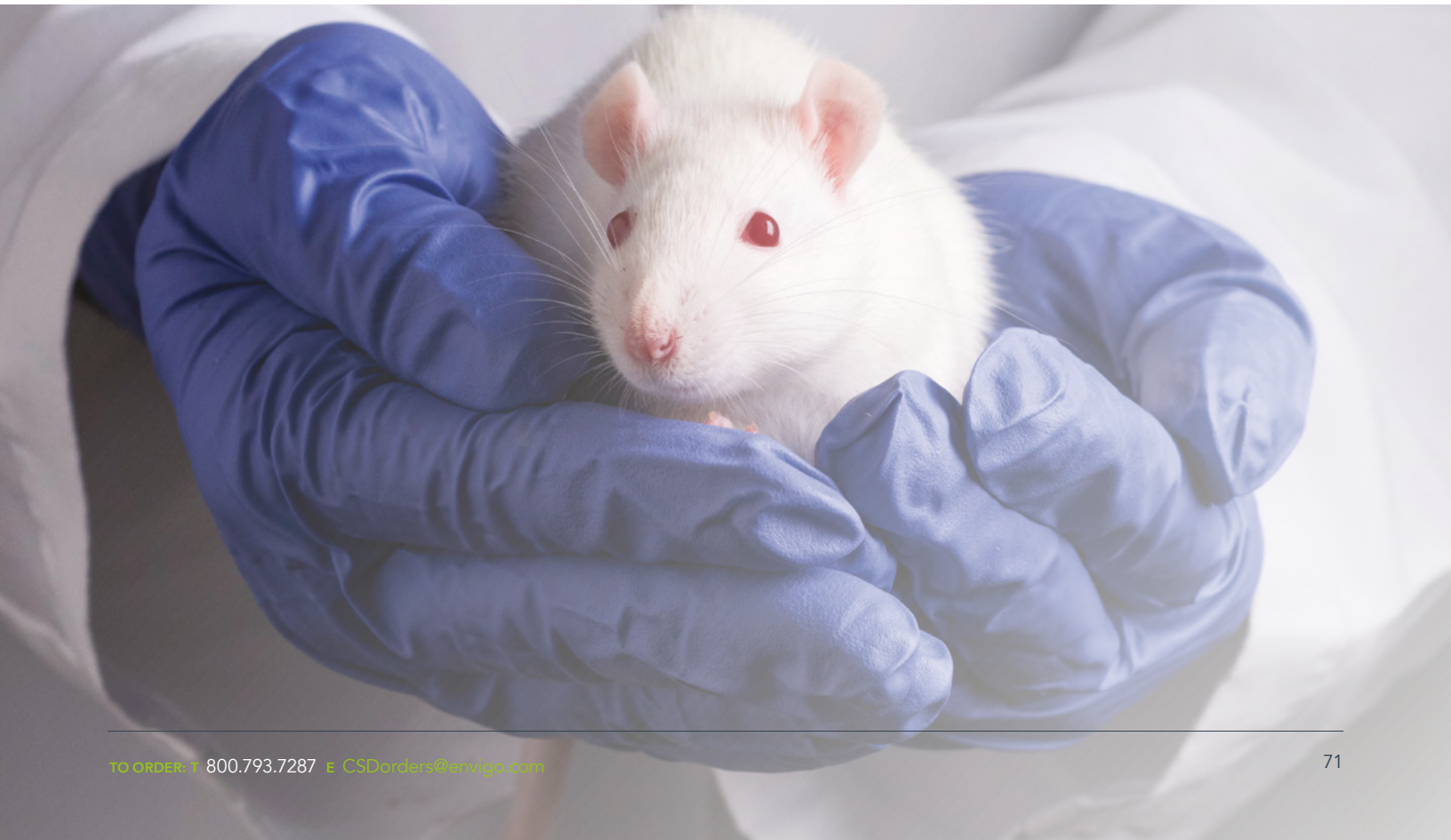
- + Working with researchers to develop new surgical models and improve current models
- + Commitment to continuing education opportunities for Envigo surgical staff
- + Continuous investment in Envigo surgical facilities
- + Flexibility to conduct surgery on both third-party and Envigo bred rodent models.

### + Collaboration

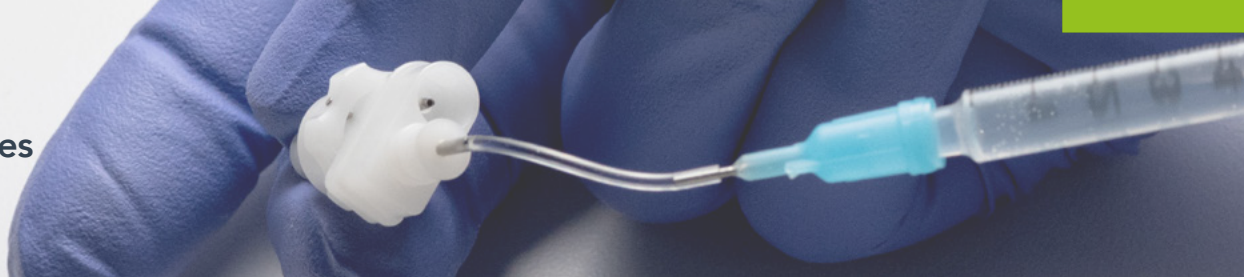
- + Developing partnerships with customers to enhance their research outcomes
- + Partnering with industry professionals to bring new products and services to the research community
- + Global best practice sharing between all Envigo surgical personnel

### + Animal welfare

- + Dedicated to the humane and ethical care of research animals
- + All surgical modifications are reviewed and approved by the Envigo IACUC
- + Envigo veterinarians provide oversight and technical and professional support to all surgical personnel



## Surgical services



### Rodent catheterizations

Envigo uses a rounded-tip catheter made of medical-grade polyurethane for all standard vascular catheterizations. Our standard catheter exteriorization option is a fixed exteriorization of 2.5 cm of exposed catheter exiting between the animal's shoulder blades. We currently offer several additional exteriorization options to access catheterized vessels for infusion and/or sample withdrawal. Furthermore, we will meticulously collaborate with our customers to develop a catheter model that fulfills their particular research needs.

Catheter patency is verified by our surgical staff intra-operatively and again prior to the animals being placed in the shipping containers.

Our recommended flushing regimen can be found on the "Post-Operative Care Sheet for Catheterizations" (sent with each order and available at [envigo.com](http://envigo.com)).

When our recommended flushing regimen is followed, vascular catheterized models are guaranteed patent up to the first five (5) days from arrival at your facility.

- For vascular catheterized rat models, patency of the rounded-tip catheter must be confirmed by the customer within four (4) days following arrival at their facility
- For vascular catheterized mouse models, patency should be confirmed on the day of arrival to customer's facility
- Non-vascular catheterized models are guaranteed patent upon the day of arrival

### Rat catheterizations

		Up to 5 animals (per animal)	6 or more animals (per animal)
<b>Vascular catheterizations</b>			
Carotid Artery	CAC	\$152.15	\$147.75
Femoral Artery*	FAC	\$242.55	\$169.80
Femoral Vein	FVC	\$229.30	\$145.55
Jugular Vein	JVC	\$187.45	\$119.05
Portal Vein	PVC	\$320.85	\$231.55
<b>Non-vascular catheterizations</b>			
Bile Duct - Closed Loop	BDCCL	\$341.80	\$242.55
Intestinal-Duodenal	IDC	\$292.15	\$210.60
Intestinal-jejunal	IJC	\$358.30	\$259.10
Gastric	IGC	\$265.70	\$185.20
Intra-Colonic		\$325.25	\$241.45
Ileum*	ILC	\$249.15	\$244.75
Intra-Cecum	ICC	\$269.00	\$199.55
Intra-Thecal		\$295.45	\$254.70

\* On certain animal models only

For inquiries on our large model surgical services, please contact us at [rmsSurgical@envigo.com](mailto:rmsSurgical@envigo.com)

### Mouse catheterizations

		Up to 5 animals (per animal)	6 or more animals (per animal)
<b>Vascular catheterizations</b>			
Carotid Artery	CAC	\$216.10	\$208.35
Jugular Vein	JVC	\$163.15	\$156.55
<b>Non-vascular catheterizations</b>			
Intestinal-Duodenal*	IDC	\$346.20	\$328.55
Gastric	IGC	\$207.25	\$199.55
Intra-colonic		\$244.75	\$237.05
Ileum	ILC	\$341.80	\$330.75
Intra-Cecum	ICC	\$202.85	\$196.25

### Surgical enrichment program

- All singly-housed surgically-modified rodents receive enrichment postoperatively and during transit
- All surgically-modified rodents are acclimated to ClearH<sub>2</sub>O gel prior to shipment

All catheterizations can be performed using Instech's PinPort™ for an additional charge of \$12.00 (to include the PinPort™ and injectors for use during surgery and shipping). See page 56 for pricing on injectors for flushing maintenance.

### Multiple procedures - single animal rat

Multiple surgical procedures, including catheterizations, can be performed on a single animal. If you require an unlisted combination, including triples, pricing is provided upon request.

		Up to 5 animals (per animal)	6 or more animals (per animal)
<b>Double vascular catheterizations</b>			
Jugular Vein/Carotid Artery	JVC/CAC	\$344.00	\$239.25
Double Jugular Vein	JVC/JVC	\$294.35	\$211.70
Femoral Artery/Femoral Vein	FVC/FAC	\$380.35	\$284.45
Jugular Vein/Femoral Vein	JVC/FVC	\$325.25	\$238.15
Jugular Vein/Femoral Artery	JVC/FAC	\$356.10	\$259.10

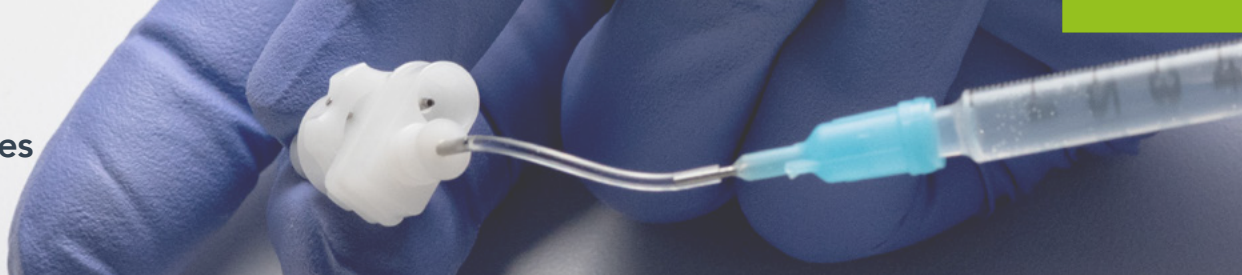
### Multiple procedures - single animal mouse

		Up to 5 animals (per animal)	6 or more animals (per animal)
<b>Double vascular catheterizations</b>			
Jugular Vein/Carotid Artery	JVC/CAC	\$411.25	\$394.70

Envigo also performs customer-specific surgical procedures. Please contact Veterinary Sciences, Research and Support, at 800.793.7287 to discuss your specific needs. In most cases, a surgical procedure development fee is assessed and includes the provision of surgically-modified animals for evaluation.



## Surgical services



### Catheterizations options\*

In addition to the standard catheterization procedure, Envigo offers these options:

	Price per item
<b>Rat Harnesses</b>	
Harness, single port	\$69.45
Harness, dual port	\$102.55
Harness, quad port	\$132.30
Harness, dual port w/connector	\$156.55
Harness, quad port w/connector	\$190.75
Connector, dual/quad harness	\$58.45
Quik Connect Harness, single port	\$67.25
Harness, custom, dual port	\$86.00
<b>Culex Catheters</b>	
CAC	\$47.40
FVC, short	\$47.40
FAC	\$47.40
JVC, short	\$47.40
BDCCCL	\$165.40
PVC	\$47.40
Culex Catheter SS Plug, 19g	\$9.90
Culex BDCCCL U-Tube Connector	\$66.15
<b>Catheter Buttons</b>	
Single Vascular Access Button, Rat	\$57.35
Single Vascular Access Button, Mice	\$49.60
Double Vascular Access Button, Rat	\$78.75
Double Vascular Access Button, Mice	\$78.75
Triple Vascular Access Button, Rat	\$97.65
<b>Catheter Ports</b>	
Vascular Access Port, JVC	\$98.10
Vascular Access Port, FVC	\$98.10
<b>Miscellaneous</b>	
Additional Catheter Tubing (per ft)	\$14.35
Blunt Needles	\$6.60
Huber Needles	\$11.05
Rat Jacket w/Pouch	\$57.35
Stainless Steel Plugs	\$7.35
Catheter Couplers	\$22.05
Hep/Gly Soln, sterile, 500 IU/mL, 10 mL bottle	\$59.55

\* Supplier partners include: Access™ Technologies, SAI Infusion Technologies, Inc., Instech Laboratories, Inc., Bioanalytical Systems, Inc. (BASi), Data Sciences International (DSI™), and Lomir Biomedical, Inc.

Surgical procedure prices are in addition to the cost of animals, shipping, and taxes. Sham operations are priced at 75 percent of the prices shown. No additional charges are assessed based upon the use of gas or injectable anesthesia.

+ +  
 For inquiries on our large model surgical services, please contact us at **800.793.7287** or by e-mail at **rmsSurgical.na@envigo.com** to place an order.  
 + +

### Soft tissue surgical procedures

		Up to 5 animals (per animal)	6 or more animals (per animal)
<b>Reproductive</b>			
Castration - rat	CAST-scrotal	\$60.65	\$33.10
Castration - mouse	CAST-scrotal	\$63.95	\$36.40
Ovariectomy - rat	OVX	\$68.35	\$35.30
Ovariectomy - mouse	OVX	\$65.05	\$36.40
Vasectomy - rat	VAS	\$80.50	\$46.30
Vasectomy - mouse	VAS	\$82.70	\$46.30
<b>Endocrine</b>			
Adrenalectomy - rat		\$48.50	\$38.60
Adrenalectomy - mouse		\$48.50	\$38.60
<b>Additional</b>			
Nephrectomy-Unilateral - rat	NEPHREX	\$103.65	\$58.45
Nephrectomy-Unilateral - mouse	NEPHREX-mouse	\$109.15	\$62.85
5/6 Nephrectomy - rat			
5/6 Nephrectomy - mouse			
<b>Cardiovascular</b>			
Telemetry - rat		<i>Pricing available upon request</i>	
Telemetry - mouse		<i>Pricing available upon request</i>	
Myocardial infarction - rat		<i>Pricing available upon request</i>	
Myocardial infarction - mouse		<i>Pricing available upon request</i>	
Transverse aortic constriction - rat		<i>Pricing available upon request</i>	
Transverse aortic constriction - mouse		<i>Pricing available upon request</i>	

### Immunodeficient models

Surgical modification of immunodeficient rodents that are maintained in flexible-film isolators is also available. These surgical procedures are performed within surgical isolators.

		Up to 5 animals (per animal)	6 or more animals (per animal)
<b>Reproductive</b>			
Castration - rat	CAST-Isolator rat	\$81.60	\$57.35
Castration - mouse	CAST-Isolator mice	\$79.40	\$59.55
Ovariectomy - rat		\$78.30	\$58.45
Ovariectomy - mouse	OVX-Isolator mice	\$72.75	\$59.55
Vasectomy - rat		\$92.60	\$68.35
Vasectomy - mouse		\$89.30	\$70.55

### Additional charges

	Each
Custom surgeries not listed	<i>Pricing available upon request</i>

Cancellations must be received two business days prior to the scheduled date of surgery. The date of surgery is indicated on the order confirmation. Surgical orders cancelled after the required 48-hour notice will be subject to the cost of surgery and any unrecoverable cost such as, but not limited to, preconditioning, treatment and maintenance of the animal model.

## Myocardial infarction model

In the mid 1990's, research concluded the rat model has many pathophysiological and clinical similarities as the human heart. Progression to heart failure is similar to human progression. Envigo now offers a myocardial infarction rat model.

### Uses

- + Identify molecular signaling mechanisms
- + Evaluate therapeutic treatments
- + Investigate disease combinations

### Current research

- + Combination of models
  - + Diabetes and MI
  - + Obesity and MI
  - + MI and aging/sex (young, middle age and old)

## Envigo MI surgical performance

### Success measures

- + Less than 40% ejection fraction (EF)  
Ejection fraction (EF) is a measurement of the percentage of pumped blood leaving the heart
- + Ensuring consistent study results with minimal deviation
- + Able to run on treadmill
- + Low ejection fraction deviations between animals
- + Minimal adhesion
- + No infection or lung damage
- + Muscle damage

### Rat myocardial infarction

- + Severe blanching
- + Thin anterior wall
- + EF = 31%

## Beating expectations



## The Envigo difference

- + Consultative approach
- + High quality surgical models
- + Knowledgeable technical support
- + Responsive customer support



## Preconditioned models and services

### Custom research diet animal maintenance

Cohorts of HsdBlu:LE rats, Hsd:Sprague Dawley® SD® rats, C57BL/6NHsd mice, and other stocks and strains of Envigo rodents can be maintained on custom research diets within our maximum security production barriers.

The rodents are fed diets specified by the customer for defined periods of time prior to shipment. Animals are shipped to the customer using environmentally-controlled vehicles.

### Benefits of Envigo custom diet animal maintenance

- + Envigo Teklad nutritionists, in collaboration with requesting investigators, customize research diets to adjust nutrients and achieve experimental objectives
- + Animals are maintained on customer-specified diets within Envigo's maximum security production barriers until shipment
- + Health and genetic integrity of the models are protected
- + Allows for reallocation of labor and other institutional resources
- + Development of in-house diet maintenance protocols is eliminated

### Research use

- Obesity
- Hypertension
- Osteoporosis
- Nutrition
- Diabetes mellitus
- Hypercholesterolemia
- Physiology
- Pharmacology

### Diet-Induced Obesity (DIO) rodent models

- + Randomly-selected rats and mice are fed Envigo Teklad irradiated custom research diets as specified
- + Animals are provided *ad libitum* diet, automated water and weighed per customer's protocol
- + Data for C57BL/6NHsd male mice, initiated on diet at either three, six, or nine weeks of age, available upon request

## Commercially-aged rats and mice

Envigo has aged inventory of male SD and F344 rats available. Pricing is available upon request. If the quantity, sex, or strain needed is not available, Envigo can age a reserved cohort of animals to the customer's specifications. Pricing of aged animals from the aging inventory is available upon request. If the requested aged animals are not available from our aging inventory, or require three or more months of maintenance prior to shipment, Envigo will age a reserved cohort of animals to accommodate customer research requirements and account for anticipated loss from natural attrition.

Pricing for customer-reserved aging cohorts will be developed based on the requirements of the project. Prior to initialization of an aging project, Envigo will confirm customer expectations, the project work scope, and animal pricing with a written agreement of understanding.

### Research use

- Memory
- Osteoarthritis
- Neoplasia
- Immune response
- Longevity
- Vision and hearing
- Motor skills
- Renal degeneration
- Age-associated pathology
- Metabolism
- Neurobiology
- Cardiovascular
- Reproductive senescence

### Common age-associated conditions include

- Hair loss
- Loss of motor skills and sensory perception
- Presence of spontaneous tumors
- Reduced immunologic and physiologic function
- Loss of vision, e.g. retinal degeneration, development of cataracts

When planning for your aged animal requirements, please consider the need to reserve extra animals on your order to replace any losses due to natural causes.

### Prices available on request

Sprague Dawley® - Hsd:Sprague Dawley® SD®

Fischer 344 - F344/NHsd

C57BL/6 - C57BL/6JRccHsd

Available from Europe

# Production locations

## WORLDWIDE RESEARCH SERVICES

	US	UK	NED	FRA	ISR	ITA	ESP
<b>Teklad Global Diets® and Bedding</b>							
Standard Diets (pelleted, extruded, meal)	+	+		+	+		
Autoclavable Diets	+			+	+		
Irradiated Diets	+			+	+		
Certified Diets	+	+		+	+		
Medicated Diets	+	+		+			
Custom Research Diets	+			+	+		
Bedding	+			+			
Cage Enrichment	+			+			
Cage Liners	+						
<b>Preconditioned models</b>							
Aging Research Models	+	+	+		+		
Animal Model Development	+				+		
Animal Identification (tattooing, implantation etc.)	+	+	+	+	+	+	
Diabetic Induced Models (STZ induced)						+	
Diet-Induced Obesity Models	+	+	+	+	+		
Diet Maintenance Studies	+	+	+	+	+	+	
Custom genetically engineered rodent models	+						
Tumor Models and Services	+						
<b>Genetic testing services</b>							
PCR Zygosity Testing	+	+					
Inbred Strain Verification	+	+					
Gene Expression	+	+					
Next-Gen Sequencing	+	+					
Speed Congenics	+	+					
Prevalidated SNP Zygosity Testing	+	+					
Prevalidated Reporter and Conditional Model Testing	+						
<b>Surgical services</b>							
Surgical services	+	+	+		+		
<b>Health monitoring</b>							
Serology							+
Bacteriology					+	+	
Parasitology					+	+	
Pathology					+	+	
Molecular Biology							+
<b>Biological products</b>							
Serum	+	+	+		+		
Plasma	+	+	+		+		
Complement	+	+			+		
Tissues, Organs, Glands	+	+			+		
Whole Embryo Culture Serum	+						
EGF, 2.5S and 7.0S Nerve Growth Factor	+						
Cytokines	+				+		

	US	UK	NED	FRA	ISR	ITA	ESP
<b>Processing and cell line services</b>							
Bioburden Testing	+						
Endotoxin Testing	+				+		
Sterility Testing	+						
Subcloning	+						
Cell Banking	+	+			+		
Cell Line Sterility	+						
Cell Line Viability Testing	+						
Mycoplasma Cleanup	+						
Cell Weaning	+						
Cell Recovery	+						
Cell Line Isotyping	+						
IgG Concentration Testing	+						
<b>Custom antibody production</b>							
cGMP <i>In Vivo</i> Production (Diagnostic and Therapeutic Use)	+						
Non-cGMP <i>In Vivo</i> Production (Diagnostic and Research Use)	+						
cGMP <i>In Vitro</i> production (Diagnostic and Therapeutic Use)	+						
Non-GMP <i>In Vitro</i> production (Diagnostic and Therapeutic Use)	+						
Hybridoma Development	+				+		
Polyclonal Antibody Production	+				+		
Mouse Antibody Production (MAP) Testing	+						
Antibody Purification	+						
Fragmentation/Conjugation	+						
<b>Colony management services</b>							
Maintenance Research Models		+	+	+	+		
Contract Breeding	+	+	+	+	+		
Import/Export Services	+	+	+	+	+		
Quarantine		+					
<b>Facility services</b>							
Facility Management					+		+
<b>Transgenic services</b>							
Embryo Transfer		+					
Cryopreservation		+					
Revitalization		+					
Sperm Cell Freezing		+					

Although the above Research Model Services are listed by location, these are globally available. Items Not Listed - We invite inquiries about services not listed in this overview. Our technical service representatives are ready to discuss your special requirements. We will work with you to select the services that best suit your needs.



## Custom antibody production

BIOPRODUCTS

At Envigo Bioproducts, we believe that when it comes to making antibodies, experience matters. For more than 40 years, we have consistently provided the research community high-quality custom antibody production services. From the more traditional *in vivo* approach, to the leading-edge *in vitro* production method, to hybridoma development, Envigo Bioproducts can tailor a program to meet your specific needs. Our technical staff will work with you to determine the best production approach for your research.

We understand the research process and how unexpected variability can negatively impact the quality and timeliness of results. Through our proven Quality Management System, our cGMP/OLAW-compliant and USDA-licensed facility, and our team of highly-qualified and experienced ISO 9001-2015 and AAALAC accredited facility professionals, we provide antibody products and services that you can depend on to support and enhance your research. By providing consistent high-quality products and services in a timely manner, Envigo Bioproducts helps you focus on your research, rather than on unwanted distractions.

### *In vivo* production

For an economical approach, Envigo Bioproducts offers monoclonal antibody production in our cGMP-compliant and AAALAC accredited facility. Our ready access to large numbers of high-quality, genetically-defined adventitious virus-free mice ensures a rapid turnaround time at a competitive price. We can also help maximize your yield time through our innovative Optimization Program.

## Custom antibody production

BIOPRODUCTS

# Custom antibody production

Envigo Bioproducts is a global market leader with more than 40 years of experience in developing, scaling up and purifying antibodies.

### Cell Line and processing services

We have expanded our cell line and processing capabilities to offer a wider selection of services, thus helping you to complete your research more efficiently.

- Bioburden
- Endotoxin
- Sterility
- Subcloning
- Cell banking
- Cell line stability
- Mycoplasma cleanup
- Viability
- Cell weaning
- Cell recovery
- Cell line isotyping
- IgG testing

Our technical staff has extensive experience in microbiology, virology, cell biology, immunology, and lab animal medicine. This translates into reliability in knowing that your projects will be dealt with in a professional and timely manner.

### The BPS advantage:

- + ISO 9001-2015 and AAALAC accredited, cGMP-compliant facility
- + Expertise > 40 years
- + Rapid turnaround time
- + Scientific expertise
- + Superior quality management system
- + Vendor qualification expertise

### In vivo (ascites) production

For an economical approach, Envigo Bioproducts offers monoclonal antibody production as ascites in our AAALAC registered cGMP compliant facility. Our ready access to large numbers of high quality, genetically defined adventitious virus-free mice and rats ensures a rapid turnaround time at a competitive price. We can also help maximize your yield time through our innovative Optimization Program.

SERVICE	Description	Cell Line	Production type	Capacity	Advantages
Optimization Program	Different doses tested Small to large run sizes	Hybridomas, NSO and SP2/0	BALB/c, Nude, SCID, and other species	Small to large scale (10mg-100g)	Determine optimal cell dose Allows maximal yield Verifies specifications Saves time
Research <i>in vivo</i> Production (non-cGMP)	When cGMP is not needed Unique service Same phases as cGMP	Hybridomas, NSO and SP2/0	BALB/c, Nude, SCID, and other species	Small to large scale (10mg-100g)	No MAP Testing requirement Quicker turn-around time Custom protocols Reduced cost
cGMP Production	Diagnostic/Therapeutic Use Extensive Quality Program Fully tested	Hybridomas, NSO and SP2/0	BALB/c, Nude, SCID, and other species	Small to large scale (10mg-100g)	AAALAC accredited, cGMP compliant Optimized production Large animal inventory Complete documentation

# Custom antibody production

## BIOPRODUCTS

### In vitro monoclonal antibody production

Envigo Bioproducts has the expertise to produce your monoclonal or secreted protein *in vitro*. We have the capacity to produce 10mg-300g of research or cGMP antibody, or other secreted proteins, in our innovative tissue culture bag and hollow fiber production units. We offer a variety of media options such as RPMI, DMEM, IMDM, serum free, protein free, or other custom media formulations.

Service	Description	Cell Line	Production Type	Capacity	Advantages
Small Scale Production	Cost effective for smaller research runs Good for early feasibility, clonal selection, and media optimization	Hybridomas (CHO's, 293's, PerC.6 and secreted proteins)	Tissue, Culture Bag Hollow Fiber Bioreactor	Up to 1 gram per project	Reduced cost Yield ~20-150mg per 1 L bag Quick turn-around Excellent oxygen transport
Large Scale Production	Flexible and easy scale up Larger scale research and cGMP runs	Hybridomas (CHO's, 293's, PerC.6 and secreted proteins)	Hollow Fiber Bioreactor	10mg-300g per project	Max environmental control Reproducible manufacturing process Reduces extraneous proteins Highly concentrated product

### Hybridoma development

Our hybridoma development program is a flexible, interactive, and cost-effective multi-phased service. We will work closely with you to design a program that will meet your requirements. Our custom development options include providing up to three, five, or 10 clones, or as many as you require. As our customer, you retain all rights to any clones that are produced. Once the clones are developed, we can scale them up via *in vivo* or tissue culture supernatant.

Service	Requirements	Project outcomes
Stage I: Immunization	Immunize mice with antigen Boost/Test by ELISA or alternate method Additional boost(s) if needed Pre-fusion boost	Move mice with best titers as fusion candidates Immunizing multiple mice increases success
Stage II: Fusion/Screen and Select	Fusion with myeloma cell line Grow cells in HAT medium Initial screen/selection	Screen all initial plates Expand positive wells and test by ELISA Set up to 30 positives for cloning Keep frozen back-up for future testing
Stage III: Cloning/Frozen Stock	First cloning Final cloning Selection for non-HT requirement Frozen stock and small antibody scale-up	Clone by limiting dilution method Test clones by ELISA Several cloning cycles Final clones expanded and small amount of antibody produced

### Polyclonal antibody production

Our comprehensive polyclonal antibody production service is offered in a variety of species. These include rabbits, goats, chickens, guinea pigs, rats, and mice. We can make your polyclonal using a wide range of antigens, bacteria, viruses, fungi, fusion proteins, synthetic peptides, plasmids, DNA, and other proteins. Peptide synthesis, carrier and labeling conjugations, and purification can easily be added to your productions. Standard protocols are available for each species, or we can follow your specific protocol. All our procedures are fully documented, allowing complete traceability.

Service	Antigen	Production type	Production capacity	Area of use	Advantages
Polyclonal	Proteins, Peptides, variety of antigens	Rabbits, Goats, Chickens, Mice, Rats, Guinea Pigs, Sheep and Horses	Small to Large Scale (all size runs available)	Diagnostics, Research	Variety of Species USDA Licensed Standard/Custom Protocols

# Custom antibody production

## BIOPRODUCTS

### Antibody purification

Envigo Bioproducts can purify from mg to gram quantities of your monoclonal or polyclonal antibodies utilizing a wide array of protein purification methods, for research or cGMP diagnostic use. We can also purify any raw antibodies that have been produced in your lab or from another supplier. Our scientific staff will work with you to discuss the best options available to meet your needs. Our goal is to develop a procedure which provides the best balance between yield, purity and cost.

Service	Production type	Method	Production capacity	Area of use	Advantages
Antibody Purification	Monoclonals	Protein A and G,	Small to large scale	Diagnostics,	Variety of Methods
IEF, SEC, MW Testing	Polyclonals	Antigen affinity,	(20mg - 20g scale	cGMP Research	Low endotoxin for <i>in vivo</i>
Fab and F(ab') <sub>2</sub>	Secreted Proteins	Hydrophobic	available)		use cGMP compliant for
Fragmentation	IgM	interaction, Size			diagnostic use
FITC, Biotin, Alk Phos, and	IgY	exclusion,			Purify customer's in-house
HRP Conjugation		Ammonium sulphate,			antibody
		Ion exchange			Standard/Custom Protocols

### Immunogenicity immunization

Envigo Bioproducts provides a unique Immunogenicity Immunization service in a variety of species, such as rats, mice, guinea pigs, and rabbits. We provide serum samples from a wide range of antigens, bacteria, viruses, lipids, nucleic acids and other proteins. Non-immunogenic haptens require conjugation with an epitope such as a protein or polysaccharide before they can illicit an immunologic response. Standard protocols are available for each species, or we can follow your specific protocol. All our procedures and production records are fully documented, allowing complete traceability.



Service	Antigen	Production Type	Production Capacity	Area of Use	Advantages
Immunogenicity Immunization	Proteins, viruses, variety of antigens	Rabbits, Mice Rats, Guinea Pigs	Small to large scale (all size runs available)	Vaccine, Research Discovery	Variety of Species USDA Licensed Standard/Custom Protocols

### MAP/RAP/HAP testing

- + If your production must be free of Mycoplasma or adventitious viral contamination, we recommend our MAP, RAP, and HAP testing programs
- + These programs can screen your cell line against the adventitious viruses associated with your cell line's origin. Testing is available by both PCR and serology

### Whole embryo culture serum/EGF, 2.5S and 7.0S nerve growth factor

- + Envigo Bioproducts offers a custom-collected serum for use in Whole Embryo Culture (WEC) of seven- to nine-day-old rat and mouse embryos, as well as the best and most competitively priced mouse-derived NGF and EGF. Custom orders are available upon request

### Rodent sera and tissues

- + We have ready access to rodent tissues and sera from high-quality, genetically-defined, adventitious virus-free mice and rats
- + Canine, rabbit and nonhuman primate tissues and sera available as well
- + Quotes from specific strains are available upon request

## Your custom antibody production partner

Whether your needs call for *in vivo* or *in vitro* production, we can supply a reliable stream of antibody to meet your research development and production needs. Our staff can perform an evaluation/optimization run to scale up, utilizing the proper regulatory documentation. We can also purify and further process your antibody to meet your desired specifications.

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Visit our website, [envigo.com/bioproducts](http://envigo.com/bioproducts), for our full program, or contact us at **800.972.4362** or by e-mail at [Bioproducts.na@envigo.com](mailto:Bioproducts.na@envigo.com) to place an order.



# Quality programs

Envigo is unique among suppliers of research models and services in the breadth of our programs for providing quality products and services to reduce variables to help you do research better.

Diet manufacturing facilities in North America and animal production facilities in Europe and Israel are ISO 9001 certified. North American animal production facilities follow standard operating procedures aligned with the ISO 9001 standard, but are not ISO certified, and are fully accredited to AAALAC International. Our animal operations in the Netherlands are both ISO and AAALAC certified.

Please visit [envigo.com](http://envigo.com) to view a list of all certifications and accreditations for all Envigo diet manufacturing and animal production sites globally.

### **Animal welfare** [envigo.com/animalwelfare](http://envigo.com/animalwelfare)

Envigo is dedicated to the humane care and use of research animals. The IACUC and dedicated veterinary staff manage policies and procedures to ensure that all animal use is performed in accordance with the highest standards.

These include AAALAC International accreditation, assurance of compliance with PHS/OLAW policy, and USDA Animal Care registration.

All animal production sites in the US are covered by a PHS Assurance and we are fully USDA registered. Globally, all Envigo sites maintain compliance with national animal welfare regulations. All EU animal operations comply with the European Directive 2010/63/EU.

Our nonhuman primate facilities in Texas and Pennsylvania are registered as importers with the CDC.

### **Diet and bedding monitoring** [envigo.com/teklad](http://envigo.com/teklad)

Teklad standard laboratory animal diets meet the highest nutritional and hygiene standards. All diets are manufactured under ISO 9001 procedures with careful ingredient sourcing and monitoring.

Many diets are offered certified for contaminant analysis. High-quality bedding and bedding enrichment products are manufactured following appropriate quality standards and screened periodically for contaminants, and can be certified on request.

### **Health monitoring** [envigo.com/healthreports](http://envigo.com/healthreports)

We are committed to providing the highest quality animals to the research community and our health testing program provides you assurance of that commitment.

If any significant changes occur in colony genetic, health or microbiologic status, customers are notified upon confirmation. Animal colonies will be restarted to eliminate significant pathogens or genetic contamination.

Microbiologically-defined rodent colonies are maintained within production barriers and flexible-film isolators. Colonies are monitored daily by trained personnel supported by our veterinary medical staff for clinical signs of disease or abnormalities.

Monitoring at our US small animal production facilities is conducted by our own internal laboratory, Envigo Health Monitoring Services. Our large model facilities undergo monthly health monitoring within our laboratories or through an external laboratory.

Our health surveillance program in Europe is based on 2014 FELASA recommendations. Monitoring is carried out at our laboratories in Italy as well as by outside laboratories.

### **Genetic monitoring** [envigo.com/GIAP](http://envigo.com/GIAP)

Envigo's global routine genetic monitoring program consists of collecting tissue samples from inbred models quarterly in North America, Israel, and Europe from all new pedigreed Foundation Colony breeding cages in non-isolator-bred colonies. Tests are conducted on all pedigreed Foundation Colony breeding cages in newly-populated isolator-bred colonies, and then five (5) new Foundation Colony breeder cages annually thereafter. Routine genetic monitoring is also performed on select outbred stocks to determine heterogeneity and compare allelic frequencies across locations globally. In addition, various mutant models on either outbred or inbred backgrounds are tested annually to confirm the mutation of interest.

Tissue samples are sent to the Envigo genetic testing services laboratory located at Infinity BiologiX (formerly Bionomics Research Technology Center at Rutgers University) in Piscataway, NJ.

Our laboratory employs a customized panel of single nucleotide polymorphisms (SNPs) to evaluate strain differences in both rats and mice. Our routine inbred panel consists of 48 markers and our outbred panel consists of 96 markers.

**For any questions or reports, please contact our Veterinary Sciences, Research and Support team at [RMSTechnicalServices.na@envigo.com](mailto:RMSTechnicalServices.na@envigo.com) or 800.793.7287.**

### **Custom antibody production** [envigo.com/bioproducts](http://envigo.com/bioproducts)

Custom antibody production facilities in North America are cGMP compliant (21CFR Parts, 210, 211, and 820).

**For any questions, please contact BPS at [Bioproducts.na@envigo.com](mailto:Bioproducts.na@envigo.com), or 800.972.4362.**

# Envigo microbiological testing

## Microbiological monitoring

The Envigo comprehensive monitoring program includes monthly evaluations of barrier-produced rodents and monthly or quarterly evaluations of flexible-film isolator-produced rodents.

Updated health reports are available at: [envigo.com/healthreports](https://envigo.com/healthreports)

## Organism List and Testing Frequency

Legend: A = annually, Semi = semi-annually, Q = quarterly, M = monthly, - = not tested. ELISA = Enzyme-Linked Immunosorbent Assay, IFA = Immunofluorescence Assay, PCR = Real Time Polymerase Chain Reaction

VIRUSES	BIOEXCLUSION LEVEL	MICE		RATS		HAMSTERS	COTTON RATS	TEST METHODS
		BARRIER	ISOLATOR	BARRIER	ISOLATOR	BARRIER	BARRIER	
Kilham's Rat Virus (KRV)	1	-	-	M	Q	-	M <sup>a</sup>	ELISA or PCR
Mouse Hepatitis Virus (MHV)	1	M	Q	-	-	-	M <sup>a</sup>	Bead or PCR
Mouse Minute Virus (MMV)	1	M	Q	-	-	-	M <sup>a</sup>	Bead or PCR
Mouse Parvovirus (MPV)	1	M	Q	-	-	-	M <sup>a</sup>	Bead or PCR
Parvovirus NS-1	1	M	Q	M	Q	-	M <sup>a</sup>	ELISA (R), Bead (M) or PCR
Pneumonia Virus of Mice (PVM)	1	M	Q	M	Q	M	M <sup>a</sup>	ELISA (R), Bead (M) or PCR
Rotavirus (EDIM)	1	M	Q	-	-	-	M <sup>a</sup>	Bead or PCR
Rat Minute Virus (RMV)	1	-	-	M	Q	-	M <sup>a</sup>	ELISA or PCR
Rat Parvovirus (RPV)	1	-	-	M	Q	-	M <sup>a</sup>	ELISA or PCR
Rat Theiler Virus (RTV)	1	-	-	M	Q	-	M <sup>a</sup>	ELISA or PCR
Reovirus 3 (REO 3)	1	Q	Q	Q	Q	M	Q <sup>a</sup>	ELISA (R), Bead (M) or PCR
Sialodacryoadenitis Virus (SDAV/RCV)	1	-	-	M	Q	-	M <sup>a</sup>	ELISA or PCR
Sendai virus	1	M	Q	M	Q	M	M <sup>a</sup>	ELISA (R), Bead (M) or PCR
Theiler's Mouse Encephalomyelitis Virus (TMEV/GDVII)	1	M	Q	-	-	-	M <sup>a</sup>	ELISA (R), Bead (M) or PCR
Toolan's H-1 Parvovirus	1	-	-	M	Q	-	M <sup>a</sup>	ELISA or PCR
Mouse Norovirus (MNV)	1	Q	Q	-	-	-	Q <sup>a</sup>	Bead or PCR
Simian Virus 5 (SV-5)	1	-	-	-	-	M	-	ELISA or PCR
Ectromelia (Mousepox)	1	Semi	A	-	-	-	Semi <sup>a</sup>	Bead or PCR
Hantaan virus	1	Semi	A	Semi	A	-	Semi <sup>a</sup>	ELISA (R), Bead (M) or PCR
Lymphocytic Choriomeningitis Virus (LCMV)	1	Semi	A	Semi	A	M	Q <sup>a</sup>	ELISA (R), Bead (M) or PCR
Mouse Adenovirus-1 (MAD-1)	1	Semi	A	Semi	A	-	Semi <sup>a</sup>	ELISA (R), Bead (M) or PCR
Mouse Adenovirus-2 (MAD-2)	1	Semi	A	Semi	A	-	Semi <sup>a</sup>	ELISA (R), Bead (M) or PCR
Mouse Cytomegalovirus (MCMV)	1	Semi	A	-	-	-	Semi <sup>a</sup>	Bead or PCR
Polyoma Virus	1	Semi	A	-	-	-	Semi <sup>a</sup>	ELISA or PCR
K virus	1	Semi	A	-	-	-	Semi <sup>a</sup>	ELISA or PCR
Lactic Dehydrogenase-Elevating Virus (LDEV)	1	Semi	A	-	-	-	Semi <sup>a</sup>	ELISA or PCR
Mouse Thymic Virus (MTV)	1	Semi	A	-	-	-	Semi <sup>a</sup>	IFA or PCR

<sup>a</sup> Cotton rats are not tested serologically; therefore, mouse or rat sentinels are utilized.

# Envigo microbiological testing

BACTERIA AND FUNGI	BIOEXCLUSION LEVEL	MICE		RATS		HAMSTERS	COTTON RATS	TEST METHODS
		BARRIER	ISOLATOR	BARRIER	ISOLATOR	BARRIER	BARRIER	
<i>Bordetella bronchiseptica</i>	3	Semi	A	Q	Q	Q	Q	Culture
<i>Campylobacter jejuni</i>	1	-	-	-	-	Q	-	Culture
CAR bacillus	1	Semi	A	Q	Q	-	Q <sup>a</sup>	ELISA or PCR
<i>Citrobacter rodentium</i>	1	Q	Q	-	-	-	Q <sup>a</sup>	Culture
<i>Clostridium piliforme</i> (Tyzzer's disease)	1	Q	Q	Q	Q	M	Q <sup>a</sup>	ELISA (R), Bead (M) or PCR
<i>Corynebacterium bovis</i>	1	-	Q	-	-	-	-	PCR
<i>Corynebacterium kutscheri</i>	1	Q	Q	Q	Q	Q	Q	Culture
Dermatophytes	1	Semi	Q	Semi	Q	-	Semi <sup>a</sup>	Culture
<i>Encephalitozoon cuniculi</i>	1	Semi	A	Semi	A	Q	Semi <sup>a</sup>	ELISA or PCR
<i>Helicobacter</i> spp.	1	Q	Q	Q	Q	Q	Q	PCR
<i>Klebsiella oxytoca</i>	3	Q	Q	Q	Q	Q	Q	Culture
<i>Klebsiella pneumoniae</i>	3	Q	Q	Q	Q	Q	Q	Culture
<i>Lawsonia intracellularis</i>	1	-	-	-	-	Q	-	ELISA or PCR
<i>Mycoplasma pulmonis</i>	1	Q	Q	Q	Q	Q	Q <sup>a</sup>	ELISA (R, H), Bead (M) or PCR
<i>Pasteurella multocida</i>	1	Semi	A	Semi	A	-	-	PCR
<i>Pasteurella pneumotropica</i>	1	M	Q	M	Q	Q	M	Culture
<i>Pneumocystis</i> spp.	1	Q	Q	Q	Q	Q	Q	IFA or PCR
<i>Proteus mirabilis</i>	3	-	Q	-	Q	-	-	Culture
<i>Pseudomonas aeruginosa</i>	2	Q	Q	Q	Q	Q	Q	Culture
<i>Salmonella</i> spp.	1	Q	Q	Q	Q	M	Q	Culture
<i>Staphylococcus aureus</i>	2	Q	Q	Q	Q	Q	Q	Culture
<i>Streptococcus</i> spp. Group B beta	3	Q	Q	Q	Q	Q	Q	Culture
<i>Streptobacillus moniliformis</i>	1	Semi	A	Q	Q	-	Q	PCR
<i>Streptococcus pneumoniae</i>	1	Q	Q	Q	Q	Q	Q	PCR

PARASITES	BIOEXCLUSION LEVEL	MICE		RATS		HAMSTERS	COTTON RATS	TEST METHODS
		BARRIER	ISOLATOR	BARRIER	ISOLATOR	BARRIER	BARRIER	
Endoparasites	1 / 2 <sup>b</sup>	M	Q	M	Q	M	M	Microscopy and PCR
Ectoparasites	1 / 2 <sup>c</sup>	M	Q	M	Q	M	M	Microscopy and PCR

<sup>b</sup> Endoparasites in Bioexclusion Level 2 include *Chilomastix* sp., flagellates, *Entamoeba muris*, and trichomonads.

<sup>c</sup> Ectoparasites in Bioexclusion Level 2 include *Demodex* spp. in hamsters.

All other endoparasites and all ectoparasites are Bioexclusion Level 1

## Ordering information

**For questions regarding our ordering and shipping guidelines, please contact us.**

Envigo  
8520 Allison Pointe Blvd.,  
Suite 400  
Indianapolis, IN 46250  
Attn: Customer Service Department

### Small Models:

**T 800.793.7287**

**F 317.806.6090**

**E [CSDorders@envigo.com](mailto:CSDorders@envigo.com)**

### Large Models:

**T 800.793.7287**

**E [CSDorders@envigo.com](mailto:CSDorders@envigo.com)**

### Small model ordering information

Orders may also be initiated via our website at [envigo.com/CSDorders](http://envigo.com/CSDorders)

List prices are subject to change without notice. Current pricing will be listed on [envigo.com](http://envigo.com). Major price and product line changes will be communicated to customers with a 30-day notification via e-mail. Terms are granted by individual review and stated on customer invoices and account statements. Unless otherwise requested, shipping charges will be prepaid and added to your invoice. Customer is responsible for all taxes (whether federal, state or local), or other charges (including interests and penalties thereon), imposed by law with respect to the sale or use from the purchase of goods.

To ensure fast processing, please draft your purchase orders using the correct name, age, weight, and sex of the animals. Standing orders are encouraged to assure an adequate supply of the animals you require. With a standing order, we will establish and maintain an agreed-upon shipping schedule.

### Shipping

Our standard shipping is via environmentally-controlled vehicles. Transportation will be made either by Envigo owned vehicles or by third-party transport companies. Our vehicles, ranging in size from sprinter vans to semitractor trailer units, make regularly scheduled deliveries over a network of truck routes encompassing most of North America. Air shipments will be made from airports located near our production facilities.

### Weight Specifications

In the event that an order for animals includes a weight specification, Envigo will assume that such specification pertains to the packaging weight. The customer must take this into account when placing an order. It is known that animals may experience weight changes during transport. Depending on the age, sex, and developmental status of the animal as well as the duration of the transport itself, animals may lose or gain weight during transport. In almost all cases, animals will return to their weight at shipping within 24–48 hours after arrival. This statement is to be used as a guideline only as the rate of weight recovery may be strain-specific and is also influenced by external factors, e.g. maintenance on arrival in a new facility, diet composition, and/or position of individuals in a new animal hierarchy. Contact our Customer Service Department for animals required with a narrowly- defined weight range.

### Special Services

If special pre-shipment animal treatment is required, please let us know at the time your order is placed so that your animals will arrive in the condition specified.

### Use of Envigo's Animals

Animals purchased from Envigo or the offspring of these animals may not be bred for sale or sold, transferred, licensed or otherwise provided to any party aside from the original purchaser. Animals purchased from Envigo are for research use only.

### Use and Distribution of Envigo Teklad's Diet, Bedding and Enrichment Products

Teklad Diets, Bedding and Enrichment Products purchased from Envigo may not be distributed or transferred to any commercial partner or any other third party for any commercial purpose; unless expressly agreed in a separate written contract between the parties.

### Pregnant animal policy

Envigo uses well-established techniques to successfully produce time mated rats, mice and hamsters. We use an Impedence Meter for determining the stage of estrus in rats prior to breeding. Time mated rats and mice are determined by observation of a vaginal plug. Plug date is considered to be day zero (0) of gestation. Due to the natural variation in the length of gestation, the exact day of parturition cannot be guaranteed. In addition, Envigo cannot guarantee the minimum number of offspring per litter. Please be aware that late-term pregnant animals may deliver their litter prematurely while in transit, and depending on the circumstances involved, requests for credit or replacement of these animals may be declined at our sole discretion.

If problems regarding gestational age or pregnancy are encountered, customers should immediately contact Envigo's Customer Service Department and provide detailed information regarding the animals involved.

### Expected pregnancy rate

	Timed mated <13 days gestation (at shipping)	Timed mated ≥13 days gestation (at shipping)	Untimed pregnant ≥13 days gestation (at shipping)
STOCK OR STRAIN			
All Outbred Rats/Mice	*	90%	90% **
All Inbred Rats/Mice	*	90%	90% **

\* Plug guarantee only; no guaranteed pregnancy. Plug date = Day 0.

\*\* Untimed pregnant rodents will be selected from our breeding colonies on the basis of palpation or visual confirmation. A variation of three to four days gestation can be expected. Therefore, Envigo cannot be held responsible for actual gestation and/or exact day of littering.

To avoid charges, cancellations for timed mated animals must be received one week prior to mating date.

### Additional charges

The following charges will be added when applicable:

2-gram weight range (mice only)	add 15%
5-gram weight range (rats only)	add 20%
10-gram weight range (rats only)	add 10%
Littermates	add 10%
Special Timed Mated Fee	\$220.00
Extra specifications for timed mated or retired breeder rodents	Priced upon request
Zip-Top Shipping Container w/ Viewing Windows & Gel Kits	\$26.00
Zip Top Double Wire Container w/ Viewing Windows & Gel	\$47.00
Plastic Shipping Container with Hydrogels	\$47.00
Zip Top MicroShipper with Two Innocages and Gel	\$82.00
Tattoo (rodents)	\$12.75
Ear Tag (rodents)	\$7.50
Import or export charges	\$1,000.00
Fish and Wildlife Declaration Fee	\$475.00
Veterinary Certificate	\$375.00

\* Dimensions 24.5" x 16.25" x 8"

## Shipping guidelines

### Shipping

- Viewing windows, plus mylar lid liner for easy, convenient viewing of animal models
- Woven-edge screen for smooth handling
- ClearH<sub>2</sub>O<sup>®</sup> gel hydration source
- Dimensions are 24.5"x16.25"x8"

ClearH<sub>2</sub>O<sup>®</sup> gel is recognized by the research industry as an innovative hydration source.

Our veterinary staff recommends ClearH<sub>2</sub>O<sup>®</sup> gel to ensure proper hydration of your research models in transit.

The following are guidelines for you to use to determine the number of containers required to ship your orders. Special considerations for shipment may apply depending on order specifications.

### Mice

WEIGHT (G)	Maximum quantity
8-24	40
25-34	36
35+	36
Pregnant females	20
Female with litter	4
Proven or Retired breeders (male)	8
Proven or Retired breeders (female)	36

Male inbred, retired, or proven breeder mice are shipped in compartmentalized containers; two, four, six, or eight per container.

### Rats

WEIGHT (G)	Maximum quantity
35-75	22
76-100	18
101-125	16
126-150	14
151-175	12
176-225	10
226-300	8
301+	6
Pregnant females	6
Female with litter	2
Proven breeders (male and female)	6*
Proven breeders (male and female)	6*
Aged	6*

\* Long Evans proven breeders and retired breeders require a maximum pack quantity of four (4).

\*\* C57BL/6, BALB/c and Long Evans males are required to ship as cage mates.

### Hamsters

WEIGHT (G)	Maximum quantity
25-60	16 per box
61-74	14 per box
74+	12 per box
Pregnant females	4
Female with litter	1
Retired breeders (male)	14
Retired breeders (female)	4

Female retired breeder and pregnant hamsters are shipped in four compartments. Female hamsters with litters must be in a divided box.

### Cotton Rats

WEIGHT (G)	Maximum quantity
Less than 60	4
61-90	4
91+	4
Pregnant females	1
Female with litter	1
Retired breeders (male and female)	1

Cotton rats must be cage mates.

### Microshipper guidelines

Zip Top MicroShipper with two Innocages and gel

	Maximum quantity
Rats	3/Innocage
Mice	15/Innocage

## ENVIGO GLOBAL SERVICES INC. ("EGSI") TERMS AND CONDITIONS OF SALE

All sales by EGSI are subject to these Terms and Conditions of Sale unless otherwise agreed in writing.

Revised August 2021

### 1. PRICE

Unless otherwise agreed in writing between Buyer and EGSI, prices listed in the attached quote are effective for 60 days from the date of quote submission, with the exception of international or air transportation prices. In case of significant regulatory developments or supply disruptions, EGSI may adjust the prices accordingly. Price does not include (i) taxes, duties, excises or other fees imposed by law or (ii) shipping fees. Buyer agrees to keep all prices confidential.

#### 1.1. PRIMATE ORDERS

In addition to the price for male only primate orders, the Buyer shall pay an additional inventory imbalance fee for each male unit specified in the Work Order. For primate orders consisting of more males than females, the Buyer shall pay an additional inventory imbalance fee for each male unit exceeding the female quantity as specified in the Work Order.

### 2. PAYMENT

All invoices are due and payable in full within 30 calendar days of receipt. Any invoice not paid within 30 calendar days of receipt shall be subject to an interest fee at the rate of the lower of 1.5% per month or the highest rate permitted by applicable law. Institutional procurement cards (AMEX, MasterCard, VISA) are accepted as a method for establishing payment terms on a preapproved basis.

### 3. ORDER PROCESSING

The order cut-off time is 5:00 PM Eastern Time on **Wednesdays** for deliveries to be scheduled the following week. Orders received after 5:00 PM Eastern Time for delivery the following week will be assessed a late order fee. Delivery the following week may not be possible and will be confirmed by EGSI. Any orders placed after the customer's cut-off time may be subject to a \$75 rush fee.

## CLIENT SERVICES

### 4. DELAYS

Cancellation Advance notification of scheduled order shipment delay and cancellation is required. Buyer-driven order delays and cancellations shall be subject to fees in accordance with the terms below. If Buyer-requested services including, but not limited to, testing, acclimation, vaccines or treatments are performed prior to notification of cancellation, Buyer shall pay 100% of price quoted for service(s) performed in addition to the cancellation fee.

#### 4.1 BUYER-INITIATED DELAY

Buyer shall pay the current per diem list price to hold the animals until the order is shipped and a shipment delay fee up to 25% of the transportation price quoted.

#### 4.2 ORDER CANCELLATION

**(a) After Order Shipment.** Any order cancelled after the shipment leaves an EGSI facility or while in transit to Buyer's location shall be subject to a cancellation fee equal to the total order price.

**(b) International Air Shipments – All Species.** The following schedule applies to cancellations of orders requiring international air shipments: Days prior to shipment Cancellation Fee (percentage of transportation price quoted)

16+ up to 25%

7 – 15 up to 50%

1 – 6 100%

**(c) Primates.** No fee shall apply for orders cancelled at least 15 Calendar Days prior to agreed shipment date. If cancellation notice is received after animals have been transferred to indoor pre-shipment quarters, Buyer shall pay 10% of total order price or a minimum of \$5,000.00.

i. Special Primate Imports Alternate cancellation terms may apply to Animals which are specially imported or which do not conform to EGSI standard specifications, as requested by Buyer. Such alternate cancellation terms shall be set forth in a Special Order Agreement and signed by EGSI and Buyer.

**(d) Canines.** No fee shall apply for orders cancelled at least 2 Business Days prior to agreed shipment date. If cancellation notification is not received or received less than 2 Business Days prior to agreed shipment date, Buyer shall pay 10% of total order price or a minimum of \$500.00.

i. For canines with Buyer-requested implanted micro-chips (i.e. ISO-transponder), cancellation received after implantation will trigger a cancellation fee equal to price quoted for all implanted canines.

**(e) Rabbits.** No fee shall apply for orders cancelled at least 2 Business Days prior to agreed shipment date. If cancellation notification is not received or received less than 2 Business Days prior to agreed shipment date, Buyer shall pay 10% of total order price or a minimum of \$250.00.

**(f) Time Mated Rabbits and Pregnant Beagles.** Orders cancelled post-breeding, are subject to a cancellation fee equal to 100% of total order price.

**(g) Surgically Modified Animals.** After EGSI's acceptance of a Statement of Work or an Order Form for surgically modified animals, cancellation fees apply unless the Statement of Work or Order Form state that such fees do not apply.

i. If cancellation notice is received on the day surgery is scheduled, the cancellation fee is equal to 100% of the total order price. If cancellation notice is received less than 10 Business Days prior to scheduled surgery, the cancellation fee is equal to 50% of total order price. Upon surgery completion, even if the modified animal removes or damages a surgical modification after surgery, including the period of time before, during or after shipment, a cancellation fee equal to 100% of total order price shall apply. Buyer will be invoiced upon notification of cancellation.

ii. If Buyer requires a minimum quantity of surgically modified animals, Buyer should order a surplus to offset any potential destruction caused by animal behavior. Buyer should contact EGSI for applicable advance order times required for each animal model. EGSI warrants that at the time of shipment all surgically modified animals meet the specifications of the Statement of Work or Order Form accepted by EGSI except any defect caused by animal behavior. Buyer waives any rights with respect to such warranty unless it contacts EGSI's Client Service Team within 24 hours upon receipt of animals.

### 5. WARRANTY

EGSI warrants that at the time of shipment via EGSI Truck or EGSI-contracted courier, all animals shall conform to EGSI's specifications in effect at such time. Any claim by Buyer regarding a failure to meet such specifications must be made within 3 Business Days of receipt of canines or rabbits, and within 15 Business Days of receipt of primates. If animals are transported from EGSI by Buyer or Buyer's contractor, EGSI shall have no liability in connection with the animals or their health status or physical state from the time of pick-up from the EGSI facility. EGSI makes no other express or implied warranty, including any implied warranty of merchantability or fitness for a particular purpose.

**5.1 HIGH RISK ANIMALS ALTERNATE WARRANTY** terms may apply to Animals which are surgically modified or are considered high risk models. Such alternate Warranty terms shall be set forth in a Special Order Agreement and signed by EGSI and Sponsor.

### 6. USE

Non Breeding Animals and/or germplasm are sold exclusively for Buyer's internal research purposes. No express or implied right to generate, breed, cross breed or reproduce animals sold hereunder and/or use germplasm sold hereunder to reproduce animals, is granted to Buyer. In consideration of EGSI's valuable proprietary rights in the unique genetic composition responsible for animals and/or germplasm sold and as a material condition hereof, Buyer agrees not to generate, breed, cross breed or reproduce animals purchased hereunder, use germplasm sold hereunder to reproduce animals, or to sell, transfer or license to any third party the animals and/or germplasm purchased.

### 7. LIMITATION OF LIABILITY

Indemnification EGSI's liability in connection with the sale of any animal shall be limited to, at EGSI's option, either replacement of the animal or refund of the purchase price. In no event shall EGSI's liability in connection with any sale exceed the price paid for the animal or service in issue.

**SAVE FOR ANY LIABILITY THAT CANNOT BE RESTRICTED OR LIMITED BY APPLICABLE LAW, UNDER NO CIRCUMSTANCES SHALL SPONSOR BE**

**ENVIGO GLOBAL SERVICES INC. ("EGSI")  
TERMS AND CONDITIONS OF SALE**

**ENTITLED TO, NOR SHALL ENVIGO BE RESPONSIBLE FOR, WHETHER IN CONTRACT OR IN TORT, ANY INCIDENTAL, INDIRECT, CONSEQUENTIAL OR SPECIAL DAMAGES, OR LOST PROFITS OR REVENUES (WHETHER DIRECT OR INDIRECT) ARISING IN CONNECTION WITH ENVIGO'S DEFAULT OR BREACH OF ITS OBLIGATIONS UNDER THIS AGREEMENT.**

The foregoing limitations shall apply whether a claim arises from breach of contract, breach of warranty, tort, negligence, strict liability or other legal basis. Buyer shall indemnify EGSI and its affiliates and their respective officers, directors and employees from any cost, loss from any Claim arising from or associated with, directly or indirectly, (i) the animals after delivery, (ii) the harmful or otherwise unsafe effect of the any product resulting from the use of the animals or products sold or (iii) the negligence, gross negligence, intentional misconduct or inaction of Buyer.

**8. USE OF NAMES**

Neither party shall use the name of the other party or the names of the employees of the other party in any advertising or sales promotional material or in any publication without prior written permission of such party.

**9. ANTI-BRIBERY**

The parties agree that each has not and will not, either directly or indirectly, engage in bribery, or offer, or promise, or authorize to pay or make any improper payment of any monies or financial or other advantage, including cash, loan, gift, travel, entertainment, hospitality, facilitation payment, kickback, political or philanthropic contribution, anything of value, or any other perceived benefit to improperly obtain or retain a business advantage in violation of any anticorruption or bribery laws and further, each party agrees that they shall not take any action that would cause the other party to be in violation of such laws.

**10. TRADE CONTROLS**

Notwithstanding any other provision of this Agreement to the contrary, each Party shall comply with, and retain responsibility for its compliance with, all applicable export control laws, as well as Specially Designated Nationals and Blocked Persons ("SDNs") relating to its respective business, facilities, and the provision of services to third parties (collectively, "Trade Control Laws"). It shall be in the sole discretion of ENVIGO to refrain from being directly or indirectly involved in the provision of goods, software, services and/or technical data that may be prohibited by applicable Trade Control Laws, including sanctions currently in place against Cuba, Iran, North Korea, Sudan, Syria, Central African Republic, Iraq, Venezuela, and SDNs.

**11. FORCE MAJEURE**

EGSI shall not be liable for any delay or failure of performance that is the result of any happening or event that could not reasonably have been avoided or that is otherwise beyond its control including, without limitation, acts of God, pandemic, fire, explosion, weather, disease, war, insurrection, civil strife, riots, government action, unavailability of scheduled commercial air transport at commercially reasonable prices, or power failure, provided that performance shall be excused only as required by such disability. Any time specified for completion of performance shall be automatically extended for a period of time equal to the period of such disability. EGSI will promptly notify Buyer if, by reason of any of the events referred to herein, EGSI is unable to meet any time for performance specified in the order.

**12. CONDITIONS OF SALE**

All sales by EGSI or purchases by Buyer are governed by this agreement. Any and all terms and conditions (including any which may be proposed by Buyer on a purchase order) which are different than, or inconsistent with or supplemental to these terms are rejected unless otherwise expressly agreed to by EGSI in writing. No modification of this agreement shall be binding or enforceable unless expressly agreed to by EGSI in writing.

**13. GOVERNING LAW**

This agreement is governed by the law of Delaware without regard to its applicable conflicts of laws rule.

## ENVIGO TERMS AND CONDITIONS

### GENERAL TERMS AND CONDITIONS

Envigo shall provide the products ("Products") and services ("Services") described in the Envigo invoice, quotation, order acknowledgement, protocol, price list, statement of work or other commercial document utilised by Envigo from time to time, to describe the Products or Services ("Envigo Document"), and customer shall purchase the Products and Services pursuant to the specifications contained in the Envigo Document and in accordance with the following terms and conditions:

#### I. BINDING CHARACTER

All sales and/or purchases of Products and Services are governed by these terms and conditions. Any and all terms and conditions (including any which may be delivered by customer with any purchase order or other commercial document) which are different than, or inconsistent with, or supplement these terms and conditions are rejected unless otherwise expressly agreed to by Envigo in writing. Instructions in a purchase order relating to the date and method of delivery for Products or Services shall be controlling only if accepted by Envigo in writing. No modification of these terms and conditions shall be binding or enforceable unless expressly agreed to by Envigo in writing.

#### II. PROVISION OF PRODUCTS AND SERVICES

Envigo will provide the Products and perform the Services in accordance with the Envigo Document, which may be amended from time to time upon the mutual agreement of Envigo and the customer. Envigo will adhere to all applicable government regulatory laws, rules and regulations in the jurisdiction from which the Products or Services are supplied (collectively referred to herein as "Laws"). If an amendment requires additional or different services on the part of Envigo, Envigo may agree to perform such services and will be paid an amount mutually agreed to by the parties. Deviations from the Envigo Document may be made in an emergency without the customer's approval, provided that Envigo shall use commercially reasonable efforts to obtain the customer's verbal approval, which shall be subsequently confirmed by the customer in writing. The parties acknowledge that during the course of performing the Services in accordance with the Envigo Document, additional costs may be incurred by Envigo as a result of procedural changes which do not amount to or require a change in the Envigo Document, but which are deemed necessary by Envigo to successfully perform the Services, and which could not be foreseen at the date of the Envigo Document. If such procedural changes occur, Envigo shall advise the customer prior to their implementation and solicit the customer's agreement as to the necessity and additional cost thereof. Should Envigo be unable to contact the customer in advance, the customer agrees that, in order to maintain the integrity of the Services, Envigo may proceed accordingly and Envigo shall be entitled to recover such additional costs from the customer upon presentation of an explanation of such procedural changes and the necessity thereof.

#### III. RESTRICTIONS ON USE AND BREEDING

i. Any Products purchased from Envigo shall be used by customer in a safe manner, and in accordance with all applicable Laws. In consideration of Envigo's valuable proprietary rights in the genetic composition responsible for the unique genetic characteristics of all animals purchased from Envigo and descendants of those animals derived by inbreeding or crossbreeding, including unmodified derivatives of those animals or their descendants ("Animals"), the customer, including its employees, agrees that no Animals or other Products may be directly or indirectly: (a) used for any purpose other than the internal research of the customer whether or not for cash or other consideration including, without limitation using any of the Products or any components thereof in manufacturing or to provide a product or a service for clinical, therapeutic, diagnostic or prophylactic purposes or for any other commercial purposes, (b) bred, generated, cross bred, reproduced, licensed or provided (for sale or otherwise) to any third party for any use, or (c) provided to any agent or other third party to provide breeding or other services with respect to such Animals, unless Envigo provides the customer with prior written authorization for deviations from these terms and conditions or an appropriate license.

ii. The purchase of any Products conveys to the customer the non-transferable right to use the Product and the components of the Products only in research conducted by the customer and specifically in accordance with the Envigo Document provided with the Products. If customer fails to comply with the foregoing limitations, in addition to any other remedies available to Envigo, the warranty provided for Products will be automatically voided.

### IV. PAYMENT TERMS

i. Unless otherwise set forth in a Envigo Document, prices will be as per Envigo's published price lists on the day of delivery. If the customer is tax exempt, then it will be the customer's responsibility to provide Envigo with written proof of the customer's tax exempt status. The price list may be adjusted by Envigo without notice. Unless otherwise stated in the price list, the prices do not include, and the customer agrees to pay, all applicable, taxes, duties, excise charges and packaging and shipping charges.

ii. The customer will pay Envigo as set forth in the Envigo Document. All invoices are due and payable within thirty (30) days from the date of the invoice, and the customer agrees to pay all invoices submitted. All amounts not paid by the customer when due may, at the option of Envigo, accrue interest from the applicable due date until paid, at a rate that is the lower of (a) the highest rate permitted under applicable Laws and (b) 1.5% per month. In addition, Envigo may elect to cease or suspend the Services or withhold required reports or other deliverables in the event that the customer does not make payments when due and payable. Termination, delay or cancellation fees will be set forth in the Envigo Document and shall be payable, as applicable, in accordance with the terms hereof.

iii. All payments to be made under this Agreement shall be made in cleared funds, without any deduction or set-off and free and clear of, and without deduction of any taxes, levies, imports, duties, charges, fees and withholdings of any nature now or hereafter imposed by any governmental, fiscal or other authority save as required by law. If a Party to this Agreement is compelled to make any such deduction, it will pay to the receiving Party such additional amounts as are necessary to ensure receipt by the receiving Party of the full amount which that party would have received but for the deduction.

iv. If, in the reasonable opinion of Envigo, customer's financial condition is precarious or there has been a materially adverse change in customer's financial condition, Envigo shall have the right to demand accelerated payment or other assurances that it deems adequate before providing any additional Products or Services.

### V. CONFIDENTIALITY

In the course of providing the Products or performing the Services, Envigo and the customer may exchange proprietary or confidential information. The parties will identify, in writing, such information as confidential and/or proprietary. If a party intends to disclose confidential information to the other party orally, the disclosing party shall (a) alert the other party of the confidential nature of the disclosure prior to the disclosure and (b) provide written notice to the other party of the confidential nature and contents of such disclosure within ten (10) days after making the original disclosure. Each party will use its commercially reasonable efforts to maintain such information in confidence and will employ reasonable and appropriate procedures to prevent its unauthorized publication or disclosure unless required to disclose such information by applicable Laws. Neither party shall use the other party's proprietary and/or confidential information for any purpose other than in performance of this Agreement. The confidentiality provisions of this Section shall not apply to any part of such information, which (a) is known to the receiving party at the time it was obtained from the disclosing party; (b) is acquired by the receiving party from a third party, and such third party is not known to the receiving party to be bound by an obligation of confidentiality to the disclosing party or otherwise prohibited from transmitting such information to the receiving party; (c) is or becomes published or otherwise in the public domain other than by violation of this Agreement by the receiving party; (d) is independently developed by the receiving party without reference to or reliance upon the information provided by the disclosing party; or (e) is required to be disclosed by the receiving party to comply with applicable Laws; provided that the receiving party provides prompt written notice of such disclosure to the disclosing party and cooperates with the disclosing party's reasonable and lawful actions to avoid and/or minimize the extent of such disclosure.

### VI. DATA PROTECTION LEGISLATION

i. Each party shall comply with the Data Protection Schedule attached hereto as Schedule 1 and incorporated by reference into this Agreement.



## ENVIGO TERMS AND CONDITIONS

### VII. LIMITED WARRANTY

i. Although Envigo maintains strict control over its environment, breeding and maintenance operations and engages in a comprehensive Health and Genetic Monitoring Quality Control Program, changes in health and genetic status can occur. Genetic and environmental pressures can affect the general health of animals. For this reason, Envigo recommends that its Animals be monitored and tested after delivery. If customer is unable to perform such monitoring and testing, Envigo will provide assistance to customer upon request. Any testing of the type discussed in this Section must commence no later than seven (7) calendar days after customer's initial receipt of the Animals and be completed no later than twenty-one (21) calendar days after customer's receipt of the Animals. Should customer accept delivery of Products, customer will not be entitled to return the Products to Envigo for any reason.

ii. Envigo warrants that the Products and Services shall conform in all material respects to the specifications contained in the Envigo Document and applicable Laws at the time of delivery or completion. Envigo does not warrant or represent that the results of the Services will be acceptable to any regulatory or governmental agency to which they are presented or that the results of the Services will enable the customer to further develop, market or otherwise exploit any product or service.

iii. Other than described herein, **ENVIGO MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR STATUTORY, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF ANY PATENT, TRADEMARK OR OTHER INTELLECTUAL PROPERTY RIGHTS OR OTHERWISE. CUSTOMER ASSUMES ALL RISK AND LIABILITY RESULTING FROM THE USE OF THE PRODUCTS AND SERVICES. ALL OBLIGATIONS OR LIABILITIES OF ENVIGO FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE PRODUCTION, USE, OR PERFORMANCE OF ITS SERVICES OR PRODUCTS, EXCEPT AS PROVIDED HEREIN, ARE FULLY DISCLAIMED AND EXCLUDED.**

iv. Any claim for breach of this limited warranty must be made in writing to Envigo upon discovery of such loss or damage and no later than: (a) in the case of Products, seven (7) calendar days after the date the Products are delivered, or (b) in the case of Services, the date that the Services are completed, after which time the Products or Services shall be deemed finally accepted. The customer must retain for Envigo's inspection all Products alleged to be defective.

v. Risk of loss and title to the Products shall pass to customer once the Products leave Envigo's facility or are delivered to a common carrier, as applicable.

### VIII. LIMITATION OF LIABILITY

i. Envigo will not be liable for penalties or liquidated damages or for special, indirect, consequential, punitive, exemplary or incidental damages of any kind, including, without limitation, loss of profits, revenue or amounts expended in using, storing, or maintaining any such Products) regardless of whether any such losses or damages are characterized as arising from breach of contract, breach of warranty, tort, strict liability or otherwise, even if Envigo is advised of the possibility of such losses or damages, or if such losses or damages are foreseeable.

ii. Envigo's liability, regardless of the form of action, shall be limited to actual damages and shall not exceed the total price paid for the Products or Services with respect to which such liability arises. In no event shall Envigo be liable for any damages arising from or in connection with any decision by the customer or any third party to use, further research, develop or market any test articles or any derivative, product or service related thereto (or to the Products or Services).

iii. Subject to the limitations set forth in this Section VIII, in the event that Envigo commits a breach of the limited warranty set forth in the Limited Warranty Section above, Envigo's sole liability, and the customer's sole remedy, shall be for Envigo to (a) replace the Products or issue a credit therefore or (b) conform the portion of the Services giving rise to the breach to the relevant specifications.

iv. If any provision or part provision of this Section VIII is invalid, illegal or unenforceable, Envigo and the customer shall negotiate in good faith to amend such provision or part provision so that, as amended, it achieves to the greatest extent possible, the intended commercial result of the original provision.

v. Nothing contained herein shall exclude or restrict a Party hereunder for death or personal injury caused by that Party's negligence or for fraud or fraudulent misrepresentation.

### IX. INDEMNIFICATION

The customer agrees to defend, indemnify, save and hold harmless Envigo and its parent, subsidiaries and affiliates and their respective directors, managers, members, shareholders, officers, employees and agents ("Indemnified Parties") from and against any claims, demands, suits, actions, causes of action, losses, costs, damages, fines and liabilities, including reasonable attorney, expert and other professional fees ("Claims") arising out of or in connection with or attributable to (a) the research, development, manufacture, distribution, use, sales or other disposition by the customer, or any distributor, collaborator, customer, sublicensee, representative or agent of the customer, of any test articles and/or any other substances upon which the Services were performed or for which the Products were used, (b) any infringement of any third party's patent rights or unauthorized use or misappropriation of its know-how, (c) the customer's negligence or willful misconduct, (d) personal injury related to contact with the Products during visits to Envigo's facilities or after delivery of the Products to the customer, or (e) the harmful or otherwise unsafe effect of any product resulting from research involving the Products and Services, and will pay any costs and damages which may be assessed against the Indemnified Parties.

### X. FORCE MAJEURE

Envigo shall not be responsible for any delays arising, directly or indirectly, from fires, floods, earthquakes, explosions, strikes, labor difficulties, acts of terrorism, riots, war, insurrection, embargo, government decrees or orders, pandemic, civil or military authority, acts of animal activism, failure or curtailment of Envigo's usual sources of supply, disease, acts of God, or any other event, occurrence or condition which is beyond Envigo's reasonable control.

### XI. APPLICABLE LAW

These terms and conditions will in all events and for all purposes be governed by, and construed in accordance with, the laws of the State of Indiana in the United States of America ("US") in circumstances where the Envigo Document is generated by an Envigo legal entity in the US, and the laws of England and Wales where the Envigo Document is generated by an Envigo legal entity outside the US. Any choice of law principle or international treaty that would dictate the application of the law of another jurisdiction is specifically excluded to the fullest extent possible.

### XII. SEVERABILITY

Each provision of these terms and conditions is severable, and subject to Section VII iv, if any provision shall at any time be held to be contrary to law or invalid or unenforceable, the remaining terms, conditions and provisions shall not be affected thereby but shall remain in full force and effect. As used in this Section "provision" shall mean and include any word, clause, sentence, sub-paragraph, paragraph, section or portion of these terms and conditions.

### SCHEDULE 1

#### DATA PROTECTION SCHEDULE

Data Protection Legislation shall mean the General Data Protection Regulation ((EU) 2016/679) and any other data protection or privacy law relevant in the applicable Jurisdiction as defined in this Agreement.

#### 1. DATA PROTECTION

1.1 Both parties will comply with all applicable requirements of the Data Protection Legislation. This clause is in addition to, and does not relieve, remove or replace, a party's obligations under the Data Protection Legislation.

1.2 The parties acknowledge that in entering into this agreement and performing their respective obligations thereunder, each party may collect and process certain Personal Data, meaning information about identifiable individuals, pertaining to employees or representatives of each company. In this regard, each party may act as a data controller or data processor (where Data Controller and Data Processor have the meanings as defined in the Data Protection Legislation) in relation to the Personal Data of each other's employees or representatives.

1.3 Without prejudice to the generality of clause 1.1, the parties will ensure that they have all necessary and appropriate consents and notices in place to enable lawful transfer of the Personal Data for the duration and purposes of this agreement.

1.4 Without prejudice to the generality of clause 1.1, each party shall, to the extent that the General Data Protection Regulation applies to processing in relation to any of each other's employees or representatives Personal Data processed in connection with the performance of obligations under this agreement:

## ENVIGO TERMS AND CONDITIONS

(a) process that Personal Data only on the written instructions of the respective Data Controller unless the Data Processor is required by Applicable Laws to otherwise process that Personal Data. Where the Data Processor is relying on laws of a member of the European Union or European Union law as the basis for processing Personal Data, the Data Processor shall promptly notify the Data Controller of this before performing the processing required by the Applicable Laws unless those Applicable Laws prohibit the Data Processor from so notifying;

(b) ensure that it has in place appropriate technical and organisational measures, reviewed and approved by the Data Controller, to protect against unauthorised or unlawful processing of Personal Data and against accidental loss or destruction of, or damage to, Personal Data, appropriate to the harm that might result from the unauthorised or unlawful processing or accidental loss, destruction or damage and the nature of the data to be protected, having regard to the state of technological development and the cost of implementing any measures (those measures may include, where appropriate, pseudonymising and encrypting Personal Data, ensuring confidentiality, integrity, availability and resilience of its systems and services, ensuring that availability of and access to Personal Data can be restored in a timely manner after an incident, and regularly assessing and evaluating the effectiveness of the technical and organisational measures adopted by it);

(c) ensure that all personnel who have access to and/or process Personal Data are obliged to keep the Personal Data confidential; and

(d) not transfer any Personal Data outside of the European Economic Area unless the following conditions are fulfilled:

(i) appropriate safeguards are in place in relation to the transfer;

(ii) the data subject has enforceable rights and effective legal remedies;

(iii) the Data Processor complies with its obligations under the Data Protection Legislation by providing an adequate level of protection to any Personal Data that is transferred; and

(iv) the Data Processor complies with reasonable instructions notified to it in advance by the Data Controller with respect to the processing of the Personal Data;

(e) assist the Data Controller, at its cost, in responding to any request from a Data Subject and in ensuring compliance with its obligations under the Data Protection Legislation with respect to security, breach notifications, impact assessments and consultations with supervisory authorities or regulators;

(f) notify the Data Controller without undue delay on becoming aware of a Personal Data breach;

(g) at the written direction of the Data Controller, delete or return Personal Data and copies thereof on termination of the agreement unless required by Applicable Law to store the Personal Data; and

(h) maintain complete and accurate records and information to demonstrate its compliance with this clause.

1.5 The Data Controller consents to the Data Processor appointing a third party processor under this agreement and the Data Processor shall promptly inform the Data Controller of the identity of the third party processor. Data Processor confirms that it has entered or (as the case may be) will enter with the third-party processor into a written agreement incorporating terms which are substantially similar to those set out in this clause. As between the Data Controller and the Data Processor, the Data Processor shall remain fully liable for all acts or omissions of any third-party processor appointed by it pursuant to this clause.

1.6 Either party may, at any time on not less than thirty (30) days' notice, revise this clause by replacing it with any applicable controller to processor standard clauses or similar terms forming part of an applicable certification scheme (which shall apply when replaced by attachment to this agreement).

ClearH2O® is a registered trademark of ClearH2O®, Portland, Maine, USA.

PinPort™ is a trademark of Instech Laboratories, Inc., Plymouth Meeting, Pennsylvania, USA.

CD-1®, CF-1®, CFW® and CD® are registered trademarks of Charles River Laboratories, Wilmington, Massachusetts, USA.

## ADDITIONAL TERMS AND CONDITIONS

Certain Products and Services are subject to terms and conditions that are in addition to these General Terms and Conditions. These additional terms and conditions may be set forth in a separate rider, label use license or commercial use agreement. It is the responsibility of Customer to obtain any licenses or third-party approvals necessary for the provision of Products or services and related deliverables. Products created using CRISPR technology are subject to separate license agreements, as are products that use the B-NDG Mouse Model. Customer agrees to be bound by the terms and conditions set forth in these license agreements.

# Envigo

## Who we are

Envigo provides the broadest range of research models and related services to the pharmaceutical and biotechnology industries, government, academia, and other life science organizations. Our business is founded on a dedication to customer service and the experience and expertise of our 1,200 people. With more than 20 locations worldwide, we are committed to helping customers realize the full potential of their research and products as we work together to build a healthier and safer world.

### **In partnership with our customers**

Our customers conduct research and develop products that have the potential to improve lives. But achieving this potential is becoming increasingly difficult. We believe that for our customers to achieve their goals, they need to trust and be absolutely confident in the company they choose to help them with their research, products and services. You can be confident that at Envigo we are dedicated to understanding your challenges, appreciating your perspectives and helping you achieve your goals.

### **Outstanding customer service**

We are proud of our customer-centric culture which makes us responsive to every customer, no matter their size, as we continually optimize their product delivery and research programs to help ensure consistently clear results.

### **Fostering and developing scientific excellence**

Our ability to combine scientific excellence with empathetic working relationships is what differentiates us. We always seek to understand our customers' goals and challenges, appreciate our customers' perspectives, and work together for a better future.

Beyond our responsibility to customers, at Envigo we are responsible to people, animals and the communities in which we live. We are dedicated to assuring people that the products they use have been tested properly for safety and efficacy. We are committed to the highest levels of animal welfare. And, we provide services that help develop new products to improve health as well as protect food supplies and the environment.

At Envigo, we exist to help our customers secure the potential of their research and products that enhance and enrich life.

Read more at [envigo.com](http://envigo.com).

