Family Relationships Are a Biological Conundrum

Now that it is possible to detect in detail the genetic proximity among species, biologists can be more objective about formal classificatory relationships above the level of the species

FRIENDS YOU CHOOSE, relatives you are stuck with. And so, too, it is with evolutionary relatives, particularly when those concerned are ourselves and our simian cousins. Surprising as it may seem, there is a wide disparity of opinions about how relationships above the species level should be judged, at least in formal classification.

For instance, until recently most biologists have classified humans as being the sole occupants of the family Hominidae, with the great apes—chimpanzees, gorillas, and orangutans—making a second family, the Pongidae. But it does not require too energetic a search through the past few decades' literature to find, on one hand, the suggestion that humans and apes should simply be separate genera within one family, the Hominidae; and on the other hand there is the lofty notion that not only should humans be removed from apes into a separate family, but also that we deserve an entire Kingdom of our own, the Psychozoa.

"It all depends on what you want classification to do," says Lawrence Martin, of the State University of New York at Stony Brook. "If you want it to reflect precisely the genetic relatedness among species, that will give you one answer. But if you want it instead to say something about levels of adaptation, then you will get another."

For instance, there is now little argument that among the hominoids (humans and apes), *Homo sapiens* is extremely close genetically to the African apes, the chimpanzee and gorilla, while being increasingly distantly related to the Asia apes, the orangutan and the gibbon. If genes are to be your guide, therefore, the above species classification of humans, chimpanzees, and gorillas should reflect this genetic proximity, presumably by putting them all in the same family.

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But the reason for the traditional separation into Hominidae and Pongidae is that humans have shifted to a very different adaptation—cultural bipeds—while chimpanzees have remained, well, just apes. It was Julian Huxley who went one step further in the 1950s and said that the power of the human intellect, and the elaboration of introspective consciousness, pushed humans into an entirely new world, one that should be recognized by Kingdom status. Julian Huxley's grandfather, Thomas Henry Huxley had, incidentally, taken a step in this direction, suggesting in his 1863 *Man's Place in Nature* that humans should be accorded suborder status, within the order Primates.

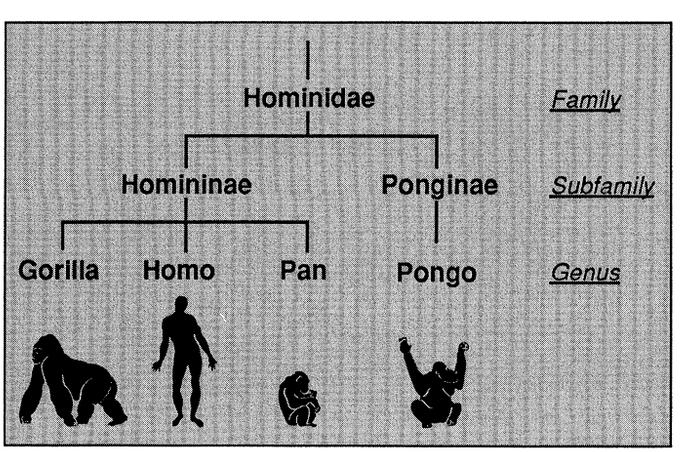
Morris Goodman, of Wayne State University, was one of the first biologists in recent times to upset anthropologists by suggesting that family separation between humans and African apes should be torn down, an act of temerity he perpetrated in 1962, based on immunological reactions of blood proteins. The idea was not well received. Since that time more and more biologists have echoed the call, some citing molecular data, some anatomical data. The proposed alternative classifications were not always identical, even though the general effect was the same: to reflect the close genetic proximity of humans and African apes.

Now, in company with four colleagues, Goodman has restated his suggestion, this time slightly differently, and this time based on DNA sequence analysis of part of a globin gene in humans, gorillas, chimpanzees, and orangutans, all compared with data from the rhesus monkey. Faced with evolutionary history written so clearly and in so much detail as this, say Goodman and his colleagues, it is foolhardy to continue with the traditional classification: they propose that it should be replaced by the one below, which recognizes humans and African apes as a natural (monophyletic) group. They say that humans and all the great apes should be within the family Hominidae, with orangs then being in one subfamily, Ponginae, and humans and African apes in another, Hominae.

This, like other suggested reclassifications, would present anthropologists with problems other than those of philosophy: specifically, the informal family name "hominid" is currently used to encompass humans and their direct ancestors. But, if chimps and gorillas are our brothers in this family, then this handy vernacular would have to be dropped.

As all this demonstrates, biologists live in interesting times, because, as Martin observes, it will soon be possible in principle to agree on an exact and objective measure of differences between genera, families, and so on: such measures would be specified differences in DNA sequence. No arguments. No longer room for subjective differences of opinion. So long as you can decide on what classification is for, of course.

■ ROGER LEWIN



Family tree: *An increasing number of biologists are coming to accept that, based on molecular and anatomical evidence, the human family tree should be redrawn.*

ADDITIONAL READING

M. M. Miyamoto *et al.*, "Molecular systematics of higher primates," *Proc. Natl. Acad. Sci. U.S.A.* **85**, 7627 (1988).