

**A Phase I Study of Active Immunotherapy  
With Carcinoembryonic Antigen RNA-Pulsed  
Autologous Human Cultured Dendritic Cells in Patients With  
Metastatic Malignancies Expressing Carcinoembryonic Antigen**

**NON-TECHNICAL ABSTRACT**

No systemic therapy improves survival for refractory metastatic cancers such as colon, lung, and breast cancer. Interest in immunotherapy for these malignancies has been stimulated by the finding that specialized antigen presenting cells, dendritic cells (DC), can induce anti-tumor immune responses. We have conducted extensive laboratory studies using a strategy for inducing anti-tumor immune responses to non-immunogenic tumor. By injecting immunostimulatory DC loaded with tumor antigens into rodents, systemic anti-tumor immune responses have been reproducibly induced, resulting in eradication of small amounts of implanted tumor at distant sites. Efficient introduction of this strategy in the models was accomplished with DC loaded with peptides and/or RNA encoding for tumor antigens. RNA has the advantage that multiple epitopes and both class I and class II antigens are presented. The RNA chosen for this trial encodes CEA, a molecule expressed by many cancers of the intestinal tract, lung, and breast. The gene for CEA has been given to many patients in the form of vaccinia or oligonucleotide vaccines.

The overall objective of the phase I portion of the study is to evaluate the safety and tolerability of injections of CEA RNA-pulsed dendritic cells derived from the patient. It is unlikely that the injections will benefit the patients who will likely have advanced tumor burdens or metastatic disease.