

FUNCTIONAL CHARACTERIZATION OF DOLPHIN (*Tursiops truncatus*) SURFACTANT PROTEIN B.

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Lung surfactant is a complex mixture of lipids and proteins that is essential for maintaining a large surface area for efficient oxygen/carbon dioxide exchange in the respiratory system of all mammals. The proteins in lung surfactant that function to reduce surface tension are surfactant protein B (SP-B) and surfactant protein C (SP-C). SP-B is our major focus due to its cardinal role in adjusting alveolar surface tension and preventing lung collapse. Our lab has previously found that the primary sequence of dolphin SP-B exhibits significant differences, including changes in charge, substitution and even added or deleted sequences. Because of dolphin's ability to survive lung collapse and extreme pressures encountered during deep dives, the dolphin respiratory system could be an important model for human lung therapy research. Understanding the structure and function of dolphin SP-B can lead to important advancements in treatment for lung collapse and respiratory distress syndrome.

The long term goal of the project is that the variation observed between dolphin and land mammals in SP- B primary sequence produces an altered secondary structure and/or function. The hypothesis to be tested is that unique and enhanced surface-active properties of dolphin SP-B, relative to human SP-B, can be examined designing vectors for and production of recombinant dolphin SP-B mutants. This will be accomplished by generating constructs with wild type and mutant forms of dolphins SP-B constructs in bacteria, with mutations focusing on the amino acid residues of the dolphin N-terminus that differs significantly from land mammalian SP-B.

This work is supported by the Marine Biomedicine Center/MUSC Summer Undergraduate Research Program, NOAA Ocean and Human Health Initiative, grants from the National Institutes of Standards and Technology and the National Institutes of Health. This study was performed under permit 932-1489-10 from the National Marine Fisheries Service (NMFS).