

Cancer stem cells in immunotherapy: Fighting fire with fire

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An ideal source of antigens to stimulate an immune response in an immunotherapeutic approach is to use the patient's own tumor. Limitations to this approach are the acquisition of tumor samples in adequate quantities and the lack of antigen sources from the most aggressive phenotypes, namely tumor stem cells. Our approach capitalizes on the recent developments in specific media formulations to isolate and propagate putative cancer stem cells from patient tumor samples to quantities necessary for loading dendritic cells. Our most recent completed clinical trial in metastatic melanoma patients demonstrated a 50% five-year survival rate (SR) using autologous cell lines with many patients showing stable disease or no evidence of disease for the entire follow up period. Previously, our standard approach using non-cancer stem cell specific media resulted in cell lines from melanoma patients in only 50% of the cases. This process was also very lengthy, taking an average of 3-4 months to reach adequate cell numbers for therapy. However, within these samples were cells that expressed markers of putative cancer stem cells of mesenchymal origin. Using the same original samples and our proprietary media formulation, we were able to reduce that time to 3-4 months and increase the success rate to 80%. This process also resulted in increasing the purity of the cancer stem cells from ~70% to >90% based on known cancer stem cell markers. Lastly, the approach is now being optimized for a more closed and uniform system that may make it feasible for automation and scalability.

Biography

While earning a BS degree in Chemistry at the University of California at Irvine, Andrew N. Cornforth trained at the Hoag Cancer Center in primary cancer cell culture under the mentorship of Dr. Shankar Nayak. He then entered graduate school at University of California in 2000. After graduating with a Ph.D. in Experimental Pathology in 2006, he returned to the Cell Biology Lab as a Senior Scientist to continue work in cancer immunotherapy, publishing a body of work in the area. In the summer of 2011, the program and its assets were purchased from Hoag Memorial Hospital by California Stem Cell under the leadership of its' CEO Dr. Hans Kierstead. Named Cancer Stem Cell Program Manager, he is focused on optimizing the protocols developed over 20 years at Hoag Hospital and to explore new avenues of research in autologous cancer cell therapy.

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