

Presenting Author Name

Nicolas Leclerc

Presenting Author Category

Masters Student

Research Category

Basic Science

Abstract Title

OneHealth Approach to Studying and Conserving Arctic Marine Animals

Background

Polar bears (PB) are particularly susceptible to the effects of climate change and environmental pollution in their rapidly warming sea ice habitats, with estimates of populations to decline by up to 50% in the next two decades. Furthermore, PBs are known for their high intelligence and large brain-to-body ratios, representing a captivating subject in evolutionary biology research.

Objective

This research project aims to generate cell cultures to bridge the understanding of neural development in PBs to the broader effects of environmental toxins on these processes.

Methods

We will be applying toxicological methods shown to be successful in human cells to our cultures by exposing them to different environmental toxins representing real threats in their environments in a controlled setting. We will measure the cellular and molecular changes, enabling us to identify their influence on developmental processes.

Results

Firstly, we have generated primary fibroblast cell cultures from over 70 individual PBs. We have confirmed their genetic and structural integrity via DNA barcoding and karyotypic analysis, and they have been sub-cultured for over 20 passages.

Secondly, we have developed a novel PB-specific induced pluripotent stem cell (iPSC) model. These cells will have the potential to differentiate into all three germ layers, allowing for the recapitulation of critical developmental steps and the replication of organ development.

All of these cells represent a unique archive of cellular and genetic material, providing an invaluable resource for in vitro experimentation and for the conservation of genetic diversity.

Conclusion

By pursuing a One Health approach, we aim to foster collaboration across disciplines to identify, prevent, and manage health risks through the perspective of humans, animals, and their environments. This project could potentially lead to a paradigm shift in evolutionary biology and how we study and preserve endangered and threatened species by utilizing cell culture to answer important biological questions.

Authors

Name	Role	Profession
Nicolas Leclerc	Presenting Author	Graduate
Evan Richardson	Co Author	Research Scientist
Mohammed Mostajo-Radji	Co Author	Assistant Professor
Colin Garroway	Co Author	Associate Professor
David Yurkowski	Co Author	Fisheries and Oceans Canada
Stephen Petersen	Co Author	Director Assiniboine Park
Meaghan Jones	Co Author	Assistant Professor
Sabine Mai	Co Author	Assistant Professor
Yale Michaels	Co Author	Assistant Professor
Lei Xing	Co Author	Assistant Professor
Robert Beattie	Co Author	Assistant Professor