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Dear Editors of Current Biology,

We would like to submit the attached manuscript *Evolutionary bursts drive morphological novelty* for consideration in Current Biology. We recently consulted with Senior Editor Dr. Florian Maderspacher via a presubmission inquiry, and we were pleased to hear they were interested in having us submit our manuscript.

Our paper addresses a fundamental question in biology: how do new morphologies evolve? At macroevolutionary scales most hypotheses of morphological evolution rely either on a gradualist view proposed by Charles Darwin or an episodic view presented by G.G. Simpson. Typically, these evolutionary modes are at odds with one another. However, using a novel high-dimensional morphological dataset paired with genome-scale genetic data we find common ground between these two opposing views. Our investigation of the lizard body plan suggests that while the prevailing process of evolutionary change is gradual (following Darwin), novel morphologies emerge through evolutionary bursts (Simpsonian "jumps"). Further, we align these bursts with the axes of morphological change, allowing us to distinguish between periods of elaboration—change along the morphological path of least resistance—and innovation—change resulting in new forms. We believe our framework will be of broad interest to biologists seeking to study the tempo and mode of evolution.

On behalf of myself and coauthors we thank you for your time and consideration,

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Potential Referees

Below we include a short list of potential referees for our article. We have tried to choose a pool of researchers with varied backgrounds (scientific expertise, career-stage, geography, sex) that may be useful for review.

1. Thomas Guillerme
    - Sheffield University, UK.; guillert@tcd.ie
    - macroevolution, trait evolution, comparative methods.
2. Marc Jones
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    - phylogenetic comparative methods, macroevolution.
3. Kate Sanders
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    - trait evolution in reptiles.
4. Samantha Price
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    - macroevolution, diversification.
5. Dan Rabosky
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    - diversification, macroevolution, reptiles.
6. Mark Hutchinson
    - South Australian Museum; Mark.Hutchinson@samuseum.sa.gov.au
    - reptiles, evolution of Australian fauna.
7. Sara Ruane
    - Field Museum; sruane@fieldmuseum.org)
    - phylogenomics, macroevolution, reptiles.
8. Mike Lee
    - Flinders University/South Australian Museum; mike.lee@samuseum.sa.gov.au)
    - macroevolution, body plan evolution.

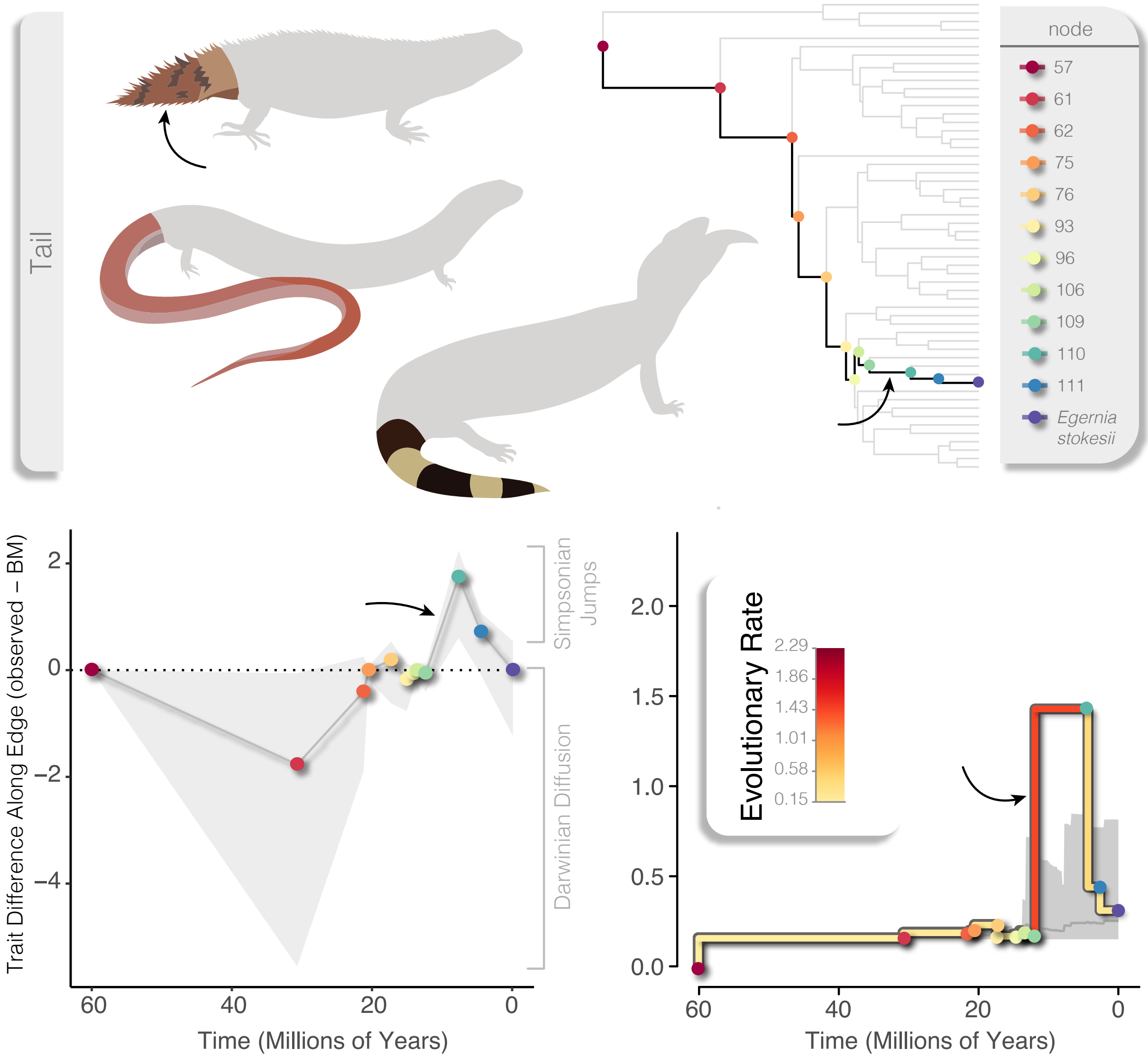

Figure. Composite figure outlining our methodology for inferring evolutionary mode of novel morphologies, using the lizard tail as an example. (top left) Representative illustrations of some Tiliquin lizards showing body form diversity, focusing on different tail morphologies. (top right) Phylogeny of this group of lizards with the path from root to a single tip noted, for interpreting following figures. (bottom left) Evolution of the tail from the ancestral form (root) to a single tip, illustrating the trait variance along each individual branch, comparing the inferred evolutionary path to a diffusion process under Brownian Motion. Values near zero indicate an adherence to Darwinian diffusion, whereas values significantly above zero indicate relatively large leaps in trait evolution akin to Simpsonian jumps. (bottom right) Evolutionary rates of the tail from the ancestral form (root) to a single tip, illustrating the variation in rates along individual branches, and the coincident jump in evolutionary rate and trait variance between nodes 109 and 110. Black arrows throughout highlight a focal branch which contributes disproportionately to the evolution of the short, wide, and spinose tail of the *Egernia stokesii* group.