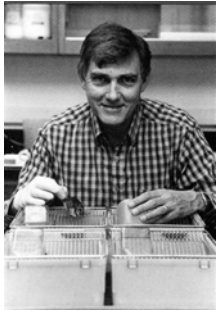


Peromyscus Genetic/Genomic Resources

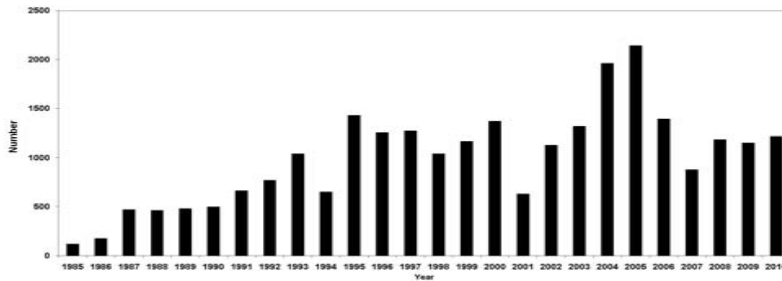
To develop *Peromyscus* as a research model, we are developing a genetic map. Currently we have ~400 markers covering all 24 chromosomes. 50,000 EST clones have been sequenced by the DOE JGI; additional ESTs will follow. Finally, NHGRI has granted our proposal for sequencing the full genomes of *P. maniculatus* (6x), *P. polionotus* (2x), *P. californicus* (2x) and *P. leucopus* (2x). The *P. maniculatus* sequence is complete and is currently being assembled and annotated.

History of the PGSC

The *Peromyscus* Genetic Stock Center at the University of South Carolina was established April 1, 1985, by Dr. Wallace D. Dawson. The PGSC began with only 120 cages in 2 small rooms. In 1999 the PGSC moved to a new state-of-the-art animal facility, and now houses >800 cages totaling >3,000 mice. As *Peromyscus* grows as a model organism the number of animals supplied each year to researchers continues to rise. With the intermediate-density genomic map for *Peromyscus* nearing completion, their utility as a model organism will only increase, finally allowing an exploration of the links between ecology and genetics.



Animals and other specimens supplied to external users by the PGSC, 1985 - 2010



Peromyscus Newsletter/Blog

The *Peromyscus* Newsletter (PN) serves as an informal means of communication among those interested in peromyscine rodents. Previous issues may be viewed at <http://stkctr.biol.sc.edu>. We have recently replaced the PN with a blog format, due to cost and to facilitate discussion between *Peromyscus* researchers. See it here: <http://www.cas.sc.edu/pgsc/>

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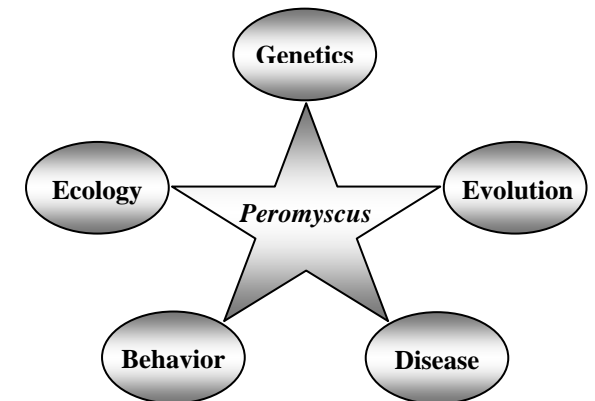
vranap@mailbox.sc.edu
803 777-4946

Selected Recent PGSC Publications

- Hoekstra HE, *et al.* 2006. A single amino acid mutation contributes to adaptive color pattern in beach mice. *Science* 313:101-104
- Loschiavo, M *et al.* 2007. Mapping and identification of candidate loci responsible for *Peromyscus* hybrid overgrowth. *Mammal Genome* 18:75-85
- Glenn, JLW *et al.* 2008. Expressed sequence tags from *Peromyscus* testis and placenta tissue: analysis, annotation, and utility for mapping. *BMC Genomics* 9:300
- Oriel, RC *et al.* 2008. Adaptive Genetic Variation, Stress & Glucose Regulation. *Disease Models & Mech* 1:255-263
- Ramsdell CM *et al.* 2008. Comparative genome mapping of the deer mouse reveals greater similarity to rat than to the lab mouse (*Mus musculus*). *BMC Evol Biol* 8:65-78
- Labinsky, N *et al.* 2009. Longevity is associated with increased vascular resistance to high glucose-induced oxidative stress and inflammatory gene expression in *Peromyscus leucopus*. *Am J Physiol Heart Circ Physiol*, 296:946-956.
- Duselis, AR & PB Vrana. 2010. Aberrant Growth and Pattern Formation in *Peromyscus* hybrid placental development. *Biol Repro* 83:988-996
- Kalcounis-Rueppell, MC *et al.* 2010. Differences in ultrasonic vocalizations between wild and laboratory California mice (*Peromyscus californicus*). *PLOS One*, 5(4):e9705.
- Yang, G, *et al.* 2011. Biotransport phenomena in freezing mammalian oocytes. *Ann Biomed Eng* 39:580-591.
- Veres, M, *et al.* 2011. The Biology and Methodology of Assisted Reproduction in Deer Mice (*Peromyscus maniculatus*). *Theriogenology*, in press

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Peromyscus Genetic Stock Center web page:

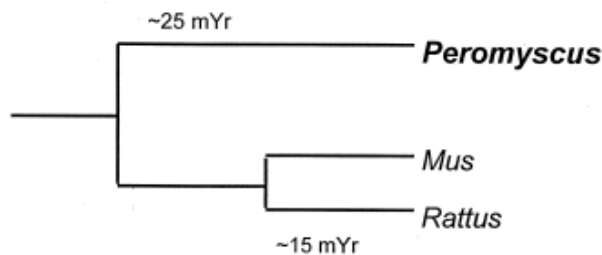
<http://stkctr.biol.sc.edu>

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ARTS & SCIENCES

The *Peromyscus* Genetic Stock Center is partially supported by grants from NIH (RR14279) and NSF (DBI-0130348).

What are *Peromyscus*?

The deer mouse (*Peromyscus maniculatus*) and congeneric species are the most common native North American mammal. They range from Alaska to Central America and occur in many natural habitats. Because of their abundance, these mice constitute a major component of nearctic terrestrial ecosystems. **Laboratory stocks of both wild-type and genetically variant *Peromyscus* are used for investigations in which laboratory-based studies can be interfaced with those of natural populations.** Deer mice differ distinctly from laboratory house mice (*Mus domesticus*) and rats (*Rattus norvegicus*) and are not closely related to these species.



Peromyscus have become important research models for:

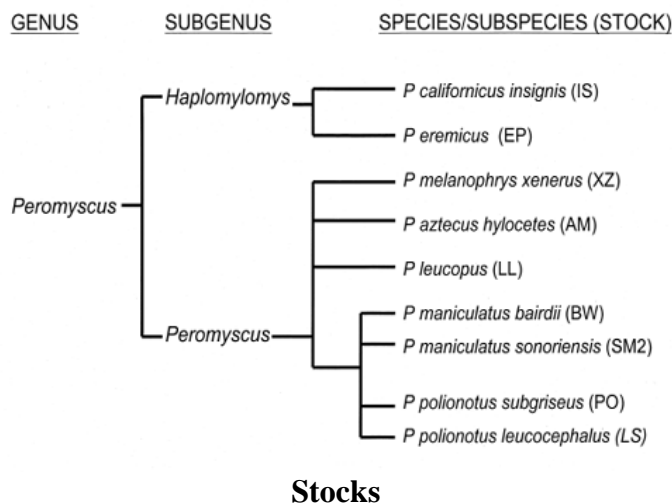
Evolution—Hybrids of *P maniculatus* and *P polionotus* offer a unique opportunity to study the genes involved in genomic imprinting and speciation. Recent work at the PGSC has also shown that genome arrangement of *Peromyscus* is much more similar to Rat than *Mus*.

Ecology—*Peromyscus* has been used to study the genes associated with coat color adaptation, altitude adaptation, and host-parasite co-speciation.

Behavior—Brains of polygamous *P maniculatus* show hormone receptor patterns that differ markedly from the patterns observed in monogamous *P polionotus*. Other studies are currently examining the role of photoperiod and hormones on aggression and reproduction.

Immunology and Disease—As the reservoir of several zoonotic diseases, *Peromyscus* is the focus of much research into the mechanisms underlying induction of the immune response. Because they live 4-5 years and the white-footed mouse lives 8 years they have been used as a grontological model to contrast with the house mouse which lives 2-3 years.

Toxicology—*Peromyscus* has been used in studies of alcohol dehydrogenase, and as models of bioavailability and bioaccumulation for ecological risk assessment.



P. maniculatus bairdii

BW Stock- Closed colony bred in captivity since 1948. Descended from 40 ancestors wild-caught near Ann Arbor, MI.

P. maniculatus sonoriensis

SM2 Stock- Derived from about 50 animals wild-caught by Jack Hayes in 1995 near White Mountain Research Station, CA.

P. polionotus subgriseus

PO Stock- Closed colony since 1952. Derived from 21 ancestors wild-caught in Ocala National Forest, FL. High inbreeding coefficient.

P. leucopus

LL Stock- Derived from 38 wild ancestors captured between 1982 and 1985 near Linville, NC.

P. californicus insignis

IS Stock- Derived from about 60 ancestors collected between 1979 and 1987 in Santa Monica Mts., CA.

P. aztecus hylocetes

AM Stock- Derived from animals collected on Sierra Chincua Michoacan, Mexico in 1986.

P. melanophrys xenerus

XZ Stock- Derived from animals collected between 1970 and 1978 from Zacatecas, Mexico and bred by R. Hill.

P. eremicus

EP Stock- Originated from 10-12 animals collected at Tucson, AZ in 1993.



Geographic origins of stocks maintained by the PGSC

Mutants

Biomedical Models

Alcohol dehydrogenase negative *Adh⁰/Adh⁰* and positive *Adh^f/Adh^f* South Carolina BW stock.

Boggler *bg/bg* Blair's *P. m. blandus* stock.

Cataract-webbed *cwb/cwb* From Huestis stocks.

Epilepsy *ep/ep* U. Michigan artemisiae stock.

Hairless-1 *hr-1/hr-1* Sumner's hairless mutant.

Hairless-2 *hr-2/hr-2* Egoscue's hairless mutant.

Juvenile ataxia *ja/ja* U. Michigan stock.

Coat Colors

Albino *c/c*- Sumner's albino deer mice.

Ashy *ahy/ahy*- Wild-caught in Oregon ~ 1960.

Blonde *bln/bln*- Mich. State U. colony.

Brown *b/b* Huestis stocks.

California blonde *cfb/cfb* Santa Cruz I., Calif., stock.

Dominant spotting *S/+* Wild caught in Illinois.

Ivory *i/i* Wild caught in Oregon.

Platinum *plt/plt* Barto stock at U. Mich.

Silver *sil/sil* Huestis stock.

Tan streak *tns/tns* Clemson U. stock from N.C.

Variable white *Vw/+* Michigan State U. colony.

Wide-band agouti *A^{Nb}/a* Natural polymorphism. U. Mich.

Other Resources

Highly inbred *P. leucopus* (I₃₀₊)

P. maniculatus x *P. polionotus* F₁ Hybrids & Y-chrom consomics

P. p. subgriseus x *P. p. leucocephalus* intercross