



Analyzing stress-related hormones in Hudson Bay beluga whale blubber during good and poor feeding seasons.



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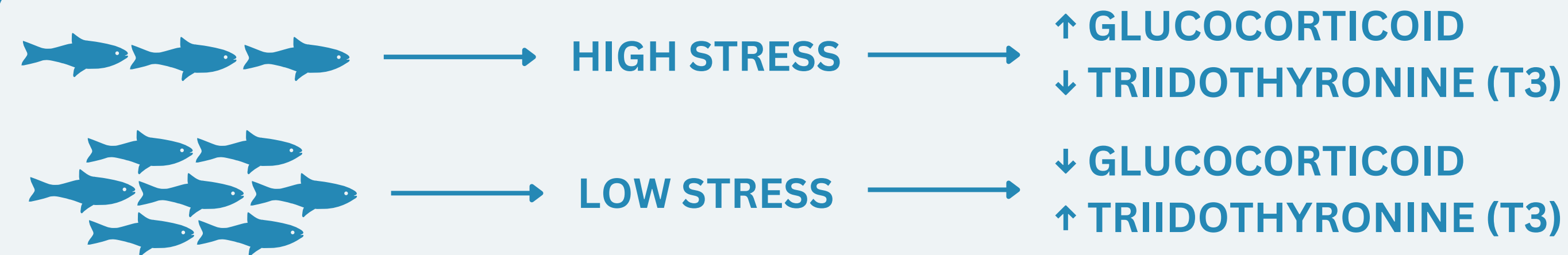
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BACKGROUND

- Hudson Bay belugas whales (*Delphinapterus leucas*) are an important Arctic sentinel species that provides economic, nutritional, and cultural value for Inuit communities
- a study looking at beluga whale fat accumulation found **seasonal and annual variation in blubber adipocyte size**
- the variation suggests there are **good and poor feeding years**
- this study uses blubber tissue to **measure nutritional and physiological stress** in the same beluga whale samples
- analyzing beluga whale diet and stress fluctuations based on glucocorticoid and thyroid hormone concentration

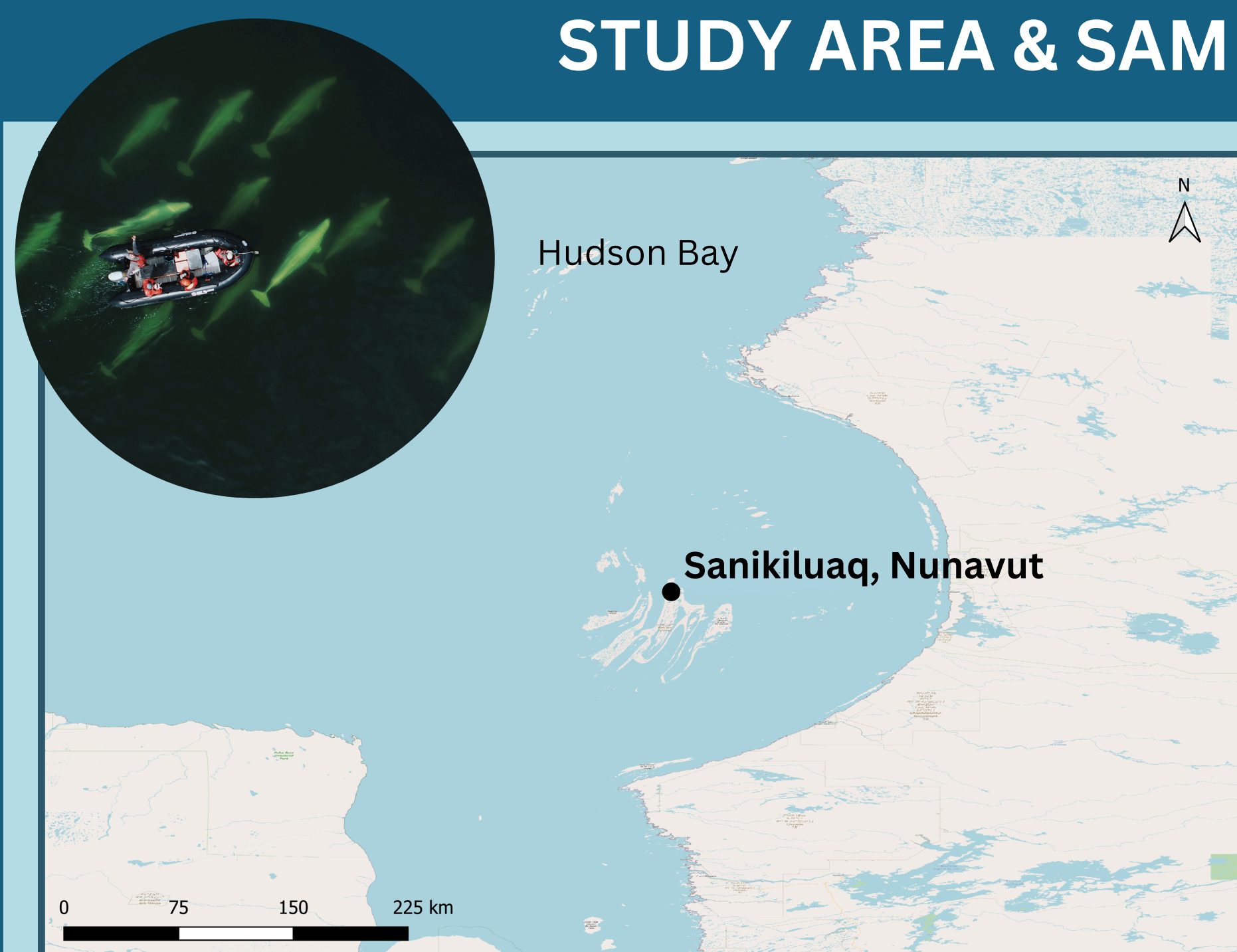
WHY? To understand Hudson Bay beluga whales and contribute valuable **baseline data** for sustainable management, abundance estimation, and conservation status.

HYPOTHESIS & OBJECTIVES:



1. To determine the dominant stress hormone (corticosterone or cortisol) in beluga whale blubber samples
2. To assess seasonal stress and thyroid hormone concentrations using extracted glucocorticoid and T3
3. To assess differences in stress hormone and T3 concentrations during good and poor feeding seasons

STUDY AREA & SAMPLES

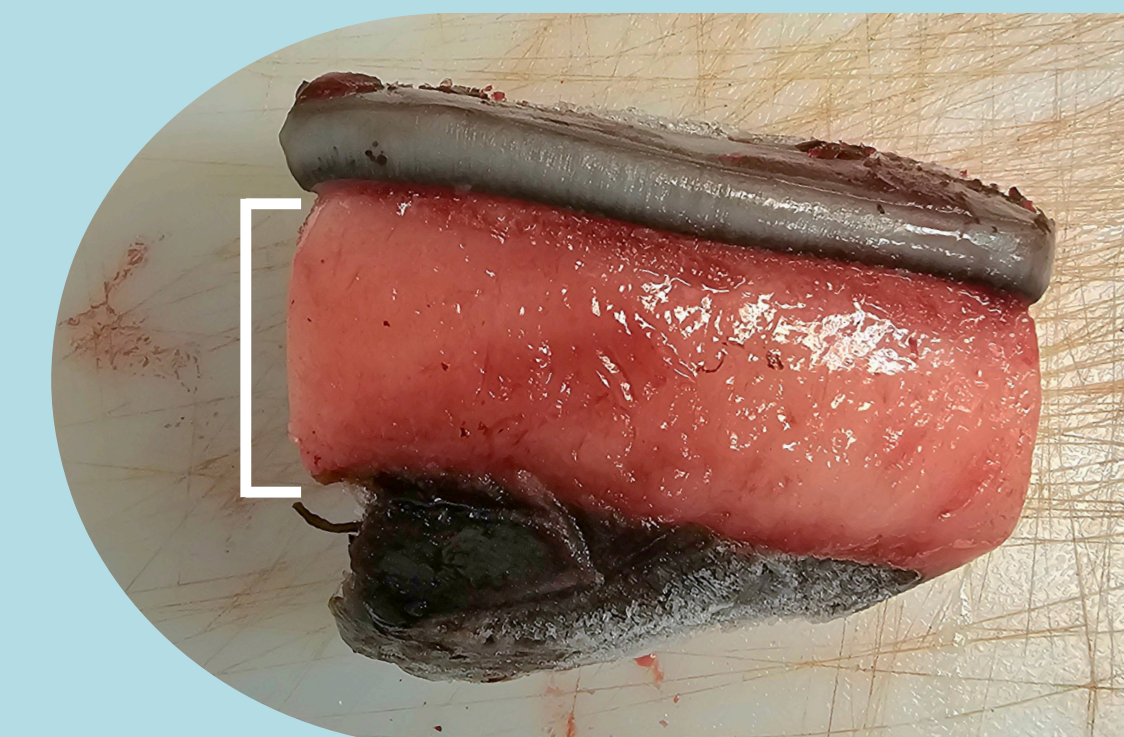


56 beluga whale blubber samples were collected from Indigenous subsistence harvests in Sanikiluaq, Nunavut. The samples were collected in the spring and fall between 2015-2021.

METHODS

1 Subsampling blubber

- cut frozen blubber samples
- collecting from tissue column
- record weight (0.2990-0.3010g)



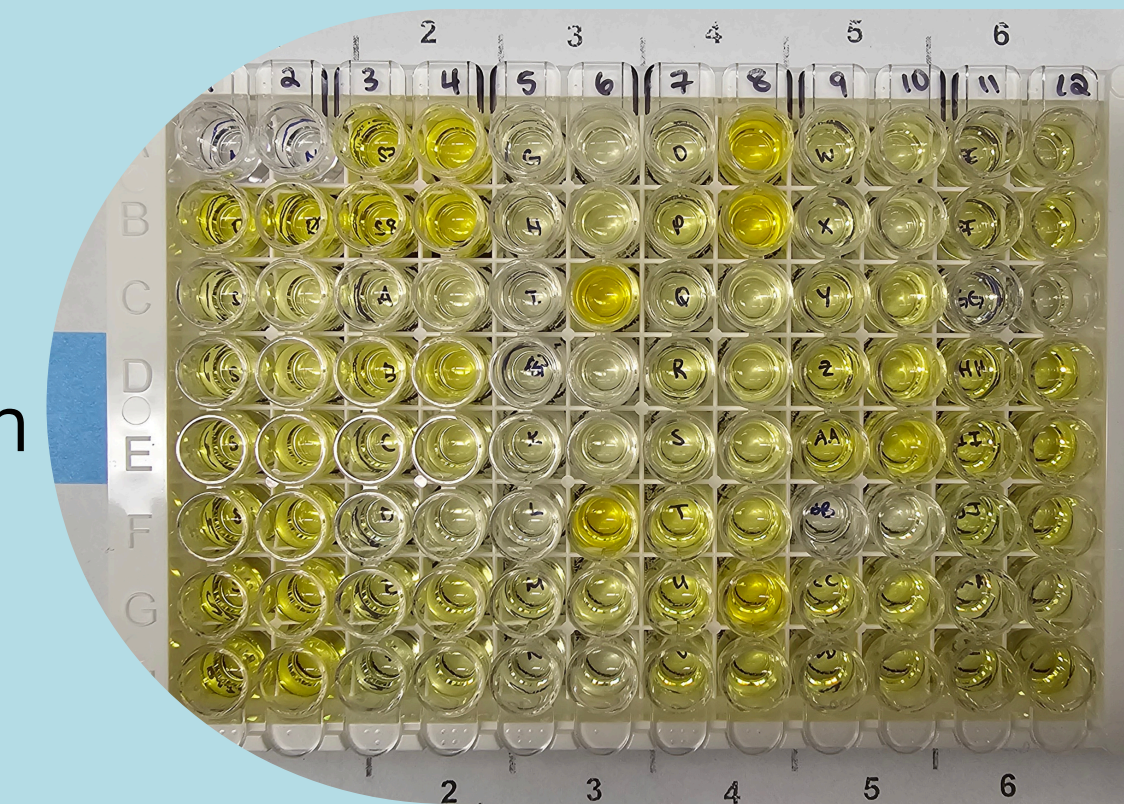
2 Hormone extraction

- homogenize samples in bead vials with high-speed shaking
- extracted samples using ethanol
- separate lipid and hormone layers



3 Enzyme immunoassay (EIA)

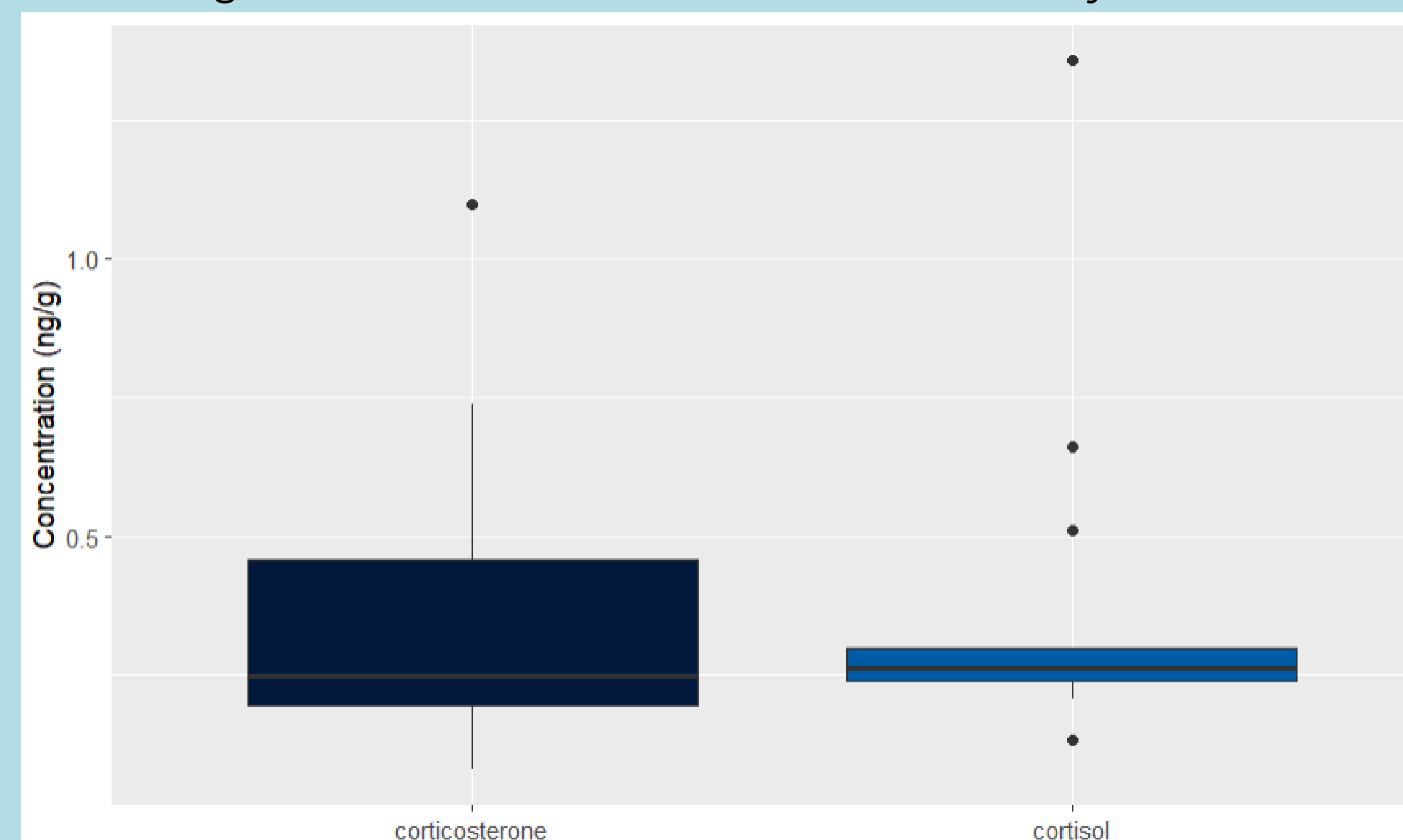
- Arbor Assay (#K003, #K014, #K056)
- serial dilution and colorimetric reaction
- measure light absorbance
- calculate hormone concentration



PRELIMINARY RESULTS

1. Mini study (corticosterone vs cortisol):

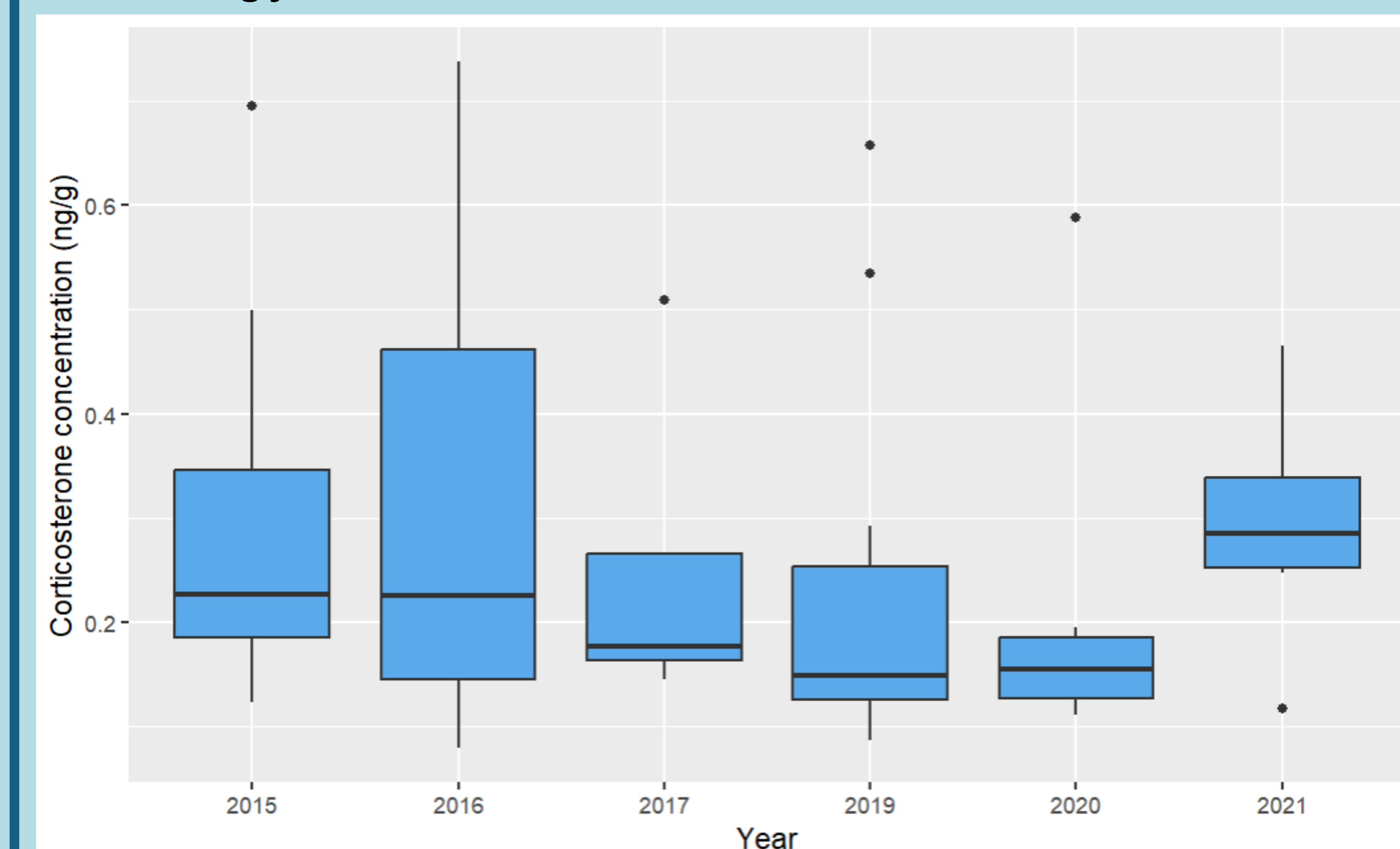
- corticosterone is the dominant glucocorticoid
- using this stress hormone for the rest of the study



PRELIMINARY RESULTS

2. Corticosterone findings

- variation in corticosterone concentrations present no significant difference between feeding years (p-value = 0.404)
- results do not align with the small adipocyte size found in suggested poor feeding years (2017 and 2019) from past study
- we reject the hypothesis and conclude that there is no statistically significant difference in corticosterone concentrations between feeding years



	Degrees of Freedom	Sum of Squares	Mean Square	F Value	p-value
year	1	0.021	0.02096	0.707	0.404
Residuals	54	1.601	0.02965		

Challenges:

- T3 concentrations presented low concentrations

NEXT STEPS

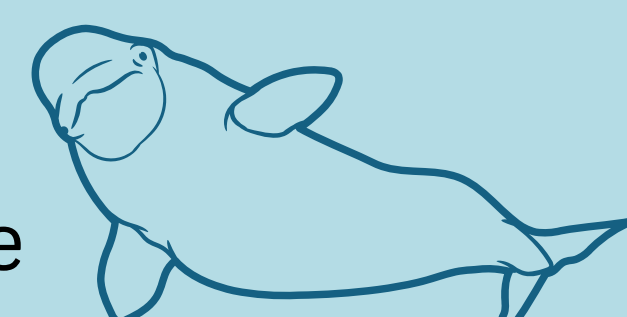
Lab work & analysis:

- re-extract blubber samples and re-run assays
- analyze T3 concentrations across feeding years
- compare corticosterone and T3

Results of this study aim to provide health data using stress hormone concentrations of Hudson Bay beluga whales to contribute to conservation physiology baseline data.

Contact Information

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Thank you to the Sanikiluaq Hunters and Trappers Organization and the hunters from Sanikiluaq for providing the blubber samples!

Reference

Belanger, A. M. (2024). Seasonal and annual variation in fat content indicate no consistent primary feeding season in Hudson Bay beluga whales. Seasonal estuary use of beluga whales. University of Manitoba, MSPACE. (pp.38-68.).

