



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

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Project Title DMSO Inhibits the Induction of Adipogenesis in 3T3L1 Cells	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The hormone receptor, PPAR, functions to regulate the differentiation of adipocytes (fat cells). This receptor functions as part of a heterodimer with another receptor, RXR. A chemical that functions as a ligand for RXR is predicted to have similar effects as a ligand for PPAR, and thus an RXR ligand might also regulate adipocyte differentiation. Methoprene acid is a commonly used pesticide that is known to bind to the human RXR and thus might function to regulate differentiation of adipocytes. I hypothesize that methoprene acid will function as an RXR ligand and induce changes in gene expression that are similar to the changes that occur when cells are exposed to a PPAR ligand.</p> <p>Methods/Materials I am using the mouse fibroblast cell line (3T3L1) that is well characterized in its response to PPAR ligands to differentiate as adipocytes. I assay for adipogenesis with Oil Red O staining that I photograph, and for changes in target gene expression using Reverse-Transcriptase Polymerase Chain Reaction (RT-PCR). Changes in gene expression are observed as an increase or decrease in the amount of the PCR product, which is visualized by agarose gel electrophoresis.</p> <p>Results 3T3L1 cells can be induced to form adipocytes when treated with the appropriate combination of inducing hormones. The addition of several different RXR ligands does not appear to significantly effect this response, Although low concentrations of methoprene acid do not seem to affect the response, high doses appear to inhibit the transition to becoming adipocytes. Results from the control samples however indicate that DMSO (the solvent I used for methoprene acid) is responsible for the observed inhibition of adipogenesis.</p> <p>Conclusions/Discussion Since methoprene acid is an environmental hormone that humans are exposed to, the interaction of this chemical with human hormone receptors should be studied. The observed effects of DMSO on adipogenesis are of significance given the current interest in the potential therapeutic applications of this compound.</p>	
Summary Statement The widely used solvent, DMSO, inhibits hormone-induced adipogenesis	
Help Received This project was conducted at UC Irvine as part of the Science Fair Initiative in the School of Biological Sciences	