

## **FUNCTIONAL GENOMICS OF THE NORTH ATLANTIC RIGHT WHALE: THE SKIN TRANSCRIPTOME AND ITS POTENTIAL USE IN THE STUDY OF HEALTH AND DISEASE.**

Jessalyn L. Ierardi<sup>1</sup>, Annalaura Mancina<sup>2,3</sup>, JoEllyn M. McMillan<sup>3</sup>, Mats L. Lundqvist<sup>3</sup>, Tracy A. Romano<sup>4</sup>, Gregory W. Warr<sup>2,3</sup>

(1) Graduate Program of Marine Biology, College of Charleston, 205 Fort Johnson Rd, Charleston, SC 29412, USA.

(2) Department of Biochemistry and Molecular Biology, Medical University of South Carolina, 171 Ashley Ave, Charleston, SC 29425, USA.

(3) Marine Biomedicine and Environmental Studies, Medical University of South Carolina, 331 Fort Johnson Rd, Charleston, SC 29412, USA.

(4) Mystic Aquarium Institute for Exploration, 55 Coogan Blvd., Mystic, CT 06355, USA.

jlierard@edisto.cofc.edu

The North Atlantic right whale (*Eubalaena glacialis*) is a highly endangered marine mammal whose populations have failed to recover despite 70 years of protection from whaling. The inability of the species to rebound may be due to a combination of several factors including environmental changes, increased interaction with humans, and compromised health. Efforts have been initiated to develop the functional genomic tools needed to study right whale health at the molecular physiological level. An expressed sequence tag (EST) cDNA library has been constructed from a skin biopsy, and 2496 randomly selected clones have been sequenced. In addition, 96 genes identified as potentially responsive to stress and immune challenge have been cloned by targeted RT-PCR from skin cDNA. The analysis of the EST collection (archived at [www.marinegenomics.org](http://www.marinegenomics.org) and GenBank) showed that the library was 31.85% redundant, yielding 1511 unigenes. A Gene Ontology analysis of the unigene collection indicated that the skin is a rich source of expressed genes with diverse function, suggesting an important role in diverse physiological processes including the inflammatory response. The unigenes derived from the analysis of the EST collection have been combined with the PCR-cloned sequences to design an oligonucleotide-based microarray for investigations of changes in the expression of genes that should be indicators of immunological health of *E. glacialis*. The role of the skin as an immune organ in marine mammals is not well understood, but knowledge derived from the skin transcriptome and its application in a microarray should lead to advances in this area.

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