



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Neda Izadyar	<b>Project Number</b> <b>S1205</b>
<b>Project Title</b> <b>Differentiation of Human Adipose Stem Cells to Osteocytes and Chondrocytes</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This study was conducted to test the efficiency of human adipose stem cell (hASCs) differentiation into chondrocytes and osteocytes. HASCs were used to differentiate into chondrocytes and osteocytes.</p> <p><b>Methods/Materials</b> Some of the materials used in this experiment were: Human Adipose Stem Cells (hASC), hASC Expansion Media, Chondrogenic Differentiation Media, Osteogenic Differentiation Media, Alcian Blue (chondrogenic marker), Alizarin Red (osteogenic marker), Microscope (Olympus Inverted Microscope Ix71). The factor that was altered in this experiment was the chondrogenic and osteogenic media. The control was the human adipose stem cells. There were six plates in which the adipose stem cells were induced to either chondrocytes or osteocytes. The number and size of the osteocyte and chondrocyte patches were measured and the intensity of the Alizarin Red and Alcian Blue stain in the patches were determined.</p> <p><b>Results</b> The Week 2 plate for the chondrogenic differentiation had the most number of patches out of the three weeks. The shapes of the patches in the chondrocyte plate tended to vary in the control versus the induced wells. The cells in the control were elongated and thin while the induced wells had rounder and larger cells resembling chondrocytes. The chondrocyte staining was observed as early as week one and increased by week two and its intensity was reduced at the end of the culture. However, the osteocytes had a steady growth with an increasing rate as it got toward the third week. By Week 3, 90% of every well in the induced section of the plate was stained with the osteogenic marker. Similarly, the intensity of the osteocyte patches at the microscopic level was significantly increased during culture. In the third week, the osteocyte staining reached its highest intensity. There was a spectacular bone-like structure with its calcium deposit held within it in small pouches. Even though the osteogenic media was supposed to cause the ASCs to differentiate into osteocytes, several adipocytes were found in the induced wells of the osteogenic plates.</p> <p><b>Conclusions/Discussion</b> This study clearly shows that hASCs have the ability to differentiate to both chondrocytes and osteocytes; however the efficiency of hASC differentiation to osteocytes was much higher than the hASC differentiation to chondrocytes.</p>	
<b>Summary Statement</b> In this experiment, the efficiency of differentiation of human adipose stem cells into chondrocytes or osteocytes has been investigated.	
<b>Help Received</b> Used lab equipment at Prime Gen Biotech under supervision of Tracy Wang	