AAO Foundation Award Final Report

Principal Investigator	Chin-Yu Lin, DDS, MS, MSD, PhD
Co-Investigator	
Secondary Investigators	
Award Type	Orthodontic Faculty Development Fellowship
Project Title	Anthony A. Gianelly Teaching Fellowship Award
Project Year	2004
Institution	Harvard School of Dental Medicine
Summary/Abstract	In the 2004 funding year, I moved from Saint Louis University to Harvard School of Dental Medicine (HSDM). As a full-time faculty member at HSDM, I spent four days a week in research, one day a week in teaching, and one day a week in clinical practice. Under the supervision of Dr. Bjorn Olsen, the Chair of Department of Oral and Developmental Biology at HSDM, my research focused on bone remodeling with specific emphasis on the molecular mechanism of cherubism. Cherubism is an autosomal dominant inherited syndrome characterized by excessive bone degradation of the upper and lower jaws followed by development of fibrous tissue masses which causes a characteristic facial swelling. It is caused by mutations in SH3BP2 protein. The pathological findings in human show that the lesions of cherubism often begin around three years of age and lead to multiple symmetrical cysts in the mandible and maxilla, which regress after puberty. The onset and organ-restricted characteristics of cherubism indicate the involvement of dental developmental processes in the pathogenesis of the lesions. Therefore, my work was to examine the progression of the lesions in craniofacial complexes of mutant mice with the same SH3BP2 mutation as seen in human and to investigate the possible roles of dental follicles contributing to the abnormal bone remodeling in cherubism. Histological examinations of the lesions in craniofacial complexes revealed the abnormal bone resorption with increased numbers of osteoclasts in mutant mice. When co-cultured with bone marrow cells in the assay of osteoclasts formation, dental follicles isolated from the mutant & wild-type mice, surprisingly, inhibited the osteoclastogenesis. ELISA results showed high concentrations of OPG in cell culture media with no difference between those of wild-type & mutant mice. Further research will be performed to elucidate the relationship of dental follicles & OPG in the process of dental

	eruption. In teaching, I participated in the pre-doctoral instructional block, “Treatment of the Child and Adolescent”, as the pre-doctoral director of orthodontics. In addition to the traditional teaching in lectures & laboratory works, I also led students in the studies of pedodontic and orthodontic cases with the format of problem-based learning. In the student clinic, pre-doctoral students diagnosed & treated orthodontic patients under my supervision. The students also participated in the treatment of orthodontic patients by being as dental assistants in my faculty practice. Because of the demands of my research and teaching responsibilities, I practiced orthodontics one day per week. In the practice, I treated orthodontic patients by a patient-centered protocol. My treatment goals focused on the chief complaints of orthodontic patients and the improvements of patients’ facial profiles.