Manganese Superoxide Dismutase (MnSOD) as a Chemoprotective and Radioprotective Agent
Technology Innovator

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Background Information

- The effects of traditional cancer therapies are not limited to cancer cells
- The effects of such therapies cause death in rapidly dividing non-cancerous cells of the oral cavity, oropharynx, esophagus, stomach, small intestine, and colon
- As the normal cells of the body succumb to the effects of cancer therapy, the patient weakens and, frequently, therapy cannot be continued at the optimal dose regiment necessary to treat the patient’s tumor
Currently Available Technologies

- Sulfhydryl free radical scavengers, growth-stimulating cytokines, and antioxidant enzymes are used to address cytotoxicity.

- Current interventions have severe side effects, including increase in blood pressure, kidney failure, nausea, vomiting, and transient hypotension.

- Competing technologies have questionable efficacy in preventing damage to normal tissues.
Technology Description/Advantages

**Manganese Superoxide Dismutase**

- Superoxide Dismutase, an endogenous antioxidant protein, protects cells by catalyzing the dismutation of superoxide into oxygen and hydrogen peroxide.
- The University of Pittsburgh has developed a method of administering MnSOD via transient gene delivery using plasmid liposomes.
- MnSOD can be locally delivered to tissues instead of given systemically.
- MnSOD treatment has not been associated with severe adverse events as illustrated by other treatments.
Stage of Development

- **Phase I-II Studies:** Concurrent Chemotherapy (Paclitaxel and Carboplatin) and Thoracic Radiotherapy with Swallowed Manganese Superoxide Dismutase (MnSOD) Plasmid Liposome (PL) Protection in Patients with Locally Advanced Stage III Non-Small Lung Cancer

  - Phase I of the study assesses the feasibility and safety of MnSOD PL by dose escalation in 3 cohorts of 3 chemoradiotherapy subjects each.

  - Phase II will examine the efficacy of MnSOD PL by assessing the incidence of Grade 3 or 4 esophagitis in 27 additional chemoradiotherapy subjects.

  - Overnight fasted subjects will swallow a liquid that contains MnSOD PL on Day 1 and 3 of each week of the experimental treatment for a total of 14 doses. Subjects also will be asked to report what foods they eat after swallowing the MnSOD PL. Biopsies of various parts of the esophagus will be obtained and analyzed.
Intellectual Property Status

- Issued patents include:
  - US 5,599,712
  - US 6,221,848
  - US 6,887,856
  - Australia 769,805

- Issued claims are broadly directed toward protecting a subject against an agent (e.g. radiation or chemotherapy) that produces a toxic species (e.g. a free radical) comprised of administering MnSOD or derivates thereof.
Opportunity

- The University of Pittsburgh is seeking a strategic partner for licensing and commercial development of this technology.

For more information, please contact:
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