



KENNESAW STATE
UNIVERSITY

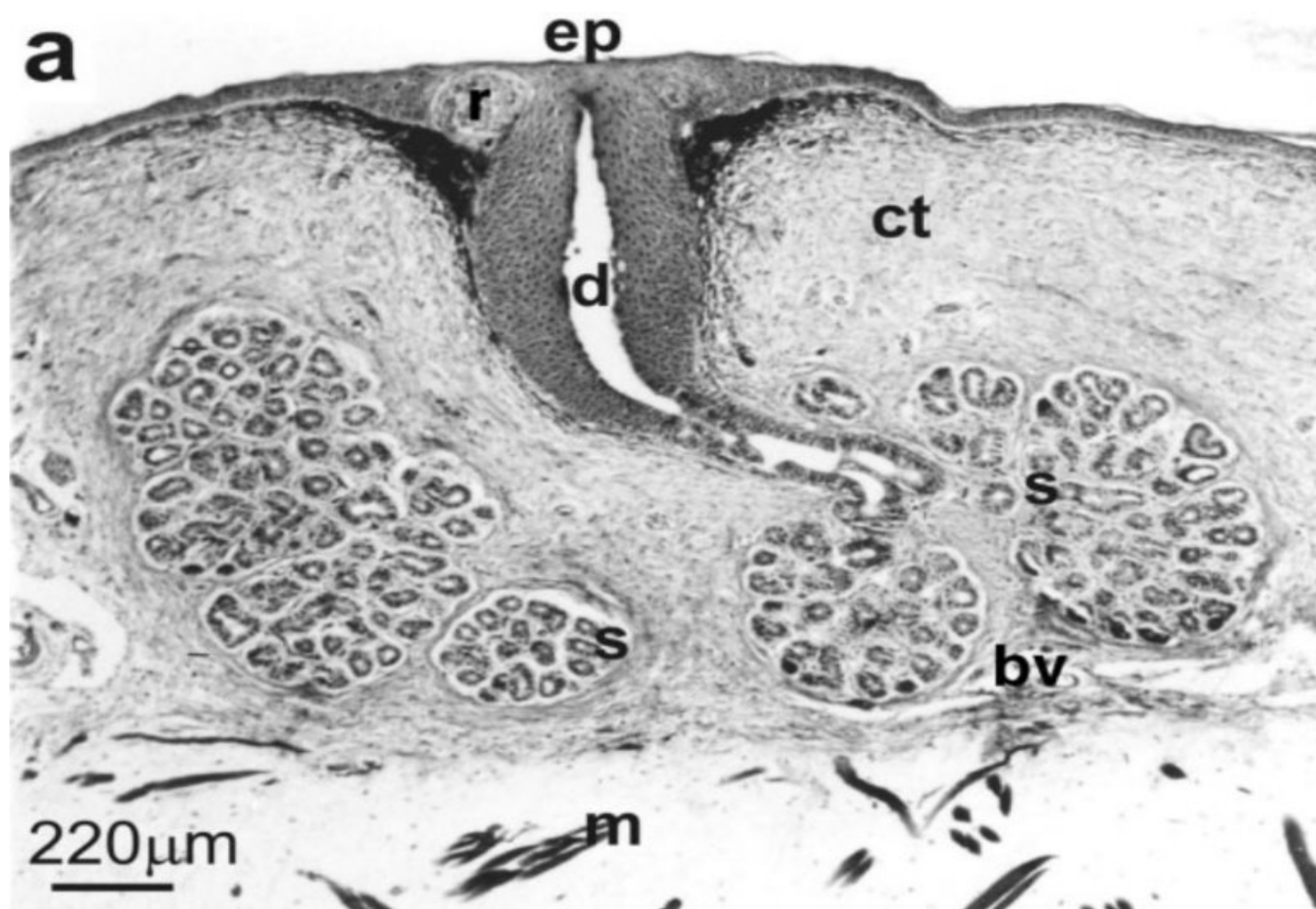
Morphological Variation of the Lingual Glands in Wild American Alligator Populations



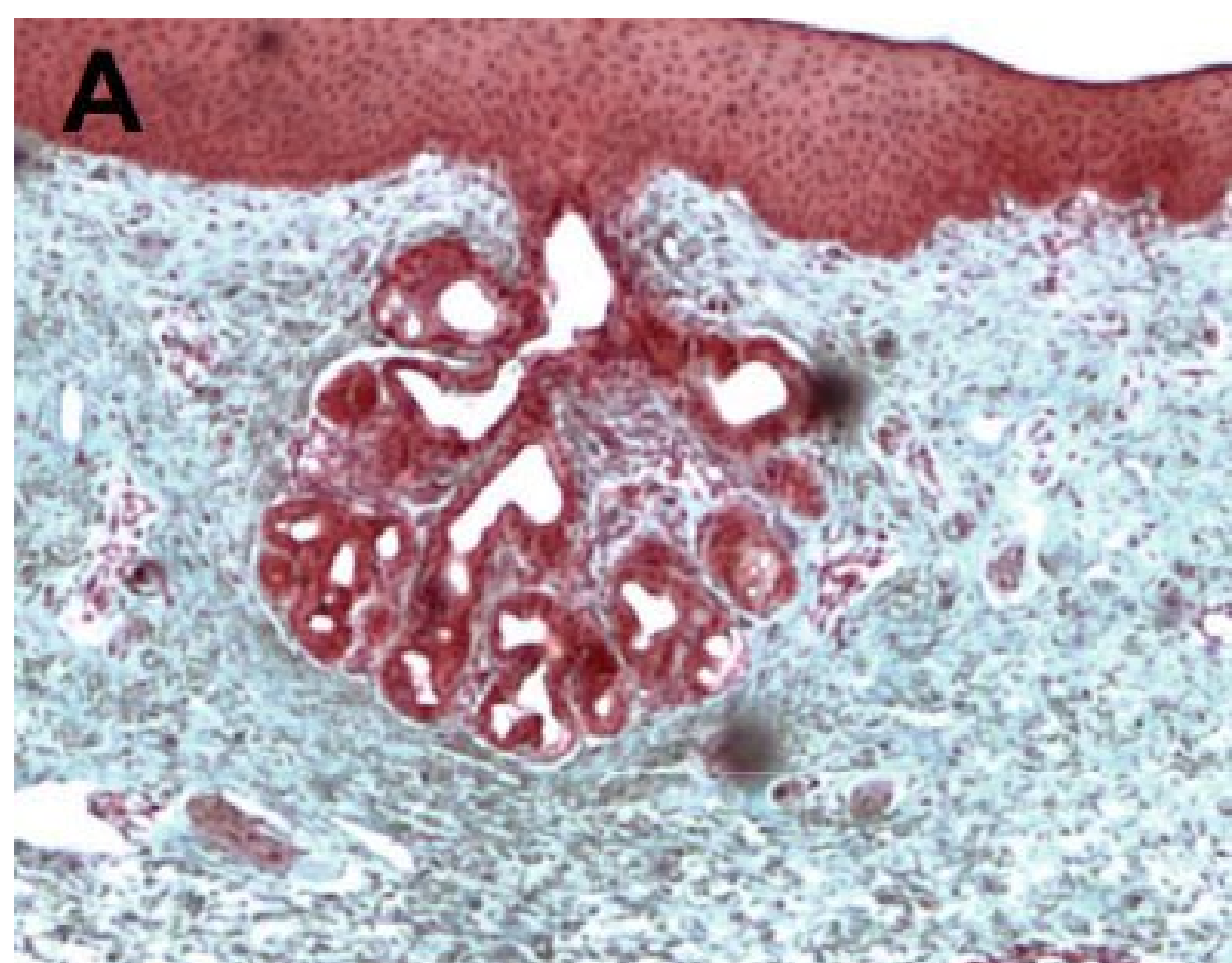
Benjamin Angalet, Chase Cheeks, Chelsea Holmes, Kamryn Moss, Chloe Segars, and Nicholas S. Green
Department of Ecology, Evolution, and Organismal Biology, Kennesaw State University

Background

- Past research suggests American alligator have limited osmoregulatory capacity.
- In contrast, crocodiles possess specialized lingual glands that actively secrete salt, enabling marine tolerance.
- The morphology and function of alligator lingual glands remain poorly characterized.
- Coastal populations experience routine exposure to brackish and saltwater environments.
- Inland populations are restricted to freshwater systems.
- **Question: Does lingual gland morphology differ between coastal and inland alligator populations?**

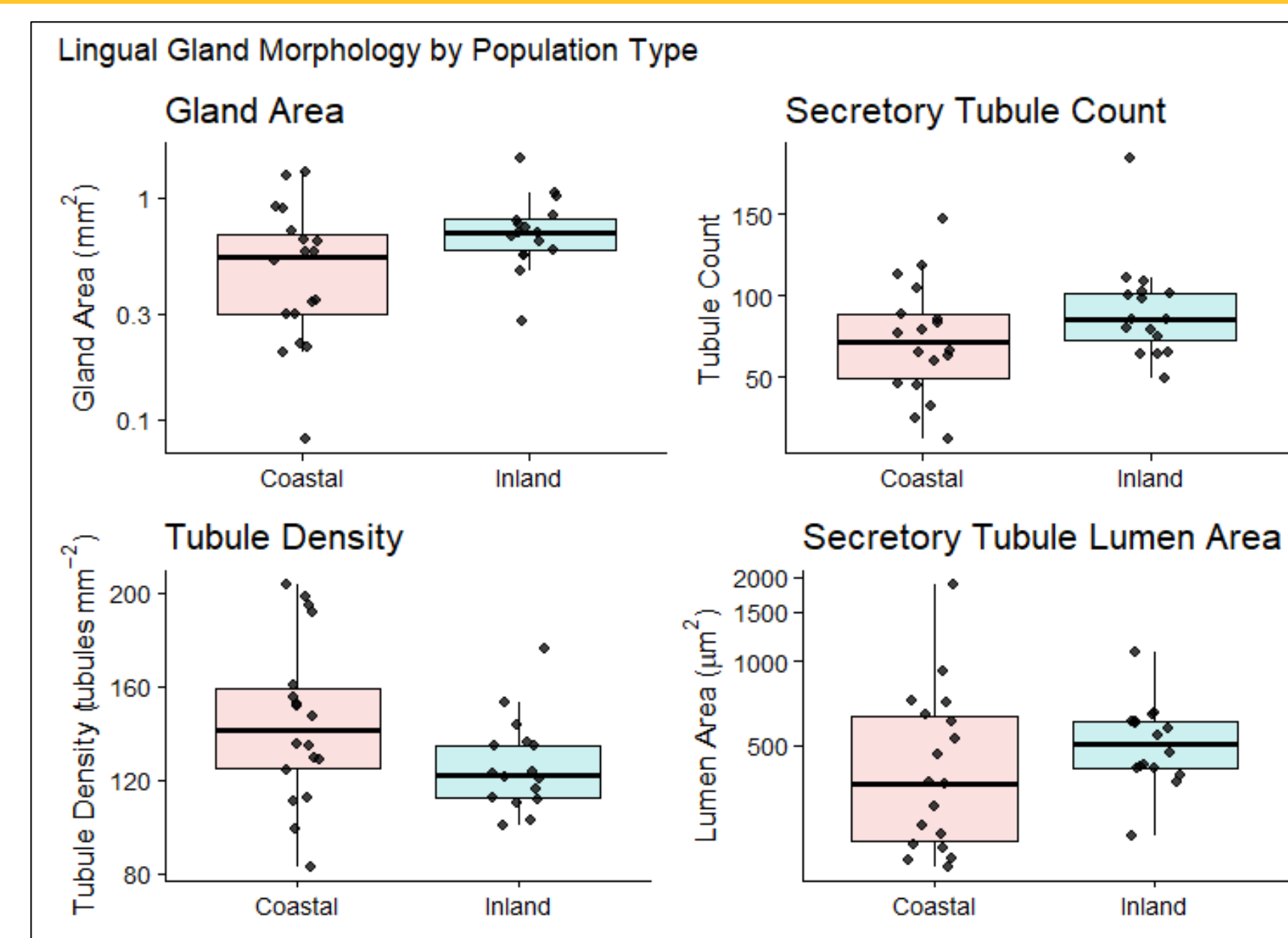


Crocodile lingual gland: Large, lobular, tightly packed secretory tubules.

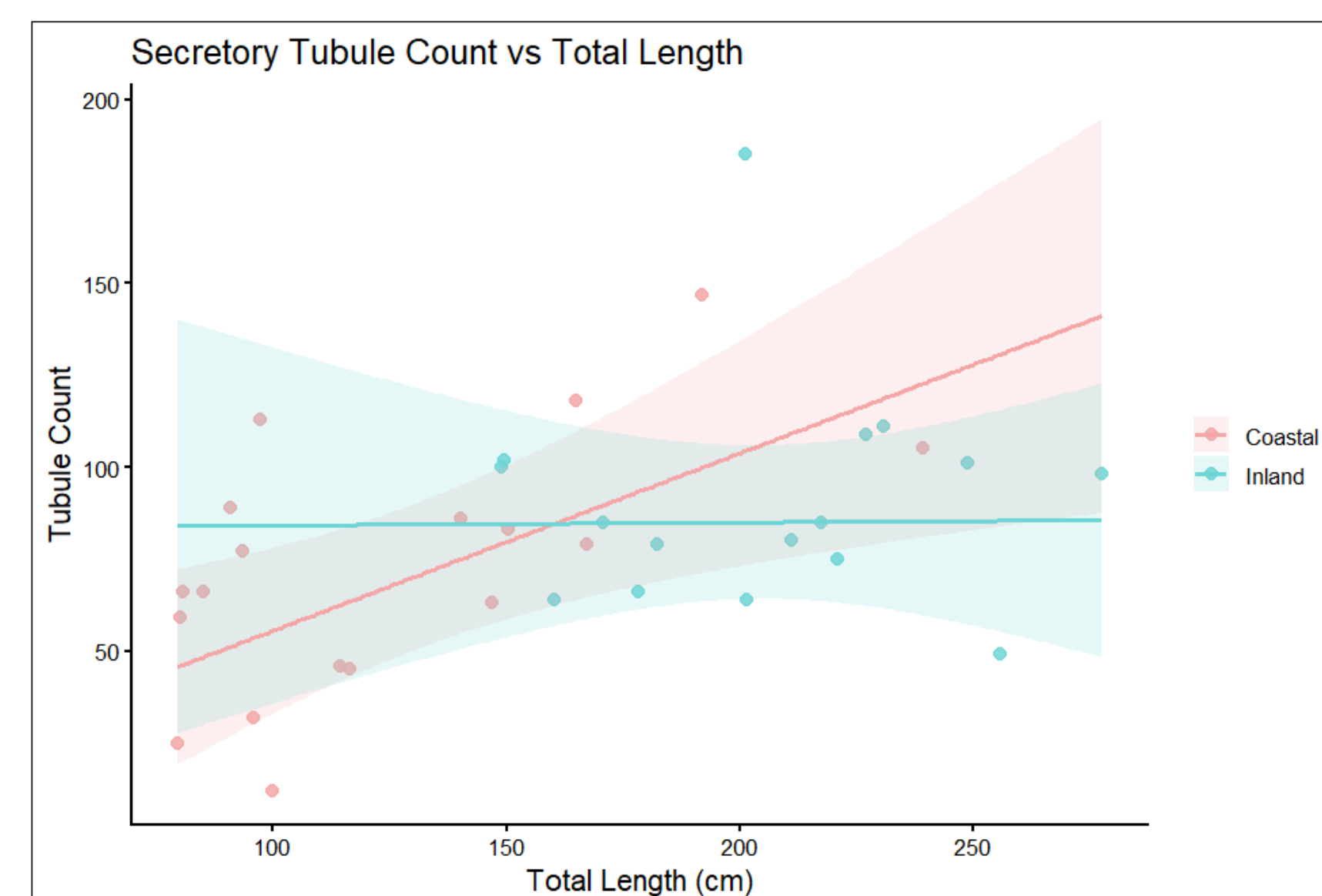


Alligator lingual gland: small, non-lobular, loosely aggregated secretory tubules.

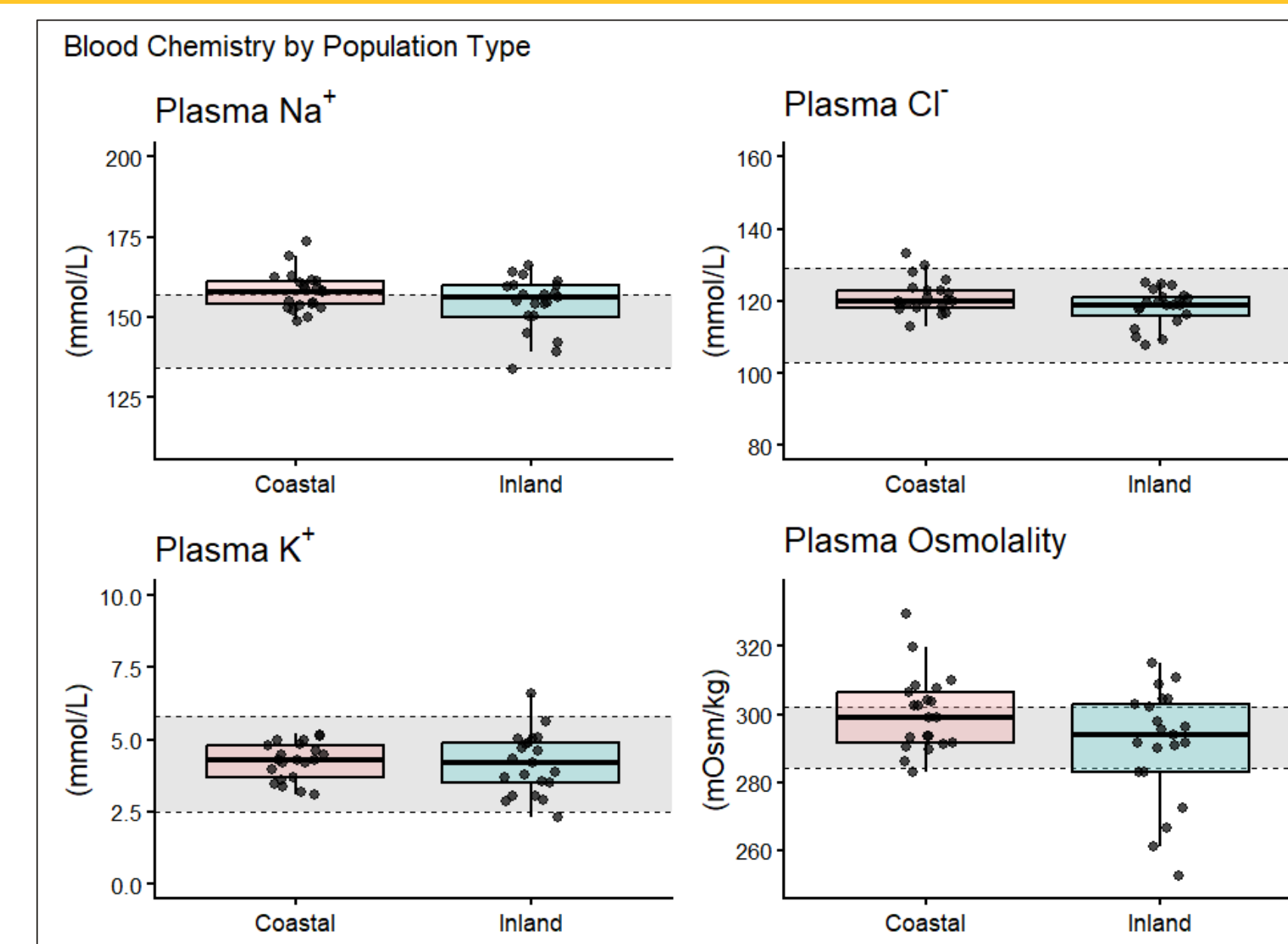
Results



No significant difference in lingual gland morphology.



The relationship between secretory tubule count and total length differed significantly between population types ($p = 0.037$).

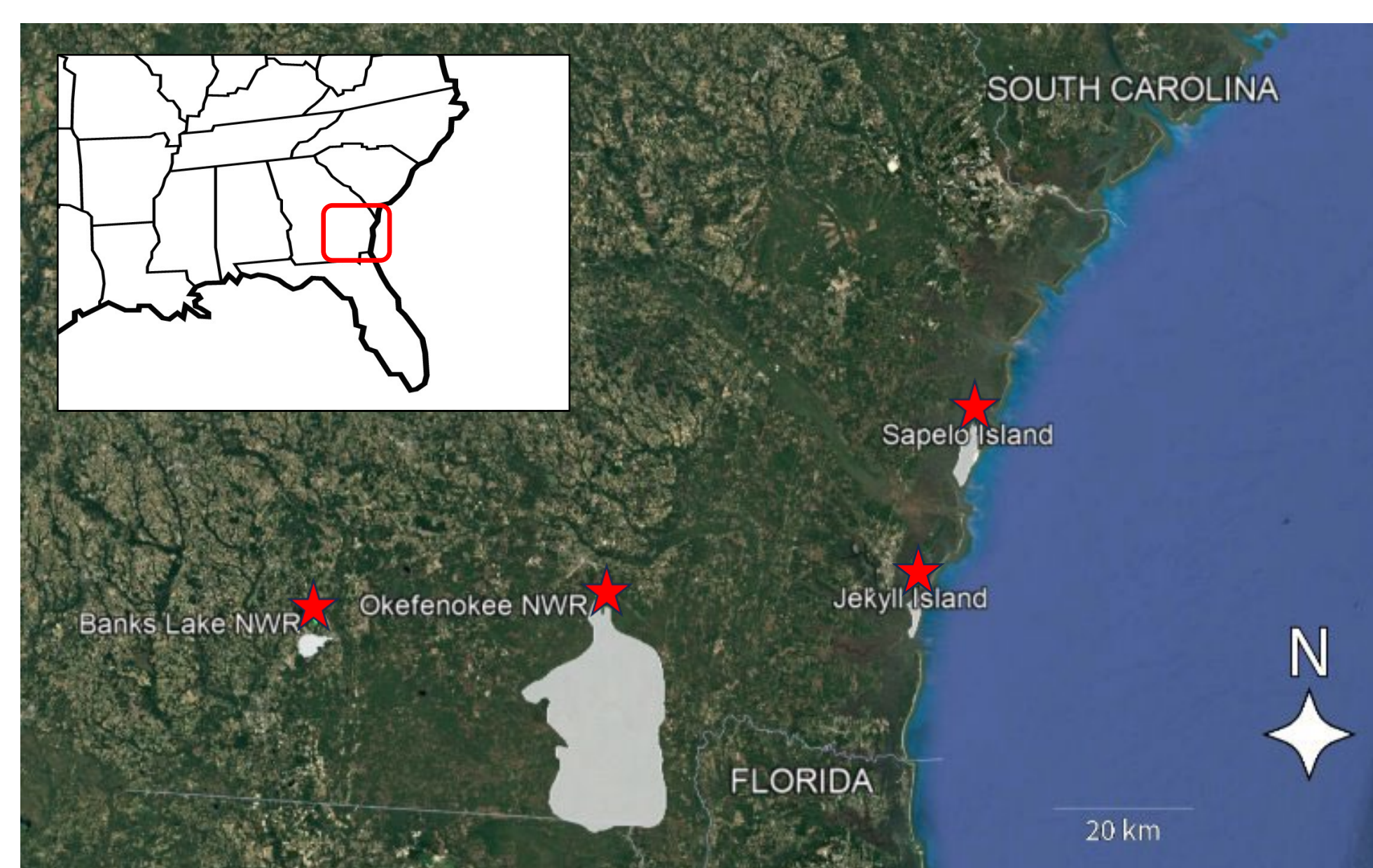


No significant difference in blood chemistry.



Alligator lingual gland composed of lobes (Lo) of secretory tubules (T); lymphatic tissue (Ly) surrounds the central duct (CD).

Methods



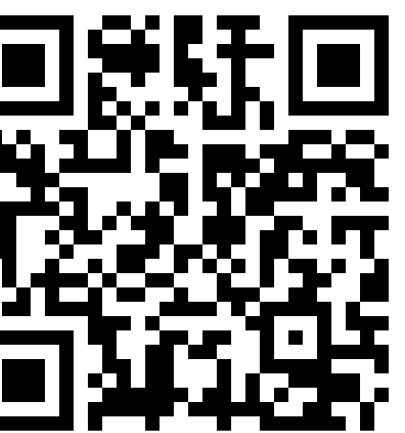
A map of the four sampling locations in South Georgia (2 coastal populations, 2 inland populations).

- 2 coastal sites (21 specimens), 2 inland sites (21 specimens)
- Capture, restraint, morphometric data capture
- Jaw prop, lingual gland biopsy

1. Paraffin histology
2. Hematoxylin & eosin staining
3. Sectioning & light microscopy
4. Morphology data capture via ImageJ
5. Data analysis
 - a. Negative binomials, ANCOVAs, interaction models
 - b. Measured gland area, secretory tubule density, count, and lumen area

Contact:

bangalet@kennesaw.edu
ngreen62@kennesaw.edu



Conclusions

- No significant differences in morphology between coastal and inland populations.
- Significant difference in secretory tubule scaling with total length between populations.
- Described previously unknown features of alligator lingual glands (multi-lobular, larger size, more secretory tubules).
- First study to describe wild and adult alligator lingual glands.
- Blood chemistry reflected no detectable osmotic stress from either population type.



Jaw prop deployed on an American Alligator to allow safe and easy access to the oral cavity.

Implications

- Understanding the osmoregulatory capabilities of wild alligator populations is important as their freshwater habitats begin to experience salt intrusion due to human-caused climate change.
 - Sea level rise, excessive groundwater pumping, mining, dredging, etc.
- An inability to tolerate saline waters could see range expansions, potentially altering conservation strategies.