

Preclinical characterization of CG201, a new more potent anti-hCG cancer vaccine formulation

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Introduction: Therapeutic vaccine formulations that stimulate antibody responses against hCG beta chain have previously been shown to extend survival in patients with advanced colorectal and pancreatic cancers. These benefits were correlated with anti-hCG antibody titers achieved in immunized patients. It is therefore desirable to develop more potent vaccine formulations that produce higher antibody titers and increase the percentage of immunized individuals who respond well to immunization. CG201 is such an improved formulation, which has been brought through preclinical evaluation studies in preparation for clinical trials in cancer patients.

Methodology: Vaccines comprising hCG peptides conjugated to diphtheria toxoid and delivered with muramyl dipeptide (MDP) adjuvant in a squalene/mannide monooleate/saline emulsion showed promise in previous clinical trials. These components were reformulated to entrap the immunogen conjugates in a solid phase of calcium sulfate with embedded dextran sulfate polymers, milled to a precisely controlled powder, delivered with MDP adjuvant in the same emulsion.

Results: Immunization studies in rabbits, a standard animal model used with previous vaccines, demonstrated that the new formulation could reliably produce titers approximately ten-fold greater than similar formulations lacking the solid phase matrix, and do so with mild injection site reactions. Repeated experiments showed that the titers were longer-lasting than with previous formulations, and required only a single injection, whereas older formulations had typically been given in a two- or three-dose primary immunization regimen. Boosting injections given as late as six months after the primary injection resulted in strong and reproducible anamnestic antibody responses. This injection regimen yielded titers in the rabbits that corresponded to human titers expected to be able to neutralize hCG for the whole course of a year or more of therapeutic treatment.

Conclusions: CG201 represents a great improvement in immunopotency over older anti-hCG vaccine formulations, yielding much higher levels of anti-hCG antibodies than possible with previous formulations. Future clinical studies will investigate the ability of this improved anti-hCG vaccine to benefit cancer patients with hCG-producing malignancies.