WOODS HOLE OCEANOGRAPHIC INSTITUTION

21 November 2011

Dr. Chris Reddy, Director
Ms. Bebe McCall, Administrator
Coastal Ocean Institute
WHOI

Dear Dr. Reddy:

It has been a year since I received funding from the Coastal Ocean Institute for my project titled "A biochemical perspective on baleen whale sound reception". As the funding cycle ends, I would like to take this opportunity to provide you with a summary of my activities for the past year. With the COI funding, I was able to visit Dr. Heather Koopman's laboratory at the University of North Carolina, Wilmington and finish gathering data for one chapter of my thesis. Dr. Koopman, a former WHOI postdoctoral fellow, is a recognized expert in the "acoustic" fats of toothed whales. Hearing in toothed whales is relatively well-understood, and toothed whales receive sound through biochemically unique fat bodies which are located along the jaws, leading up to the ears. In contrast, little is known about hearing in baleen whales and sound reception pathways are still unknown.

As a Minority Fellow, Summer Student Fellow, and graduate student at WHOI, I started studying the auditory anatomy of the minke whale (*Balaenoptera acutorostrata*), one of the smallest and most abundant baleen whale species. I found a large body of fat located at the posterior end of the mandible, adjacent to the ears and contacting the ossicles. This fat body could provide a direct pathway for sound to travel from the aquatic environment to the ears of the minke whale. In Dr. Koopman's laboratory, I analyzed the biochemical composition of this fat body and compared it to the acoustic fats of toothed whales. We found that although the minke whale fats do not have the same composition as the acoustic fats of toothed whales, they have a very different lipid signature compared to other adipose deposits such as blubber. The lipids in the fats associated with the minke whale may be better suited for hearing low-frequency sounds, compared to the lipids involved in high-frequency hearing in the echolocating toothed whales.

I presented preliminary findings at a conference in San Diego, CA this summer and received widespread interest from researchers in my field. I am currently working on writing a paper based on our results and plan on presenting this work at a Biology Departmental Seminar early next year. The research made possible by the Coastal Ocean Institute has greatly enriched my thesis while allowing me to develop a whole new skillset in lipid extraction and analyses, which will be valuable as I launch my academic career. Thank you for your support and I look forward to sharing the resulting paper and thesis with you.

Sincerely,

Maya Yamato
MIT-WHOI Joint Program in Biological Oceanography