

THE EXPENSIVE TISSUE HYPOTHESIS IN PRIMATES – NEW RESULTS

A.Navarrete, K. Isler, C. van Schaik

Anthropological Institute & Museum, University of Zurich, Switzerland

Presenter's Email: a.navarrete@aim.uzh.ch

The renowned Expensive Tissue Hypothesis (ETH) proposes that the energetic costs of brain enlargement can be balanced by reducing the size of other expensive organs, mainly the digestive organs. The only substantial evidence for this hypothesis was a significant negative correlation between brain mass and gut mass in 18 anthropoid primates (including *Homo sapiens*). However, in this sample brain and gut data were not measured in the same individuals. Here, we test the ETH using consistent measurements of organ masses from 31 primate species obtained directly from dissections, and including digestive tract mass in the analyses. Correlations between brain size and the mass of other expensive organs were tested using phylogenetic methods. Contrary to the predictions of the ETH, no negative relationship between brain size and either stomach, intestine or combined digestive tract mass was found in primates as a group. In catarrhines (N=13), the correlation between brain size and intestine mass was even significantly positive. Moreover, in a large sample of other mammalian orders (N=130 species, same methodology), any existing correlations between brain size and other expensive organs were also positive. However, most of these correlations were driven by basal metabolic rate (BMR) as a confounding variable. These results indicate that the ETH is not valid as a general principle within mammals or primates. This study was supported by the Swiss National Science Foundation (grant number 3100A0-117789).

Keywords: encephalization, “Expensive Tissue Hypothesis”, BMR, primates