

# C57BL/6 Mice

NOMENCLATURE: C57BL/6NCrl



## Strain Origin

Developed by C.C. Little in 1921 from a mating of Miss Abbie Lathrop's stock that also gave rise to strains C57BR and C57L. Strains 6 and 10 separated about 1937. To The Jackson Laboratory from Hall in 1948. To NIH in 1951 from The Jackson Laboratory at F32. To Charles River in 1974 from NIH.

Coat Color: Black

Produced: North America, Europe and Japan

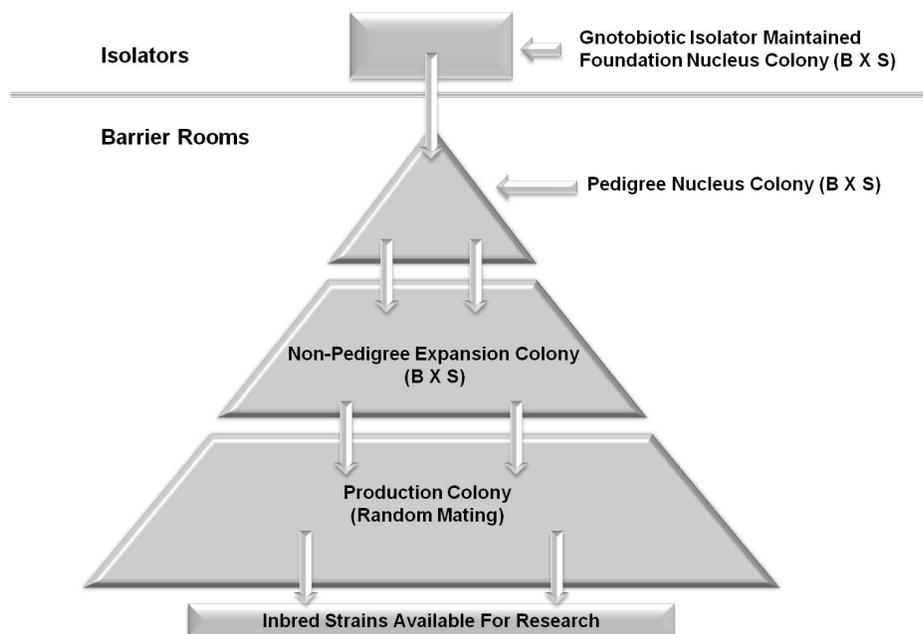
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## Genetic Management of C57BL/6 Mouse Colony

Inbred strains are defined as animals produced by a minimum of 20 generations of brother-sister mating, traceable to a single founding pair. Charles River uses our International Genetic Standardization (IGS) program coupled with a pyramid mating system designed to maintain authenticity and the highest possible levels of genetic uniformity. The pyramid mating system (see Figure 1) ensures that our C57BL/6 colonies are genetically identical within each strain (i.e., fundamentally free of genetic differences that could increase variation in experimental results). In this system, the foundation colony serves as the genetic and health standard and provides breeders for the top level of the pyramid in every barrier room. This top level, the nucleus colony, is composed of a relatively small number of pedigreed brother-sister mating pairs that produce breeders for the next level of the pyramid, in addition to replenishing itself. In larger colonies, the next level is called the expansion colony, and it provides breeders to the production colony, which in turn produces the animals that are commercially available. The unidirectional flow of breed stock in this system helps to ensure that any genetic changes or mutations, which would be most likely to occur in the more populous expansion or production colonies than in the smaller nucleus colony, will “wash out” within a single generation. Nucleus colonies are replaced every three to five years (within 10 generations) by migrating new breed stock from the foundation colony to the barrier rooms. As a safeguard against any large scale disaster affecting the foundation colonies of several strains, Charles River has cryopreserved a sufficient number of embryos for multiple, complete replacements of those populations. For further information regarding Charles River’s IGS program, please refer to the IGS Technical Sheet found at [www.criver.com/info/rm](http://www.criver.com/info/rm).

**Figure 1: Pyramid Mating System**



## Charles River C57BL/6 Data

### Clinical Chemistry

C57BL/6NCrI*		ALB (g/dl)	ALK (U/l)	ALT (U/l)	AST (U/l)	TBIL (mg/dl)	BUN (mg/dl)	Ca (mg/dl)	CL (meq/l)	CHOL (mg/dl)
Male	Mean	3.24	195.49	66.46	127.58	0.32	14.34	11.00	117.95	112.17
	S.D.	0.46	55.56	184.87	142.05	0.28	5.26	1.06	6.16	23.59
	n	110	114	108	114	111	113	113	45	118
Female	Mean	3.33	234.51	50.53	126.54	0.28	13.83	10.93	120.43	102.00
	S.D.	0.62	93.36	37.15	133.29	0.10	6.60	1.68	10.29	24.76
	n	92	96	95	98	94	94	92	13	101

C57BL/6NCrI*		CRE (mg/dl)	GGT (U/l)	GLU (mg/dl)	P (mg/dl)	K <sup>+</sup> (meq/l)	Na (meq/l)	TP (g/dl)	TRIG (mg/dl)
Male	Mean	0.33	3.71	247.00	10.66	9.65	158.44	5.67	153.38
	S.D.	0.12	2.58	60.86	2.05	0.89	10.53	0.76	56.20
	n	102	59	114	116	45	45	113	117
Female	Mean	0.31	2.59	236.78	10.03	16.48	144.01	5.57	151.13
	S.D.	0.08	2.19	55.17	1.98	27.99	40.43	0.95	52.97
	n	85	39	94	96	13	13	95	102

\*North American colonies only/non-fasted values

+ Potassium levels reflect acidosis caused by CO<sub>2</sub> euthanasia

Age: 56 - 70 days

Diet: Purina 5L79 rodent chow

Temperature: 68 - 72°F

Humidity: 40 - 60%

Screening Period: August 2006 to November 2007

Euthanasia: CO<sub>2</sub>

Bleed Route: Cardiac puncture after euthanasia

Analyzing Equipment: Alfa Wassermann Ace Alera

### Hematology

C57BL/6NCrI*		WBC (K/ $\mu$ l)	RBC (M/ $\mu$ l)	HGB (g/dl)	HCT (%)	MCV (fL)	MCH (pg)	MCHC (g/dl)	RDW (%)
Male	Mean	8.91	9.51	14.33	47.02	49.44	14.88	30.28	17.89
	S.D.	2.50	1.25	2.64	7.27	3.95	1.03	3.04	1.15
	n	109	107	107	107	107	107	107	107
Female	Mean	8.69	9.17	13.72	45.32	49.46	15.02	30.54	17.90
	S.D.	2.44	1.05	1.59	6.27	3.88	1.11	3.19	1.24
	n	113	111	111	111	111	110	111	111

C57BL/6NCrI*		PLT (K/ $\mu$ l)	MPV (fL)	NEUT (K/ $\mu$ l)	LYMPH (K/ $\mu$ l)	MONO (K/ $\mu$ l)	EOS (K/ $\mu$ l)	BASO (K/ $\mu$ l)
Male	Mean	1350.67	5.04	1.45	6.85	0.43	0.14	0.03
	S.D.	337.98	0.44	1.01	1.97	0.24	0.12	0.03
	n	101	101	109	109	109	109	109
Female	Mean	1167.12	4.90	1.22	6.92	0.37	0.16	0.03
	S.D.	306.96	0.33	0.51	1.92	0.15	0.13	0.04
	n	105	105	113	113	113	113	113

\*North American colonies only/non-fasted values

Age: 56 - 70 days

Diet: Purina 5L79 rodent chow

Temperature: 68 - 72°F

Humidity: 40 - 60%

Screening Period: August 2006 to November 2007

Euthanasia: CO<sub>2</sub>

Bleed Route: Cardiac puncture after euthanasia

Analyzing Equipment: Drew Scientific HemaVet

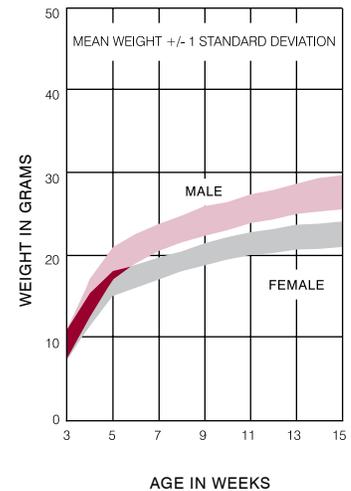
## Strain Highlights

### N Strain

- Enhanced ES cell growth and morphology vs. J substrains (Pettitt, S.J. *et al.* 2009)
- Lower incidence of vaginal septa vs. J substrains (Gearhart, S. *et al.* 2004)
- Lower genetic variability among the N substrains vs. J substrains (Zurita, E. *et al.* 2010)
- Does not carry the *Nnt* deletion (Freeman, H.C. *et al.* 2006)

### NCrI (Charles River)

- Global availability through more than 20 breeding facilities
- Bred worldwide under the Charles River International Genetic Standardization (IGS) program
- VAF® Plus and VAF Elite® health status



## Research Applications and References

The C57BL/6 mouse is a multipurpose model that can be used in such fields as model creation, physiology, safety and efficacy and genetics.

### General Purpose

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- Crabbe, J.C. *et al.* Genetics of mouse behavior: interactions with laboratory environment. *Science*, **284**, 1670-1672 (1999).
- Freeman, H.C. *et al.* Deletion of nicotinamide nucleotide transhydrogenase: A new quantitative trait locus accounting for glucose intolerance in C57BL/6J mice. *Diabetes*, **55(7)**: 2153-2156 (2006).
- Hu, C.C. *et al.* Diet-induced changes in stearoyl-CoA desaturase 1 expression in obesity-prone and -resistant mice. *Obesity Research*, **12(8)**: 1264-1270 (2004).
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### Physiology

- Bryant, C.D. *et al.* Behavioral differences among C57BL/6 substrains: implications for transgenic and knockout studies. *J. Neurogenetics*, **22(4)**: 315-331 (2008).
- Gearhart, S. *et al.* Increased incidence of vaginal septum in C57BL/6J mice since 1976. *Comparative Medicine*, **54(4)**: 418-421 (2004).
- Toye, A.A. *et al.* A genetic and physiological study of impaired glucose homeostasis control in C57BL/6J mice. *Diabetologia*, **48(4)**: 675-686 (2005).

### Model Creation/Genetics

- Hanson, G.W. *et al.* Large-scale gene trapping in C57BL/6N mouse embryonic stem cells. *Genome Research*, **18(10)**: 1679-1679 (2008).
- Pettitt, S.J. *et al.* Agouti C57BL/6N embryonic stem cells for mouse genetic resources. *Nature Methods*, **6(7)**: 493-495 (2009).
- Watkins-Chow, D.E., Pavan, W.J. Genomic copy number and expression variation within the C57BL/6J inbred mouse strain. *Genome Research*, **18(1)**: 60-66 (2008).
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