Columbia Technology Ventures

**Whole cell-based vaccine against pancreatic cancer**

*Technology #cu16094*

Pancreatic ductal carcinoma (PDA) is the fourth leading cause of death among U.S. cancer patients. Chemotherapy is the common course of treatment but is only minimally effective. Recently, tumor cell-based vaccines have emerged as a promising alternative approach for cancer treatment. This technology is a whole cell-based vaccine that boosts the patient’s immune system and directs its focus to pancreatic cancer cells. This technology is unique even among other emergent immunotherapies in that it relies on exposing immune cells to whole cancer cells rather than only tumor-associated antigens or peptides. This approach targets the entire repertoire of tumor-cell antigens and reduces the possibility that cancer cells can evade the immune system response by mutation.

**Dual whole cell-based vaccine confers immune protection against cancer cells**

In this approach, white blood cells are extracted from the patient and are treated to differentiate into dendritic cells and macrophages, which are normally responsible for initiating the immune response. Separately, whole cancer cells—preferably from the patient, but, if unavailable, from an in vitro source—are harvested and inactivated. The immune dead whole cancer cells are then co-cultured with the differentiated dendritic cells and macrophages, which internalize the cancer cells. The conditioned cells are then injected back into the patient along with a cocktail of homing-receptor ligands to ensure cells will travel to the patient’s lymph nodes and initiate an immune responses against the cancer. This dual cell approach using both dendritic cells and macrophages achieves a complementary effect in activating both humoral and cellular immune response for more effective cytotoxic response against cancer cells.

In vivo testing of this dual cell vaccine in a mouse model of metastatic pancreatic cancer is underway.

**Lead Inventor:**

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**Applications:**

- Vaccine for pancreatic cancer
• Vaccine for other cancers with similar cell dynamics
• Further research into immune-cell response and whole-cell based immune-cell engineering
• Library of various genotypes of immune cells presenting antigens from various whole cancer cells
• Combination therapy for cancer in conjunction with chemotherapy and radiation

Advantages:

• Greater potential for effectiveness than chemotherapy
• Patient-specific therapy
• Combinatorial design (i.e., dendritic cells, macrophages, whole cancer cells) activates complementary immune-response pathways against a full range of pancreatic cancer antibodies
• Limits ability of cancer mutation to circumvent treatment

Patent Information:

Patent Pending

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