

Some sauropods really did hold their long necks high

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Sauropod dinosaur *Euhelopus zdanskyi*. Image: Wikimedia Commons

(PhysOrg.com) -- A new study suggests the long necks of sauropod dinosaurs really were held high, in spite of theories suggesting they were more likely to keep their necks low because of the very high blood pressure resulting from the long distance from heart if they lifted their heads.

The sauropods were the among largest dinosaurs and included well-known species such as the Brachiosaurus, Brontosaurus (now called Apatosaurus) and [Diplodocus](#), which had very long necks to extend their reach. Many scientists have for decades thought they held their necks low to extend their reach horizontally rather than vertically because of the energy that would be required to hold their necks high. In some sauropods the neck could be over 10 m long. More recently there has

been controversy, with other scientists thinking that during food shortages holding their necks high to grab food would be worth the energy expended.

The study was carried out by functional morphologist Andreas Christian of the University of Flensburg in Germany, and concentrated on fossils of *Euhelopus zdanskyi* a mid-sized Early Cretaceous [sauropod](#) that lived around 112-130 million years ago. It weighed a moderate (for a sauropod) 3,800 kg, with its head and neck weighing more than 210 kg. It measured 11-12 m from head to tail, and the distance from the base of the neck to the nose was about 4.6 m.

Christian calculated the stresses that would have been felt by the [cartilage](#) in the sauropod's neck joints, and found the most energy-efficient pose would have been to hold its neck straight and inclined at about 45 degrees above horizontal, rather like a modern-day giraffe. He also calculated the energy costs for walking given distances and compared them to the energy required to raise the neck, and the energy expenditures for maintaining a high [blood pressure](#) for five minutes of high browsing.

The results of the calculations showed that even though a lot of [energy](#) is required to pump blood to such heights, from an inclined pose less work would be needed to hold its neck vertically to graze for up to half an hour than it would need to move their large bodies 100 meters to look for food. The findings were also true for the much larger [Brachiosaurus](#), and may be true for some other sauropods.

Christian said the sauropods may have used their necks differently depending on the distribution of food and the kinds of vegetation, and during food scarcity would have found the ability to extend their reach vertically advantageous if not essential.

The findings were reported on June 2nd online in the journal *Biology Letters*.

More information: Andreas Christian, Some sauropods raised their necks—evidence for high browsing in *Euhelopus zdanskyi*, *Biology Letters*, Published online before print June 2, 2010, [doi:10.1098/rsbl.2010.0359](https://doi.org/10.1098/rsbl.2010.0359)

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