

The all-purpose guinea pig

SCIENTIFIC NAME

Cavia porcellus

TAXONOMY

PHYLUM: Chordata

CLASS: Mammalia

ORDER: Rodentia

FAMILY: Caviidae

Physical description

The guinea pig has a stout, compact body and no tail. Whereas their wild relatives have ticked grey coats, guinea pigs bred for research and show have coats varying in color, length and quality. Guinea pig fur may be long or short, straight or curly, soft or rough, and lying smoothly or in rosettes. Common colors include white, brown, black and combinations thereof. Guinea pigs are large for rodents, measuring 20–40 cm from head to rump and weighing between 500 and 1,500 g at adulthood. They typically live an average of 4–5 years but may live as long as 8 years. Male and female guinea pigs do not differ in external appearance apart from general size, with females weighing slightly less than males.

The guinea pig breeds year-round with a long gestation period of 59–72 days, permitting easy differentiation between stages of prenatal development. Unlike the offspring of most other rodents, newborn pups are immediately mobile and well developed with hair, teeth, claws, partial eyesight and mature central nervous systems. Because pups begin eating solid foods immediately, scientists can surgically remove them from the pregnant guinea pig in a sterile environment and then raise them on sterile food for use in germ-free research¹.

History

The prolific use of guinea pigs in scientific experimentation, dating back at least to the 17th century, underlies the use of the term 'guinea pig' to describe an experimental subject. Their susceptibility to infections and the similarity of their immune systems to those of humans has made them ideal models for infectious diseases studies. In 1882, guinea pigs were used to discover that tuberculosis is caused by the bacterium *Mycobacterium tuberculosis*², and in 1919, the immune reactions of guinea pigs in response to inoculation with blood from people with yellow fever was used to discover acquired immunity³. Their skin sensitivity led to their widespread use in testing for allergic skin reactions, though this practice has now been largely replaced by the use of local lymph node assays in mice⁴.



Katie Vicari

Vitamin C was first discovered in guinea pigs in 1907 (ref. 5); like humans and unlike other small laboratory animals, guinea pigs do not produce their own vitamin C and instead must obtain this vitamin from their diet. The species continues to be used for studying collagen biosynthesis, a process that requires vitamin C and is essential to wound healing, bone remodeling and atherosclerosis⁶.

Research résumé

Comparatively fewer guinea pigs are used in research today, but the species is still commonly used in studies of the respiratory and hearing systems. The respiratory systems of guinea pigs are sensitive to allergens, making them useful for asthma studies, and they display anaphylactic reactions more readily and strongly than most species⁷.

The structure of the guinea pig ear is similar to that of humans, and deafness can be detected easily by testing for the Preyer reflex, in which the outer ear moves in response to a whistle⁸. Furthermore, the guinea pig inner ear is readily accessible for dissection and exposure⁹. Guinea pigs have therefore been essential to hearing research, from the discovery of the mechanical mechanisms of the cochlea in 1961 (ref. 10) to the first successful attempt to regenerate hair cells in the inner ear of a mammal in 2003 (ref. 11).

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