



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Dmitry Kravchenko</b>	<b>Project Number</b> <b>S0517</b>
<b>Project Title</b> <b>Modification of Calcium-Phosphate Coatings on Titanium by Recombinant Amelogenin</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Investigate the effects of amelogenin on calcium phosphate crystal morphology to gain a better understanding of the mechanisms in enamel biomineralization, and to design a coating with improved osteo-integration properties.</p> <p><b>Methods/Materials</b> To simulate an environment similar to that in dental enamel, amelogenin was applied to a titanium surfaces submerged in SCS's, solutions that resemble physiologic fluid and allow for the formation of calcium phosphate crystals. The samples were then treated with various agents to improve surface reactivity.</p> <p><b>Results</b> At certain concentrations, amelogenin had a significant affect on the morphology of calcium phosphate crystals. It is not known which conditions are favorable, but the data goes to show that dose-depnent amelogenin has an effect on the topography of calcium phosphate crystals.</p> <p><b>Conclusions/Discussion</b> The spectacular effects of amelogenin on apatite crystals sustain the idea that amelogenin facilitates the formation of enamel crystals. Amelogenin was found to have a significant, elongationg effect on the morphology of Calcium-Phosphate crystals. Furthermore, the effects of amelogenin on the transformation of Calcium-Phosphate crystals is reliant on certain aspects, such as the concentration of amelogenin and the type of crystal.</p>	
<b>Summary Statement</b> Investigating mechanisms in dental enamel and potential development of a novel biomaterial.	
<b>Help Received</b> Used lab equipment at the Center for Craniofacial Molecular Biology at the University of Southern California under the supervision of Dr. Janet Oldak and Dr. Chang Du	