



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> Nathan G. Mermilliod	<b>Project Number</b> <b>J0515</b>
<b>Project Title</b> <b>Scar Solutions: The Effects of Enzymes in Collagen Breakdown and Scar Prevention</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment is to test whether enzymes can inhibit the binding of collagen during the formation of scar tissue thereby reducing the swelling and severity of a scar.</p> <p><b>Methods/Materials</b> The ability of collagen in gelatin to bind when exposed the papain enzyme in meat tenderizer was tested. Prepared, liquid gelatin was added to six cups containing a serial-diluted solution of the papain enzyme, which included a control sample, and allowed to set. Viscosity was observed, compared, and recorded.</p> <p><b>Results</b> Observable differences in viscosity among the samples showed a direct relationship with exposure to the papain enzyme. The cup with the most meat tenderizer kept the gelatin from solidifying the most, resulting in a liquid-like gelatin that poured easily. The control cup containing no meat tenderizer (papain enzyme), contained the thickest gelatin of all the sample cups.</p> <p><b>Conclusions/Discussion</b> The gelatin was unable to fully develop when exposed to the meat tenderizer, thus the papain enzyme inhibited the gelling process. As gelatin primarily contains collagen, the experiment showed that enzymes, specifically papain, can inhibit the binding of collagen, the main component of scar tissue, and therefore may be indicated in the reduction of scar formation and severity.</p>	
<b>Summary Statement</b> As measured by the viscosity of gelatin exposed to meat tenderizer, I showed that the papain enzyme inhibits the binding of collagen as an effective treatment in scar formation.	
<b>Help Received</b> I used online sources to identify collagen experiments and understand serial dilution techniques. My science teacher and peers reviewed my report and offered comments for revision, as did my mentor, Cynthia Dick, a graduate student at the University of California, Riverside.	