**1 SUPPLEMENTARY TEXT**

**2 DIAGENESIS EVALUATION**

In order to reconstruct past ecological and environmental conditions based on stable isotope information derived from bioapatite tissues, the diagenetic effect on the stable isotope imprint must be assessed. Several controls allowed us to consider that the original isotopic signal of LVF and BAT herbivore and carnivore bioapatite is preserved and therefore, usable for reconstruction of past features. Firstly, only tooth enamel has been analysed at LVF and BAT because it constitutes the most resistant bioapatite tissue and therefore, it is less prone to undergo intense post-burial alteration. This is due to its low porosity, large size of apatite crystals and a low content of organic matter in comparison to dentine and bone (Kohn and Cerling, 2002). Secondly, although oxygen in the phosphate fraction of bioapatite is regarded as most reliable than oxygen in the carbonate fraction, due to more stable P-O bonds in contrast to C-O bonds, it is possible to evaluate whether δ\(^{18}\)O values of the carbonate (δ\(^{18}\)O\(_{\text{CO}_3}\)) preserve a pristine signal by comparing these values to those shown by δ\(^{18}\)O values of the phosphate (δ\(^{18}\)O\(_{\text{PO}_4}\)). The rationale of this reasoning is based on the comparison of modern living mammalian δ\(^{18}\)O\(_{\text{CO}_3}\) and δ\(^{18}\)O\(_{\text{PO}_4}\) values. Bryant *et al.* (1996) and Iacumin *et al.* (1996) observed that if CO\(_3\)\(^{-2}\) and PO\(_4\)\(^{3-}\) in bioapatite are cogenetic equilibrium precipitates from body water at relatively invariant mammalian body temperatures, there should be a consistent difference in δ\(^{18}\)O\(_{\text{CO}_3}\) and δ\(^{18}\)O\(_{\text{PO}_4}\) values (expressed as Δ\(^{18}\)O\(_{\text{CO}_3-\text{PO}_4}\) = δ\(^{18}\)O\(_{\text{CO}_3}\) - δ\(^{18}\)O\(_{\text{PO}_4}\)). These authors observed a consistent range of values for this difference between ~ 8.6 to 9.1‰. Obtaining a Δ\(^{18}\)O\(_{\text{CO}_3-\text{PO}_4}\) value near this range for fossil mammalian bioapatite has been regarded as an indication that both phases retain pristine isotopic values. Table S1 shows raw isotopic data for LVF and BAT herbivore and carnivore taxa considered in this study. In the case of LVF, we were able to run δ\(^{18}\)O\(_{\text{CO}_3}\) and δ\(^{18}\)O\(_{\text{PO}_4}\) analyses in a good representation of both,
herbivores and carnivores. LVF herbivore mean $\Delta^{18}O_{\text{CO}_3\text{PO}_4}$ value is $8.6\pm0.9\%$ (n = 43, ~68% of the total LVF herbivore dataset), whereas LVF carnivore mean $\Delta^{18}O_{\text{CO}_3\text{PO}_4}$ value is $8.7\pm0.5\%$ (n = 18, ~64% of the total LVF carnivore dataset). These results point to a good preservation of the oxygen isotope composition of both, the carbonate and phosphate fractions of LVF herbivore and carnivore tooth enamel. In the case of BAT, sampling restrictions to this collection enabled us to perform $\delta^{18}O_{\text{CO}_3}$ and $\delta^{18}O_{\text{PO}_4}$ analyses only on selected BAT herbivores. BAT herbivore mean $\Delta^{18}O_{\text{CO}_3\text{PO}_4}$ value is $8.5\pm0.8\%$ (n = 20, ~23% of the total BAT herbivore dataset), also indicating an acceptable $\Delta^{18}O_{\text{CO}_3\text{PO}_4}$ value. Although, we were not able to perform $\delta^{18}O_{\text{PO}_4}$ analyses of BAT carnivore samples, we assumed that the similar taphonomic history that BAT carnivore remains underwent when compared to BAT herbivores, along with the robustness of tooth enamel, grant the preservation of pristine $\delta^{18}O_{\text{CO}_3}$ values. As far as $\delta^{13}C$ tooth enamel values are concerned, there are no conclusive tests that categorically confirm its preservation. However, when dealing with carnivore and herbivore coe tenaneous individuals, the trophic offset estimated for modern carnivore and herbivore mammalian tooth enamel ($\Delta^{13}C_{\text{carnivore-herbivore}} \sim -1.3\%$, Fox-Dobss et al. 2006; Clementz et al. 2009) constitutes a useful approach to evaluate the preservation of the fossil bioapatite $\delta^{13}C$ signal. When considering strict LVF and BAT carnivores, we obtained a LVF $\Delta^{13}C_{\text{carnivore-herbivore}}$ of -1.1%, and a BAT $\Delta^{13}C_{\text{carnivore-herbivore}}$ of -1.5%, close to the trophic offset proposed for modern mammalian assemblages and hence, suggesting preservation of the isotopic signal at both localities. These tests demonstrate that the oxygen and carbon isotope compositions of LVF and BAT carnivore and herbivore taxa retain its pristine signal and therefore, these datasets can be used in the reconstruction of past ecological traits and environmental conditions.

50 THE ROLE OF MEGAHerbivores ON MODern CARNIVORES’ DIET
The role of megaherbivores on large active predators’ diets should be regarded with caution. In modern ecosystems, megaherbivores (∼1 ton in adult body weight) rarely experience predation as adults and only infrequently as juveniles (Ruggiero, 1991; Sinclair, 2003; Owen-Smith and Mills, 2008). Hunting strategy is vital for large active predators to subdue megaherbivores and it has been observed that the group hunting strategy of lions allows them to prey on herbivores as large as adult giraffe (Hayward and Kerley, 2005). Giraffes are considered to be the largest herbivore that a lion can take as prey and their body size is far from the weight of preferred prey species (350 kg). LVF and BAT large active predators (felid Machairodus, barbourofelid Albanosmilus, and amphicyonids Magericyon and Thaumastocyon) likely had a solitary hunting style more similar to the one observed today for tigers (Agustí and Antón, 2002; Antón et al. 2004; Salesa et al. 2006), whose preferred prey range from 60 to 250 kg (Hayward et al. 2012).

We searched the literature for information regarding the contribution of very large herbivores to the diets of modern predators under unusual circumstances, i.e., preying on sick, young or old individuals, feeding on their carrion. We found no quantitative data in this regard. An exception is the study of Loveridge et al. (2006), who showed that only under atypical circumstances (drought periods), lions from Hwange National Park (Zimbabwe) incorporated elephant calves in fairly large quantities (23% of their kills).

However, the diet of the lion was largely dominated by medium-sized prey, a strategy that may optimize food intake in relation to energy expended in hunting. Therefore, feeding on young individuals of megaherbivores should be considered the exception and not the rule. Information about the contribution of megaherbivore carrion on predator diets is rarely reported. In studies of modern felids, this information is totally absent because scavenging is not a common feeding practice (Karanth and Sunquist, 2000; Hayward et al. 2012).

Carrion is a relatively unreliable food resource for large carnivores because its availability
is conditioned by unpredictable environmental conditions such as drought episodes or diseases within herbivore populations. By analogy with modern hyaenids, LVF hyaenid *Lycyaena* may have incorporated larger proportions of carrion on its diets. However, *Lycyaena* had morphological traits that point to an active hunting, with a lower degree of reliance on scavenging practices (Agustí and Antón, 2002).

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82 REFERENCES


89 –, JEDRZEJEWSKI, W. and JÈDRZEJEWSKA, B. 2012. Prey preferences of the tiger


