

# Neandertal energetics and foraging efficiency

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## Abstract

Mechanical interpretations of Neandertal skeletal robusticity suggest extremely high activity levels compared to modern humans.

Such activity patterns imply high energy requirements; yet it has been argued that Neandertals were also inefficient foragers.

The present study addresses this apparent conflict by estimating energy needs in Neandertals and then evaluating those estimates in the context of energetic and foraging data compiled for contemporary human foragers and nonhuman primates.

Energy demands for Neandertals were determined by first predicting basal metabolic rates (BMR) from body weight estimates using human standards developed by the World Health Organization [FAO/WHO/UNU (1985) *Energy and Protein Requirements*. Report of the Joint FAO/WHO/UNU Expert Committee, Geneva: WHO].

Total daily energy expenditure (kcal/day) was then estimated assuming high levels of physical activity (i.e., 2–3×BMR), comparable to those observed among subsistence-level populations today.

These estimates of energy requirements (ranging from 3000–5500 kcal/day) were then used to determine Neandertal foraging efficiency assuming (1) minimal survival-level foraging returns, and (2) daily foraging times *longer than* those observed among any contemporary foraging group and comparable to a nonhuman primate.

Even with these extremely conservative parameters, estimates of Neandertal foraging efficiency (~800–1150 kcal/h foraged) were comparable to those observed among living hunter–gatherers.

These results indicate that if Neandertals did have heavy activity levels, as implied by their skeletal robusticity, they would have required foraging efficiencies within the range observed among modern groups.

Thus, Neandertals could have been *either* highly active or poor foragers, but they could not have been both.

**Author Keywords:** basal metabolism, total energy expenditure, physical activity level, foraging efficiency, adaptation, hominid evolution

