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Cells as delivery vehicles for anti-cancer therapeutics

Deryl Troyer
Kansas State University, USA

Targeting cancer therapy specifically to the cancer site so that it does not affect healthy tissue is a major objective of current cancer research. Many different strategies for targeting therapy have been developed, including targeted drug delivery vehicles, antibody targeted therapy, protease targeted therapy, and others. There is now compelling evidence that a variety of cells can preferentially migrate to tumors to deliver anticancer molecules. Examples of such cells include bone marrow mesenchymal stem cells, neural stem cells, macrophages and umbilical cord mesenchymal cells derived from Wharton's jelly. The latter cells have also been demonstrated to have significant intrinsic anti-tumor effects as naïve cells against preclinical models of human cancers. These cells are attractive for cytotherapy because they do not themselves form tumors, are immunologically well tolerated, can be isolated non-invasively in large numbers. We have engineered these cells to secrete cytokines such as beta interferon to attenuate human metastatic breast cancer in mice. In addition, cells have been used as carriers for nanotherapy payloads. For example, iron/iron oxide nanoparticles have been synthesized and loaded into RAW264.7 cells, the cells homed to peritoneal tumors, and AMF exposure resulted in a significant survival effect. Tumor-tropic cells are thus potentially valuable cytotherapy agents for targeted anti-cancer therapy.

Biography

Deryl Troyer holds DVM and PhD degrees from Kansas State University. He has served as an Assistant Professor at the University of Illinois in Urbana, Illinois, and was a visiting researcher in molecular genetics at Howard Hughes Medical Institute in Salt Lake City, Utah. He has been a professor at Kansas State University since 1986. He is a founding member of the Midwest Institute for Comparative Stem Cell Biology at KSU. He is a recipient of the international Otto Zietschman Prize in Experimental Embryology, and is a recipient of the Pfizer Award for Research Excellence.

troyer@vet.k-state.edu