



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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Project Title Does Method of Delivery of Chemotherapy Affect Cancer Cell Death?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Introduction: In 2008, approximately 142,070 Californians will be diagnosed with cancer. Most will receive expensive intravenous chemotherapy, which causes harmful side effects. If locally injecting chemotherapy into a tumor is effective in causing cell death, systemic side effects may be reduced, and costs lowered. Problem: Is delivering chemotherapy to a cancer sample by direct injection as effective as delivering the same chemotherapy, in the same dose, to an identical sample by passive diffusion?</p> <p>Methods/Materials Thirteen cancer specimens were divided into 3 or 5 equal samples, depending on availability. One sample was fixed in formalin, another injected with chemotherapy, and one exposed to the same chemotherapy in R.P.M.I. solution (diffusion). Where 5 samples were available, one was injected without chemotherapy, and one was placed in R.P.M.I. solution without chemotherapy (negative controls). The tissues were then processed for microscopic examination. Five indicators of cell damage and life cycle disruption were evaluated: mitoses, pyknosis, tissue necrosis, chromatin streaks, and tissue tears. Results were analyzed.</p> <p>Results There was no significant difference in mitoses, pyknosis, or necrosis between the formalin-fixed and negative control samples. Comparing chemotherapy treated samples, there was no significant difference in mitoses for injection versus diffusion. Pyknosis and necrosis were greater in the injection samples. Chromatin streaks and tissue tears were seen almost exclusively in samples treated by injection, with or without chemotherapy.</p> <p>Conclusions/Discussion Delivering chemotherapy to cancer samples by injection causes greater nuclear pyknosis, tissue necrosis, chromatin streaking, and tissue tearing than chemotherapy delivered by diffusion. This study has confirmed the hypothesis that chemotherapy delivered by injection is at least as effective as chemotherapy delivered by diffusion.</p>	
Summary Statement The efficacy of delivery of chemotherapy by direct injection into a cancer sample was compared with the efficacy of delivering the same chemotherapy to an identical cancer sample by passive diffusion.	
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