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Oligopithecidae

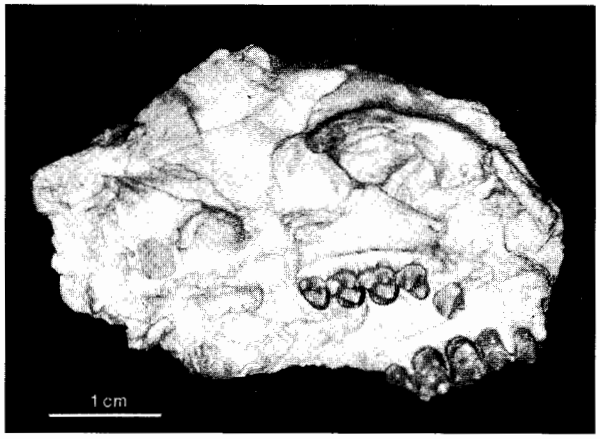
An extinct group of African (and East Asian?) archaic anthropoid primates. Raised recently to the status of a family, oligopithecids are found principally in rocks of Late Eocene age in the Fayum Province (Egypt) in an area of badlands at the eastern edge of the Sahara Desert. Other fragmentary remains of oligopithecids come from Oman and possibly China and Thailand. Here, Oligopithecidae includes two moderately well known genera and species: *Oligopithecus savagei* and *Catopithecus browni*, as well as up to three less well understood species.

History of Study

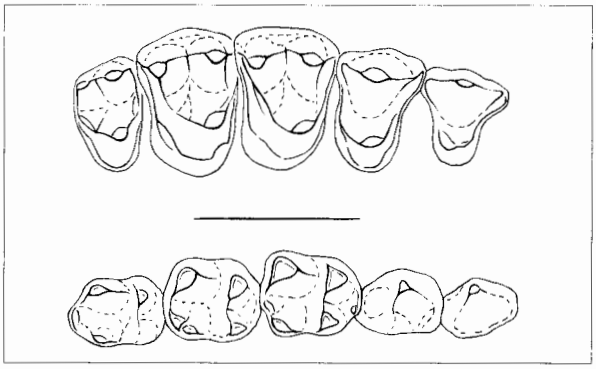
The first recovered oligopithecid was *Oligopithecus savagei*. A single mandible was found in the Fayum at Quarry E in the Jebel Qatrani Formation by D. Savage in 1961 and described the same year by E.L. Simons, who immediately recognized its anthropoid status. Because an Early Oligocene age was generally accepted for the Fayum fossil deposits at that time, he called it "Oligocene ape." A few teeth of *Oligopithecus* were recovered from Quarry E in the early 1980s.

These specimens were difficult to relate to modern primates and remained of uncertain evolutionary relationship for 30 years following Simons's description of the single mandible. Simons's view was that, because of its dental formula (two rather than three lower premolars), *Oligopithecus* was an early catarrhine allied to *Aegyptopithecus* and *Propliopithecus* occuring at higher levels in the Fayum. Others were more impressed by the remarkably primitive structure of the molar teeth, especially the paraconids, high trigonids, and small hypoconulids, and thought that *Oligopithecus* might be the sister group to living catarrhines or even to living anthropoids as a whole. A few workers even questioned whether *Oligopithecus* might belong with a poorly known European Eocene adapid group, the cercamoniines, and represent a linking form between anthropoids and the latter group.

In 1990, Simons described a closely related but older Fayum oligopithecid, *Catopithecus browni*, based on a complete skull. The skull has cleared up some of the debate about oligopithecids by showing that it was clearly at a monkey



Right oblique infero-lateral view of crushed cranium of Catopithecus browni. *Scale bar 1 cm.*



Occlusal view of upper right (above) and lower left P3-M3 of Catopithecus browni. *Scale bar = 5 mm. By C. Tarka, after Simons and Rasmussen, 1996, and photographs by E. Delson.*

Occlusal view of lower left C1-M2 of Oligopithecus savagei. *Compare with drawing above.*

grade of cranial organization, but scientists remain divided about its precise place in anthropoid phylogeny. Another possible oligopithecid, *Proteopithecus sylviae*, was at first referred to this family but is no longer believed to be so since it has three rather than two premolars, as first thought, and shares derived features with some more advanced anthropoids. Also in the 1990s, a French team described some fragmentary material of *Oligopithecus* from the Sultanate of Oman.

Three Asian species might also be related to the Oligopithecidae. *Hoanghonius stehlini* from the Middle Eocene of China was first reported in 1930, while its neighbor *Rencunius zhoui*, and *Wailekia orientale* from the Late Eocene of Krabi, Thailand, were only discovered in the mid-1990s. All have dental features reminiscent of *Oligopithecus*, but this may be superficial, and an alternative possibility is that they are related to cercamoniines or other adapiformes.

Age of the Oligopithecids

Most oligopithecid fossils come from the lower levels of the Jebel Qatrani Formation, which conformably overlies the marine and fluvial Qasr el Sagha Formation of Late Eocene age (ca. 37 Ma). *Catopithecus browni* occurs in Quarry L-41 from the lowest part of the formation and (based on preliminary paleomagnetic calibrations) may date between ca. 35.9 and 35.6 Ma. *Oligopithecus savagei* is younger and could be nearer 35.1–34 Ma (latest Eocene). A few teeth of oligopithecids from Oman may be slightly younger, perhaps earliest Oligocene. The Asian fossils are even older, *Hoanghonius* and *Rencunius* dating to perhaps 45 Ma, while *Wailekia* may date to 40–35 Ma.

Oligopithecid Adaptations

The anatomy of the oligopithecids is based principally on the skull and teeth, with little (as of 1999) published about the postcranial skeleton. The cranium of *Catopithecus* was similar in size and shape to that of *Saimiri*, the living squirrel monkey from South and Central America. Known specimens document the closure of the rear of the orbit and the fusion of the frontal bones in the midline, two important characteristics of anthropoids. On the other hand, two partial mandibles suggest that the mandibular symphysis was not fused.

Oligopithecids have cheek teeth with well-developed shearing crests but not as extreme in this respect as primarily folivorous or insectivorous living primates. It appears likely that oligopithecids had a diet consisting primarily of fruit but with an important component of insects, like living *Saimiri*. One interesting and distinctive feature of the lower molars is the close appression of the hypoconulid and entoconid.

From the size of the teeth and skull elements, oligopithecids were much smaller than any living catarrhine and within the size range of living New World monkeys (platyrrhines). The two genera seem to have been between 600 and 1,000 g, about the size of *Saimiri*. A distal humerus and proximal portions of a femur from the same quarry as *Catopithecus* may belong to that oligopithecid. These show several prosimianlike features, including a large third trochanter on the femur and a long capitular tail on the humerus. These bones suggest that *Catopithecus* was an arboreal climbing quadruped somewhat like squirrel monkeys.

The brain size of *Catopithecus* cannot be estimated directly because the skull is crushed. However, the temporal lines, produced by the muscles of mastication, converge quite far toward the front of the skull, and there was a sagittal crest. This suggests substantial postorbital constriction and a relatively smaller brain than in living monkeys. The suggestion that *Catopithecus* had a small brain should not be surprising since the Early Oligocene propliopithecid *Aegyptopithecus* also had a small brain for an anthropoid.

The relatively small size of the eye sockets of *Catopithecus* suggest that the animals were daytime active (diurnal), as are the living anthropoids, but distinct from many prosimians with relatively large eyes (and eye sockets) and nocturnal habits. In sum, probably the closest living ecological parallels

to the oligopithecid primates are found in small- to medium-size South American monkeys.

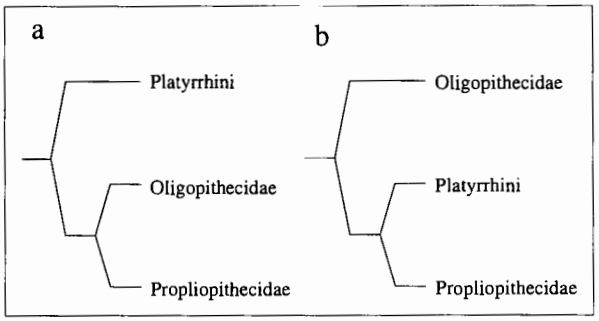
Phyletic Status of Oligopithecidae

As noted above, when Simons first described *Oligopithecus*, he identified it as a catarrhine on the basis of its having two premolars resembling those of *Propliopithecus*. However, the subsequent recovery of abundant new remains and the skull of the new genus *Catopithecus* further highlights the morphological paradox that had been recognized from the fragmentary remains. The cranial and dental material of *Catopithecus* shows that oligopithecids had reached the anthropoid, or monkey, grade of organization. They resemble living anthropoids and are dissimilar to Holarctic Eocene primates or modern Madagascar lemurs in having an anthropoid configuration in bony-ear structure (the ectotympanic bone for the tympanic membrane is fused to the lateral edge of the bony middle ear box; it was ringlike as in *Aegyptopithecus*, parapithecids, and living platyrrhines, not tubular as in all extant catarrhines), a bony partition between the eye socket and the space behind it that houses the jaw muscles (postorbital closure), closely packed cheek teeth, spatulate incisors, and projecting canines. This advanced combination of characteristics has led all authorities to accept their status as anthropoids.

At the same time, the molar dentition of oligopithecids was seen by many as similar to European adapids, particularly cercamoniines. These morphological similarities have thus led some to argue that anthropoids are derived from a cercamoniine adapid. However, the fact that oligopithecids have been linked (by Simons) with catarrhines (in the family Propliopithecidae) on the one hand, and to adapids on the other, has again called into question the role of parapithecids in early anthropoid phylogeny. In short, if primitive anthropoids resembled primitive parapithecids, then the primitive anthropoid dentition was quite unlike that of cercamoniines. This would mean that the resemblances between oligopithecids and cercamoniines must be homoplasies.

A more difficult and unresolved question concerns oligopithecid relationships within Anthropoidea. Opinion is divided as to whether oligopithecids are more closely related to the Old World (catarrhine) anthropoids or are an earlier offshoot of the anthropoid tree. As above, much of this controversy revolves around acknowledged conflicts in the distribution of anatomical resemblance. Many similarities between oligopithecids and some other anthropoids (e.g., the ringlike ectotympanic shared by oligopithecids, propliopithecids, platyrrhines, and parapithecids) are acknowledged primitive holdovers from the last common ancestor of all anthropoids and do not indicate a special relationship with any one group of anthropoids.

Oligopithecids have several apparent derived similarities with catarrhines. For example, they resemble early catarrhines like *Propliopithecus* in having a reduced premolar number, with the upper canine wearing against the lower third premolar. On the other hand, oligopithecids lack important derived cheek-tooth morphology shared by catarrhines and platyrrhines (e.g., they still retain molar paraconids, and the P_4 and M_1 trigonids are still open; the upper premolars lack hypocones, and P^3 is still waisted). One or another of these sets of similarities must be homoplasies (evolutionary parallelisms), and the other set must be true homologies. The phylogenetic significance of this confusing set of apparent derived similarities can be cleared up only when we have more fossils documenting early anthropoid cladogenesis.



Conflicting views of the phylogenetic position of the oligopithecids. Courtesy of Richard F. Kay.

Oligopithecidae
- †*Oligopithecus*
- †*Catopithecus*
- ?†*Hoanghonius*
- ?†*Rencunius*
- ?†*Wailekia*

†extinct

See also Adapiformes; Anthropoidea; Fayum; Hoanghonius; Parapithecidae; Propliopithecidae; Skull. [R.F.K., E.D.]

Further Readings

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