



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Edith A. Pierre-Jerome</b>	<b>Project Number</b> <b>S0421</b>
<b>Project Title</b> <b>The Role of Brassinosteroids in Root-Cell Differentiation in Arabidopsis thaliana</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project was to answer two questions: 1) Do brassinosteroids play a role in cell differentiation in the root of Arabidopsis? 2) Is this role due to the biological connection between brassinosteroids and WEREWOLF?</p> <p><b>Methods/Materials</b> Homozygous werewolf mutant seedlings were obtained and grown on five different concentrations of brassinolide (the most active form of brassinosteroids) and the hypocotyls were measured. Brassinosteroid mutants were then grown and compared to wildtype(control) on plates containing either 1mM brassinolide or no brassinolide. The length of the meristematic zones and root hairs were measured and a count of root hairs were taken for comparison between the mutants and wildtype on both plates. This experiment was then attempted again using seeds from what were thought to be adult homozygous werewolf plants.</p> <p><b>Results</b> A comparison of the hypocotyl lengths of the werewolf mutant and wildtype found that the mutants were less sensitive to the brassinolide at higher concentrations suggesting that the WEREWOLF protein is necessary for a normal brassinosteroid response. The measurements of the brassinosteroid mutants and wildtype showed that the addition of brassinolide affected all three factors of cell differentiation being studied through a decrease in root hair length, meristematic zone length, and root hair count. When the experiment was tried again on the werewolf seeds, the phenotype was unconvincing so a PCR was done to confirm the genotypes of the plants that were grown. All were found to have a wildtype gene suggesting that the mutant seedlings had not lived into adulthood to set seed; most likely due to the allele used which is possibly seedling lethal for the homozygous mutants.</p> <p><b>Conclusions/Discussion</b> A strong biological connection between brassinosteroids and WEREWOLF was confirmed when it was found that WEREWOLF was necessary for a normal brassinosteroid response. The results from the experiment done on the brassinosteroid mutants supported the idea that brassinosteroids play a role in cell differentiation. The possibility that this role is due to the connection with WEREWOLF is highly likely but has yet to be tested.</p>	
<b>Summary Statement</b> The role of brassinosteroids in cell fate in the root of Arabidopsis thaliana.	
<b>Help Received</b> Used lab equipment at the Salk Institute under the supervision of Dr. Jennifer Nemhauser	