



CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY

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<b>Project Title</b> Plant Based Lipase Inhibitors: A Potential Treatment for Obesity	
<b>Abstract</b> <b>Objectives/Goals</b> Obesity is a global problem that affects 30% of the World's population. One of the approaches used to target obesity is to decrease the absorption of fatty acids from the digestive system. Lipase is an enzyme that converts triglycerides into free fatty acids in the GI tract. The FDA approved lipase inhibitor, Orlistat, is available for use as a treatment for obesity. However, patients taking Orlistat show severe side effects such as nausea, vomiting, hives, etc. Therefore, the objective of this study is to identify effective plant-based lipase inhibitor(s) from selective dietary supplements. The hypothesis states that, if the dietary supplement(s) are rich in polyphenols, then they will have the highest percent of lipase inhibition. <b>Methods/Materials</b> Dietary supplements (Grapeseed extract, Raspberry Ketone, Acai Berry extract and Green Tea extract) at 2.5 mg/mL and the positive control (Orlistat) at 10 µg/mL were incubated with pancreatic lipase enzyme in potassium phosphate buffer at room temperature. After the 10 minutes, the reaction was initiated by the addition of substrate, P-Nitrophenyl butyrate. The mixture was incubated for an additional 10 minutes and the optical density was read on a spectrophotometer at 405 nm. Each sample was analyzed in triplicates and the average was calculated. The percent inhibition for the supplements was calculated. <b>Results</b> The results revealed that Orlistat, Grapeseed extract, Raspberry Ketone, Acai Berry, and Green Tea inhibited lipase activity by 67%, 59%, 51%, 48%, and 22%, respectively. The grapeseed extract inhibited lipase the best out of all the tested extracts. <b>Conclusions/Discussion</b> Since three out of four dietary supplements rich in polyphenols inhibited lipase activity significantly, the hypothesis was supported. It was concluded that consuming diets and/or dietary supplements rich in polyphenols will have as equal beneficial effects as Orlistat, without any serious side effects.	
<b>Summary Statement</b> In this project, selective dietary supplements were identified for their lipase inhibitory activity, a potential treatment for obesity.	
<b>Help Received</b> My science teacher, Ms. Jana Nisbet provided valuable guidance. My parents purchased the materials. The management of Applied Immunology helped me get acquainted with the lab equipment such as spectrophotometer and centrifuge.	