

**Exhibit 2. SCIENTIFIC ABSTRACT**

Our laboratory has been developing a vector system (Ad-sig-TAA/ecdCD40L) which encodes a fusion protein composed of a tumor associated antigen (TAA) linked to the extracellular domain (ecd) of the CD40 ligand (CD40L). This model system is designed for the *in vivo* activation and antigen loading of dendritic cells (DCs) in order to induce T cell and B cell immunity against TAA positive cancer cells. We have used two TAA: the HPV E7 protein, which is a foreign viral antigen associated with cervical cancer, and the human MUC-1 (hMUC-1), which is a self antigen, overexpressed in carcinomas of the lung, colon, breast, ovary and prostate. The Ad-sig-TAA/ecdCD40L vector is injected subcutaneously (sc). The vector is engineered so that the TAA/ecdCD40L protein is secreted from vector infected cells for at least 10 days in the vicinity of the vector injection site. The TAA/ecdCD40L protein activates and antigen loads DCs which then migrate to regional nodal tissue. The result is a CD8+ systemic immune response against TAA positive cancer cells. We have shown that the subcutaneous injection of the TAA/CD40L vector can induce an immune resistance to the growth of TAA positive tumor cells for up to a year, and that this immunity can be transferred from vaccinated donor mice to unvaccinated mice through splenic CD8 T cell lymphocytes. In addition, we have shown that these vector injections can overcome the anergy for the human MUC-1 (hMUC-1) self antigen which exists in hMUC-1.Tg mice. The induction of the immune response is HLA restricted, and is mediated through up to a 250 fold increase in the levels of cytotoxic lymphocytes specific for the hMUC-1 antigen in the spleens of the vaccinated mice. We have also studied the effect of boosting the immune response induced by subcutaneous injection of the Ad-sig-ecdhMUC-1/ecdCD40L vector by administering subcutaneous injections of the ecdhMUC-1/ecdCD40L protein. Our studies have shown that the protein boosting not only increases the level of the hMUC-1 antigen specific cytolytic lymphocytes in the spleens of the injected animals, but the protein boosts also generate high levels of circulating serum antibodies against the hMUC-1 antigen or cells bearing that antigen. These results have suggested that the administration of this vaccine could suppress recurrence of epithelial malignancy after surgery in individuals whose disease is at a high risk of recurrence or for the treatment of recurrent disease. We are now proposing to study the toxicity of the ecdhMUC-1/ecdCD40L vector and protein injections in a phase I clinical trial in which the primary objective is to assess the toxicity of the injections. The secondary objective is to define the "optimal" dose or if positive the MTD, and also to observe at which dose any evidence of efficacy of the Ad-sig-ecdhMUC-1/ecdCD40L and the ecdhMUC-1/ecdCD40L protein occurs.