

AAO Foundation Award Final Report

Principal Investigator	Igor G. Lavrin
Co-Investigator	Elizabeth Hay, Harvard Medical School Bjorn Olsen, Harvard Medical School/Harvard School of Dental Medicine
Secondary Investigators	
Award Type	Biomedical Research
Project Title	The Mechanism of Palatal Clefting in the <i>Coll1a1</i> Mutant Mouse
Project Year	1999
Institution	Harvard School of Dental Medicine, Department of Growth & Development, Division of Orthodontics
Summary/Abstract	<p>Knowledge of the genes involved and the mechanistic process of cleft palate formation will lead to better understanding and treatment of this craniofacial anomaly. Palatal adherence to form a midline seam that then undergoes epithelial-mesenchymal transformation (EMT) are normally the important steps leading to full palatal fusion. Studying the <i>Coll1a1</i> mutant mouse, which has a phenotype of chondrodysplasia, including cleft palate, we show that full palatal fusion using the EMT mechanism is possible when palatal shelves are grown <i>in vitro</i>. <i>In vivo</i>, it seems that the tongue causes a mechanical obstruction, preventing palatal fusion. We studied the window of opportunity for palatal shelves to retain the ability to form a midline seam with EMT potential and found that this potential is lost shortly before birth (between E17 and E19), a point of some relevance to timing of surgical intervention. In the case of the <i>Coll1a1</i> mutant mouse, what appears to happen is that fibrillar collagen defect occurs, cartilage is affected, including Meckel's cartilage, the mandible is small and the tongue is positioned high, preventing otherwise normal palatal shelves from adhering and undergoing EMT.</p>
Were the original, specific aims of the proposal realized?	Yes
Were the results published? If not, are there plans to publish? If not, why not?	<p>Yes</p> <p>The mechanism of palatal clefting in the <i>Coll1a1</i> mutant mouse. Igor O. Lavrin, William McLean, Robert E. Seegmiller, Bjorn R. Olsen and Elizabeth D. Hay. Archives of Oral Biology 46 (2001) 865-869.</p>

<p>Have the results of this proposal been presented? If so, when and where? If not, are there plans to do so? If not, why not?</p>	<p>Yes.</p> <ul style="list-style-type: none">• Lecturer at the Australian Society of Orthodontists including presentation of thesis results, Combined Victorian and South Australian Clinical Days, Dunkeld, Victoria, 2001• Oral presentation of thesis research at 101st Annual Session of the American Association of Orthodontists, Toronto 2001, as recipient of the Thomas M. Graber Award.• Oral abstract presentation of thesis research at 100th Annual Session of the American Association of Orthodontists, Chicago, 2000.• Poster presentation of thesis research at Department of Cell Biology Retreat, Harvard medical School, 2000.• Poster presentation of thesis research at Teratology Meeting, Palm Beach, 2000.• Oral presentation of thesis research at 3rd International Conference of Biological mechanisms of Tooth movement and Craniofacial Adaptation, Seoul, South Korea, 1999.•
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