ENERGY REQUIREMENT OF CAPTIVE NON-HUMAN PRIMATES

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ABSTRACT

Energy is a fundamental need of all living things. In the wild, satisfying energy requirements may be the most important aspect of foraging ecology and feeding decisions. In captivity, satisfying an animal's energy requirement is usually not difficult. The concern is more over balancing energy intake with that of other necessary nutrients. The energy density of manufactured foods is normally fairly high, and these foods are usually highly digestible as well. Also, energy requirements for captive animals are likely lower than those of their wild conspecifics, due to the nature of captivity. Captive animals generally are faced with less thermal stress, and less required physical activity. In many cases physical activity is actually constrained. Overweight and obesity are much more likely conditions to be found in otherwise healthy captive animals compared with underweight.

Primates do not differ significantly from most other mammals in the relationship of metabolic rate to body mass. The actual energy requirement of an individual will generally be between 1.5 and 3 times the metabolic rate, depending on housing, social group, enclosure size, life stage, reproductive status and animal health. For example, food intake studies on captive adult, non reproductive callitrichid primates have found that digestible energy intake is roughly twice the mean resting metabolic rate (Power, 1991). The Non-Human Primate 2003 NRC energy calculations for various species of primates provide a good starting place for estimating energy needs. The NRC recommends use of the general equation 140 X (body mass)$^{0.75}$, where body mass is expressed in kg, for estimating maintenance energy requirements of captive primates. This is basically twice the estimated resting metabolic rate based on the equation from Kleiber (1975). It is important to note, however, that the allometric exponent of 0.75 is appropriate for interspecies comparisons but may not be accurate for intraspecies comparisons. It is a good estimate of maintenance energy requirement differences between two species of different body size, but in primate species with large sexual dimorphism this calculation may overestimate the difference in maintenance energy requirement between males and females.

Energy requirements for young, growing animals and for gestating and especially lactating females will generally be higher than the estimated maintenance requirement based on body mass. For example, lactating common marmosets roughly double food intake compared to their nonreproductive state (Nievergelt and Martin, 1998). Larger nonhuman primates will likely not increase food intake to such an extent during lactation; but food intake will likely be increased.

REFERENCES

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