

CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s)	Project Number
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	35945
Project Title	$\langle \rangle$
The Role Model Effect: Optimizing Blood Macrophage Signal	
Transduction in a Novel Treatment Method for Leukemia	
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Objectives/Goals Abstract	
Leukemia is notoriously difficult to detect and to treat. The current leading	reament: radiation and
chemotherapy, are either indiscriminate in inducing general cell death or o	nly effective over short periods
of time. The Role Model Effect seeks to explore a venue for treatment that primes the	
macrophage-mediated immune response to act against leukemic gets while	e selecting for healthy cells by
increasing macrophage density to facilitate apoptotic signal amplification.	\mathbf{Y}
Methods/Materials	
Pro-B leukocytes of five different genetic markers, (WT, MIGNRES, PAC	, JAK2VF, JAK2VI) were
cocultured with macrophage "role models" plated at high deposities over 72 cells were counted using flow cytometry. After the assay was completed	hours. Every 24 hours, the B
for Annexin V-PE to indicate apontosis. In a secondary assay, the apontosis	c rates of cocultured MIG cells
for Annexin V-PE to indicate apoptosis. In a secondary assay, the apoptoti were compared with those in MIG treated with UV-Apadiation, chemothe	rapeutic drug thansigargin and
untreated cells 24 hours following treatment.	
In all cell groups, growth slopes either reversed or plateaued after treatment by factors of 60X or higher while wild type cells thrived in treated environments. Treated VF cells had a 95.86% apoptosis upwards of 46.38% from the untreated strain; P210 increased 46.28% to 95.38%, and WT cells increased 9% to	
while wild type cells thrived in treated environments. Treated YF cells had a 95.86% apoptosis upwards	
of 46.38% from the untreated strain; P210 increased 46.28% to 95.38%, and WT cells increased 9% to	
89.89%. P210 and VF had the highest percent differences of around 46.28	%. The MIG cells increased by
89.89%. P210 and VF had the highest percent differences of around 46.28%. The MIG cells increased by 33.16% to 94.56% and VI increased by 27.49% to 95.47%. In the Case Study, thapsigargin showed 26.25% apoptosis and UV-A had 69.09%. The masrophage-treated MIG cells had 94.56% apoptosis.	
Conclusions/Discussion	
The results of this assay support the individual hypotheses of the Role Model Effect. The first hypothesis was that cellular #role models# would be able to have an impact in reversing proliferation characteristic of	
cancers. This was supported by the growth curves, in which the growth rates in untreated cells were	
considerably reversed in treated cells. The second was that these role models would push cancerous cells towards apoptosis through cell signaling. This was supported by increased apoptotic percentages across all	
towards apoptosis through cell signaling. This was supported by increased apoptotic percentages across all groups which surpassed these at cells treated with simulated radiation and chemotherapy and was especially prominent in tyrosine-kinase stimulant mutations. This research paves the way for noninvasive macrophage transfusion in reating leukemia.	
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especially prominent in typesine-kinase stimulant mutations. This research	paves the way for noninvasive
macrophage transfusion in treating leukemia.	
Summary Statement	
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The Role Model Effect presents a novel approach to leukemia treatment by	nst loukomia and
macrophage-sovemed immune response to prime the immune system against leukemia and simultaneously select for healthy cells.	
Help Received	
Lab facilities and materials/procedures completed at UCI under supervision of Dr. Fleischman; Sarah	
Morse approved project parameters as they were drafted.	