

Medicine Without Reference Ranges: The Dinosaur Thought Experiment

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Abstract

This concept paper examines medicine without reference ranges: the dinosaur thought experiment. It develops an argument drawn from Terrain Medicine for Dinosaurs, identifies the relevant biological or clinical mechanisms, and considers where that argument may fail. This is a narrative perspective, not a systematic review or an original clinical study.

The central problem

What would medicine look like for a living organism whose normal values, drug kinetics and population outcomes are unknown? The dinosaur manuscript uses extinction as an epistemological thought experiment. It does not describe actual clinical experience with living non-avian dinosaurs. Its value lies in forcing a distinction between direct evidence, comparative inference, physical constraint and speculation. The absence of reference ranges does not make all guesses equally credible.

Mechanisms and causal architecture

For extinct dinosaurs, fossil paleopathology can reveal some bone injury, tumors, infection-associated lesions and growth patterns, but soft-tissue physiology remains poorly observed. Birds and crocodilians provide phylogenetic information, yet neither serves as a generic stand-in for all dinosaur taxa. Scaling laws constrain heat exchange, biomechanics and cardiovascular demand, while comparative anatomy limits possible respiratory and digestive systems. A responsible model assigns confidence to each claim according to evidentiary distance: physical laws are strong constraints, conserved biology is informative, reconstructed physiology is less certain, and detailed drug response without measured pharmacokinetics is largely unknowable.

A discriminating example

A fossilized injury can document that a dinosaur suffered bone pathology, but not the animal's exact pain experience, blood chemistry or treatment response. Acknowledging this boundary is not anti-scientific; it is what makes the inference credible. The thought experiment reminds medicine that good explanations must identify which observations actually support the claimed mechanism.

Competing explanations and limitations

The thought experiment should not imply that contemporary medicine is merely “bookkeeping” because it uses population evidence. Clinical trials, reference distributions and diagnostic validation are extraordinary strengths precisely because physiological reasoning alone can mislead. Nor is it safe to extrapolate drug doses by body size across very different species, or to assume specific rates of growth, healing and longevity without taxon-specific evidence.

What evidence would change the interpretation?

The scientific criterion is internal discipline: identify the evidence for each inference, show alternative explanations, and avoid conclusions stronger than fossils and comparative biology support.

Hypothetical dinosaur cases should be explicitly labeled illustrative scenarios rather than observations. If new paleontological evidence conflicts with a proposed scaling assumption, the model must change.

Implications for medical interpretation

The paper is best published as philosophy of medical inference and comparative physiology, illustrating humility under profound uncertainty rather than offering veterinary treatment for imaginary patients.

Selected scientific reading

Kitano (2002), Systems biology: a brief overview, Science.
<https://doi.org/10.1126/science.1069492>

Bailleul et al. (2019), Dinosaur paleohistology: review, trends and new avenues, PeerJ.
<https://doi.org/10.7717/peerj.7764>

Original source: Terrain Medicine for Dinosaurs. All source books supplied by the author.

Conceptual research commentary. Not a peer-reviewed clinical study, original trial, systematic review, validated diagnostic instrument or treatment protocol. Consult qualified care for medical decisions.