Tail Length Relative to Body Size

(Caracal caracal, Panthera Leo, Panthera tigris)

What's the tale on tails?

Scientist have spent many hours researching the use and function of tails in mammals. Interestingly, animals use their tails for very specific purposes and many have very unique uses that are only seen in a certain species. I'm going to focus on the function of tails in felid species; specifically the tails of Caracals, lions, and tigers. So, let's dig a little deeper!

Caudal Appendages

Caracal caracal

* The caracal has the shortest tail length relative to body size among the three focal species. On average their tails are 33cm(13 in.).

Panthera leo

* Lions' tails are much longer compared to that of the Caracal. The lion tail measures around 89 cm(35 in.). Interestingly, the tail has a dark tuft at the distal end of the tail.

Panthera tigris
*The tigers' tail is similar to that of a lion. There isn't a great difference in body to tail length ratio. On average tigers' tails are 87 cm (34 in.).

**Evolution of tails**

Felid tails differ among each species. Some are longer than others and some are shorter. Amongst the focal species of team Grant the tails seem to be directly proportionate to the size of the species. Tigers and lions are very similar in size and their tails differ very slightly. Both tails seem to make up 3/4 of the body length. The caracal tail is rather short compared to that of the lion and tiger. The caracal tail makes up about a third of the body length. Caracals are much smaller than the "big cats", but can this solely be the answer to the difference?

Pictured above is the Proailurus. Scientist predict that the Proailurus is one of the earliest "cat" species to live. The proailurus is dated to live almost 25 million years ago in the late Oligocene and Miocene. Proailurus belonged to the superfamily Feloidea, but is characterized as a felid or "true cat". So, if all felid species share a similar common ancestor, let's focus on the tail. Fossils have been found and a false color image was produced of this strange creature. As one can see the tail is much longer compared to others in the Felidae family. It's tail length to body ratio is different than that of a Caracal, tiger, and lion. The Proailurus tail seems to stretch to almost the full body length. So, what has changed?

**Genes & Development**

Surprisingly, there isn't much research on the tails of felids such as the tiger, caracal, and lion; however, scientist have done experiments using domestic cats to unveil the truths about felid tails. Since the focal species are somewhat closely related and share a common ancestor, scientist assume tails in the Felidae family share common functions.

What they found:

- The gene responsible for the development is not exactly known.
- Development may be caused by the expression of many genes.
- Scientist are assured that it's not one gene responsible, because tails are not just used for; let's say balance, but also for thermoregulation and communication.
- All felid tails have very specified muscles in the tail that allows them to have precise control over the entire tail (precision higher in domesticated cats than in "big cats" or Panthera).
- Felid tails simply are directly proportionate to body size in different species. Also, a variety of species have different tails that are advantageous in their environments.
- This phylogeny shows our hypothesis on where short tails emerged in different species in the Felidae family.

**What team Grant thought:**

We hypothesized that caracals have shorter tails than the tiger and lion, because as a much smaller felid a shorter tail may be advantageous. Having a longer tail and a smaller overall body size would be disadvantaging in the wild, when a species have much larger predators that could potentially grasp their tails easier. Being large and at the top of the food chain as the tiger and lion are, it may not matter that they have longer tails, because hypothetically nothing will be chasing after them.

**Just for fun!**
This video displays how "big cats" aren't that different from the domestic house cat. Felis catus or the house cat diverged from a common ancestor almost 9 million years ago, but these "big cats" of the Genus Panthera show very similar interest as cats today.

http://www.youtube.com/watch?v=J1uu8L8FTY

References:

All photos courtesy of National Geographic (Picture editing done by: DMR).

Smithsonian National Zoological Park

Phylogeny produced and edited by: Catherine Debban.


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