

Reconstructing Dinosaur Body Temperatures

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Abstract: Several aspects of dinosaur physiology are enigmatic; among the more general problems is that it remains unclear whether their basal metabolisms resembled those of modern birds and mammals ('warm blooded'), large reptiles ('cold blooded') or any of the other metabolic and thermo-regulative strategies observed in modern animals (heterothermy, 'gigantothermy', etc.). Previous attempts to address this question have focused on various indirect evidence from growth rates, bone histology, and reconstructions of ecology. I will present a new line of evidence based on determinations of the growth temperatures of preserved hard body parts (tooth enamel and egg shells), using carbonate 'clumped isotope' thermometry. The results of this study suggest that dinosaurs varied in body temperature over a large range, correlated with body size, consistent with relatively low basal metabolic rates and thermoregulation most resembling 'gigantothermy'.