

Orthodontic Faculty Development Fellowship Award

Dr. Siddharth Vora, *University of British Columbia*

Siddharth R Vora BDS, MSD, PhD, FRCD(C)

Biography

I received my BDS at Nair Hospital Dental College in Mumbai, India, in 2002; a PhD in Oral Biology at Boston University in 2009 and an MSc in Orthodontic at the University of Washington in 2012. After completing a post-doc at the University of Washington and Seattle Children's Hospital, I moved to the University of British Columbia as an Assistant Professor in Orthodontics. My primary research interests lie in exploring the developmental processes that govern dental and craniofacial tissues, in particular the genetic and epigenetic influences at the molecular/cellular levels which integrate to produce the complex phenotypes we treat in our clinics.



Synopsis of Research Project

Tooth morphogenesis occurs via a complex cascade of gene expression events which regulate and direct highly differentiated cells to form specialized mineralized tissues. Colony stimulating factor 1 (CSF-1) controls the proliferation and differentiation of cells belonging to the mononuclear phagocyte lineage (macrophages, microglia, osteoclasts) by binding its high affinity tyrosine kinase receptor, CSF-1R. Mice deficient in CSF-1 ligand or receptor are osteopetrotic and *toothless*, i.e. teeth fail to erupt due to the lack of normal osteoclastic activity required for bone remodeling around the developing tooth crypts. However, cellular and structural defects have been observed in molars and incisors of teeth at early developmental stages in CSF-1 deficient mice, long before eruption is initiated. Interestingly, CSF-1 ligand and CSF-1R expression has been demonstrated in postnatal odontogenic cells, however its function in these cells has not been elucidated. Hence, it is likely that CSF-1 and CSF-1R have a more direct role during odontogenesis independent of macrophage/osteoclast functions, which will be assessed in this research proposal.

Importance of the Foundation

In a financially challenging research environment, support from the AAOF afforded me the ability to follow an organized and mentored period of research development in the past. Continued support from the AAOF is not only encouraging but, more importantly, enabling my perusal of an academic career. I thank the foundation and all of its champions for their efforts and am truly honored to be a recipient of this award.