

From missiles to malaria

by Monica Harrington

SCIENTIFIC NAME

Saimiri sciureus

TAXONOMY

PHYLUM: Chordata

CLASS: Mammalia

ORDER: Primates

FAMILY: Cebidae

Physical description

Squirrel monkeys are New World monkeys native to the tropical rainforests of South America. They are the smallest members of the Cebidae family, with a body length of 25–35 cm and tail length of 35–42 cm. Males weigh 750–1,100 g and females weigh 500–750 g, generally. Squirrel monkeys have a short coat colored gray to black on the shoulders and yellowish orange on the back and legs. The throat and ears are white, the mouth is black and males have large upper canine teeth.



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Ecology

Like most of their relatives among the New World monkeys, squirrel monkeys are diurnal and arboreal. Unlike other New World monkeys, they use their tails more for balance than climbing as they are very agile. The tail is often held aloft or curled toward the head when at rest. Squirrel monkeys prefer to live in groups and vocalize energetically to communicate with one another. Females are dominant in social groups.

Research résumé

Squirrel monkeys have several characteristics in common with other species used in research. They are small and easy to handle, they have a short generation time and they are amenable to living in a laboratory environment. They also share a closer phylogenetic relationship with humans than do non-primate laboratory species. Squirrel monkeys were used in aerospace research during the 1950s (ref. 1). In 1959, a squirrel monkey named Miss Baker and a rhesus macaque named Miss Able became the first two vertebrates to return alive from spaceflight, aboard a ballistic missile named Jupiter².

Squirrel monkeys are susceptible to certain diseases whose human counterparts are of great interest in medical research. For

example, after it was discovered in the 1960s that squirrel monkeys naturally develop atherosclerosis³, they were used in research on cardiovascular and metabolic disease. During the 1980s and 1990s, research on squirrel monkeys shifted to focus more on neuroscience, pharmacology and behavior⁴.

For decades, the squirrel monkey has been used in studies of experimental infection with Creutzfeldt–Jakob disease⁵ because it is highly susceptible to transmissible spongiform encephalopathies⁴. This susceptibility seems to have a genetic basis; the prion protein sequence in squirrel monkeys shares 93.8% homology with the sequence in humans that is associated with increased susceptibility to infection⁶.

Squirrel monkeys also share humans' susceptibility to color blindness. About 5–8% of men are color-

blind, as are most male squirrel monkeys. In 2009, scientists reported the successful use

of gene therapy to rescue color blindness in adult male squirrel monkeys⁷.

These results challenge the idea that modification of the brain's abilities, like vision, is only possible during a critical period of development early in life.

The squirrel monkey is also a valuable model for malaria because the *Plasmodium* spp. protozoa that cause malaria are host-specific, and squirrel monkeys are one of the only animals that can be infected with the same strain

of *Plasmodium* that causes severe malaria in humans.

To facilitate the study of malaria, researchers recently developed molecular tools that can assess cellular immune responses to *Plasmodium* infection in squirrel monkeys⁸.

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