Vanderbilt Otolaryngology–Head & Neck Surgery
Bill Wilkerson Center

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It is a pleasure for me to write this letter in celebration of the 15th year anniversary of Dr. Yasuaki Harabuchi's tenure as Professor and Chairman of the Department of Otolaryngology at Asahikawa Medical University. In 2003 Dr. Harabuchi became interested in the research going on in my laboratory and inquired about the possibility of one of his young faculty, Dr. Akihiro Katada, joining my team as a postdoctoral fellow. After learning of Dr. Katada's excellent credentials I agreed. This was the beginning of an extremely fruitful collaboration between Vanderbilt and Asahikawa University.

Dr. Katada worked primarily on 2 projects. The first was concerned with development of a new treatment for bilateral laryngeal paralysis termed "laryngeal pacing". The goal is to restore the opening function of the vocal folds through electrical stimulation of the abductor (posterior cricoarytenoid) muscle. The approach is more physiologic and does not damage the vocal folds or destroy the voice, as occurs with conventional techniques to surgically enlarge the glottis (egs. cordotomy, arytenoidectomy). In a series of acute canine studies, Dr. Katada evaluated the stimulus-response characteristics of an implantable system that could be used for laryngeal pacing. It included a deep brain stimulation electrode and implantable pulse generator manufactured by St Jude Medical, Inc. Dr. Katada published a landmark paper on this topic. The second project was concerned with determining the effects of stimulation of a denervated laryngeal muscle on its subsequent reinnervation by native versus foreign motoneurons. It is well know that reinnervation of laryngeal and facial muscles following nerve injury randomly reinnervate denervated muscles resulting in nonfunctional contraction or synkinesis. Previous studies in our laboratory have shown that patterned electrical stimulation during the regeneration period can control muscle chemistry to make the muscle more receptive to reconnection by the original native motoneurons. Dr. Katada worked on a sequential double labeling technique for studying changes in motoneuronal projections to muscle following nerve injury and reinnervation in rat hind limb. He was first author on another landmark paper describing this technique, which is useful in studying the nature of selective reinnervation of muscle.

After such a productive research experience with Dr. Katada, I encouraged Dr. Harabuchi to send me another of his faculty to continue the research collaboration. Isamu Kunibe joined my team in 2006. Dr. Kunibe focused on translating the double labeling technique from the rat hind limb to the canine larynx. This technique is extremely important to our study of electrical induction of selective reinnervation

in canine laryngeal muscles. Dr. Kunibe also led the first successful chronic implant of the St Jude laryngeal pacing device in the canine. This study has now been completed and he has coauthored 2 land mark papers on this research project. He has also coauthored a paper recently submitted on selective reinnervation of the canine larynx.

Dr. Kunibe spent an extremely constructive 2.5 years as leader of our research team. Before his departure, I began putting pressure on Dr. Harabuchi to choose another post doctoral fellow for me from his incredibly talented group of faculty. He chose Dr. Kenichiro Nomura, who joined us in 2008. Dr. Nomura took the reigns of the canine laryngeal pacing project started by Dr. Kunibe and saw the project through to completion 2 years later. The results were simply amazing. Animals were implanted with the pacing device and electrode leads placed underneath each PCA muscle. Following nerve section, sykinetic reinnervation ensued. With the device off, paradoxical closure of the vocal folds occurred during inspiration. The animals were dyspneic with poor treadmill performance. When the device was switched on, bilateral stimulated glottal opening restored ventilation and treadmill performance to normal (ie. 8 mph for 12 minutes). Dr. Nomura is first author on yet another landmark paper describing these results. He has coauthored a second paper on this study and also the submitted paper on selective reinnervation of the canine larynx.

I feel so fortunate to have met Yasuaki Harabuchi . I will always be indebted to him for providing me the opportunity to work with such talented young physician scientists over the last decade. I have become very close to Akihiro, Isamu, and Kenichiro and view them as my sons. I have had many postdocs in my laboratory over the years, but these three are the most outstanding. Together, they represent a reflection of the great clinical and academic program that Professor Harabuchi has built over the last 15 years. In my opinion his department stands out as one of the best in the world. I look forward in the future to further collaboration with members of his department.

Best Regards,

David L. Zealear, PhD
Professor