

How do new world monkeys and old world monkeys differ?

Nose

Today, biologists and anthropologists classify monkeys into two groups: New World monkeys, situated in Central and South America, and Old World monkeys, found in Africa and Asia (Stanford, Allen and Antón 2009, 180). The defining feature that separates New World monkeys from Old World monkeys, into platyrrhines and catarrhines respectively, is the fact that platyrrhines generally have broader and flatter noses, with nostrils far apart and facing sideways, and catarrhines have relatively narrower noses that project forward, and nostrils that face downward (Fleagle 1999, 137).

Skull

When examining the cranium, it is also distinctive of a platyrrhine if contact between the zygomatic and the parietal bones of the skull can be spotted, whereas, in a catarrhine, a frontal-sphenoid junction can be found instead. Furthermore, New World monkeys have the eardrum connected to the outer ear by a loop made of bone, while alternatively, in Old World monkeys, the tympanic membrane is attached to the external ear by an ectotympanic tube. The Old World monkeys also tend to have relatively longer and narrower skulls (*Ibid.*).

Teeth

In the jaws, there are also recognizable dental differences, in that the platyrrhines have three premolars, giving a dental formula of 2:1:3:3 (Swindler 2002, 40), and the catarrhines have two premolars, giving a dental formula of 2:1:2:3 (*Ibid.* p. 44). Catarrhines also have sharp-edged, sectorial premolars on either side of the mandible, specialized for honing the upper canines, sharpening them in preparation for tearing apart food. Catarrhine molars are bilophodont as well—teeth that have two transverse ridges. These molars feature shearing, dagger-like cusps (Fleagle 1999, 186) for grinding the tough cell walls of leaves (Strier 2007, 61). These molars are either comparatively smaller, or missing altogether, in the platyrrhines situated in the Western hemisphere.

Diet

In conjunction with their dentition, catarrhines and platyrrhines also differ in their diets. With the exception of several species of howler monkey, catarrhines are more folivorous than platyrrhines, and in addition to the teeth they have adapted, they also have specialized digestive tracts to digest leafy material (Stanford, Allen and Antón 2009, 183). Colobines, a subfamily of the catarrhines, have developed sacculated stomachs, in which leaves, and sometimes, even highly toxic seeds can be digested by bacteria in the gut (Strier 2007, 59). Although both Old and New World monkeys feed on fruit, no Old World monkey feeds on insects exclusively (Fleagle 1999, 220).

The New World monkeys, on the other hand, are generally more frugivorous as opposed to folivorous, and some species such as the capuchin monkey, the Common Squirrel Monkey and the Red-Handed Tamarin also have insects make up a large percentage of their diet (*Ibid.*

p. 143-4). Some specimens of the New World also feed on different gums in times of fruit scarcity and insect dearth. Special adaptations of marmoset incisors and guts, for example, allow them to supplement their diets with just various types of gum (Ferrari, et al., 1996, cited by Strier, 2007 p. 57). To further illustrate this, in the pygmy marmoset, as much as eighty percent of its feeding time is devoted to a range of exudates, and the remainder to animal prey solely, such as tiny insects and amphibians (Yápez, et al., 2005, cited by Strier, 2007 p. 57).

Locomotion, stationary posture and size

Marmosets and tamarins, members of the platyrrhine family of Callitrichidae, have also developed claws on their big toes, “an adaptation that enables them to cling to the sides of large tree trunks to feed on gums, saps” (Fleagle 1999, 160) “and cryptic prey on trunks and in tree holes” (*Ibid.* p. 172). In terms of the locomotion of New World monkeys, being relatively more arboreal than the catarrhines, some leap from tree to tree, some travel on all fours along the branches, and for larger species, such as the Red-Faced Spider Monkey, or the Red Howler Monkey, suspensory postures have been documented (*Ibid.*).

Some spider monkeys even habitually use their “tails and arms as pendulums to swing through the canopy” (Strier 2007, 57). While these platyrrhines use their tails to support their own bodies, to help them keep their balance as they move along branches, and even carry food items behind them (*Ibid.*), catarrhines lack any form of prehensility in their tails (Stanford, Allen and Antón 2009, 181).

They do, however, have sitting pads, otherwise known as ischial callosities (Stuedel 1981), around the tail region, that support the animals while they sit in trees, or on the ground, as they feed, rest, or sleep (Stanford, Allen and Antón 2009, 182). More arboreal catarrhines would be found sitting on branches as opposed to suspending by their limbs like the platyrrhines (Fleagle 1999, 220). Many catarrhines are terrestrial, like baboons and patas monkeys (Wilson, et al. 1996, 29). Most Old World monkeys are also larger in body weight than the New World ones, especially male baboons (*Papio anubis*), which typically have a body weight of 23.5kg, nearly four times the body weight of the average spider monkey (*Ateles geoffroyi*), 6.00kg (Stanford, Allen and Antón 2009, 440).

Reproduction

In terms of sexual anatomy, female catarrhines have prominent swelled sexual skin around the anus and vagina during the estrous cycle (Stanford, Allen and Antón 2009). While catarrhines rely more on visual displays of sexuality, platyrrhines rely on scent to mark territory (Rowell 1972, 107). One example of this is when female spider monkeys will use their urine, maybe sometimes with glandular secretions, to attract males and signal that they are ready to mate (*Ibid.*). Platyrrhines have relatively longer life histories, due to their slow reproductive rates. Old World monkeys have a gestation period lasting five to six months, while New World monkeys are pregnant for seven to nine months (Rowell 1972, 122). While marmosets, spider monkeys and woolly monkeys wait, on average, three years between births,

Old World monkeys typically give birth once every year (Nishimura, 2003; Strier, 1999, cited in Strier, 2007 p. 57).

Social groupings

New World monkeys have diverse social organizations, from monogamous groups demonstrated in titi, saki and night monkeys, to large groups of intergendered spider monkey societies. Also, howler monkeys live in single-male groups, while capuchins and squirrel monkeys live in complex groups of several adults (*Ibid.* p. 172-3). In contrast, Old World monkey monogamy, or intergendered groupings, are rare, and most groups consist of single-male or multi-male, female kin-bonded societies (Fleagle 1999, 220).

Evolutionary success

Although they all share similar social orders, these catarrhine groups inhabit a wider range of latitudes, climates and vegetative regions than the platyrrhines (Fleagle 1999, 186). This may be due to their terrestrial locomotor potential, their manipulative abilities, and higher intelligence (Stanford, Allen and Antón 2009, 440), and the fact that they can access a wider range of foods and environments. They are also more prolific breeders (Fleagle 1999, 220). While the platyrrhines are much more assorted in their social systems, they occupy a narrower variety of niches than the catarrhines (Stanford, Allen and Antón 2009, 182), and due to this, it can be supposed that the Old World monkeys are evolutionarily more successful.

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