

Campinas, Brazil, 11 August 2025.

Review of the Thesis by Valeriia Telizhenko

Title: *Genetic and morphological proxies for evolutionary changes in the ontogeny of cetacean skeleton*

The dissertation addresses an important and relatively underexplored topic: the integration of morphological and genetic data to investigate evolutionary changes in cetacean skeletal ontogeny. The scope of the work is ambitious, covering cranial suture ossification, accessory bone occurrence, forelimb skeletal variation, molecular evolutionary analyses of regulatory genes, and postnatal gene expression patterns. The combination of broad museum-based morphological datasets with molecular evolutionary and expression analyses is a strength and provides a multifaceted perspective on the evolution of cetacean skeletal traits.

I would like to highlight some points:

- The dataset is large, with hundreds of cranial and limb specimens examined, and integrates both original measurements and literature records.
- The use of phylogenetic comparative methods (ancestral state reconstructions, phylogenetic signal analyses, evolutionary rate modelling) is appropriate and up to date.
- The linkage of morphological variation to gene sequence evolution is a good conceptual advance, and the focus on relaxed selection as a driver of morphological diversity is a valuable contribution.
- The persistence of posterior Hox gene expression into postnatal life is an intriguing result that raises new questions about developmental regulation in non-model marine mammals.

Conclusion and verdict:

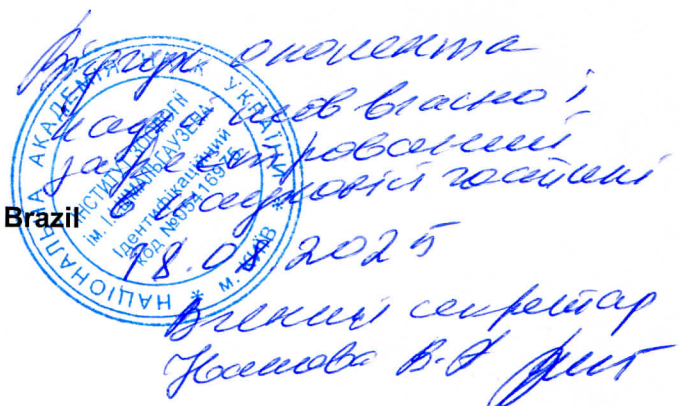
Overall, this dissertation makes a substantive contribution to our understanding of cetacean skeletal evolution by combining morphological datasets, molecular evolutionary analyses, and developmental gene expression profiles. The work is methodologically sound and generates novel insights, though the synthesis across datasets could be stronger, and certain methodological details require clarification for full reproducibility. These shortcomings, while notable, do not undermine the scientific value of the findings.

Verdict: I recommend a **positive evaluation** of the dissertation and consider it suitable for the award of the degree of Doctor of Philosophy.



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