Anticholinergic combination therapy for gastric cancers

Technology #cu13357

Gastric cancers are diagnosed at a rate of over 21,000 new cases each year in the United States. These cancers, which affect the upper digestive tract, have an outsized impact on a patient’s quality of life, often causing intense abdominal pain and severely limiting the patient’s ability to eat and digest food. Interventions like chemotherapy, radiation, and surgery have significantly increased the survival rate of gastric cancer victims, but these cancers still have mortality rates as high as 50%. Recent research at a number of institutes has demonstrated that cells of the gastric system receive growth-stimulating signals from cholinergic neurons in the peripheral nervous system, indicating that gastric tumor cells may also proliferate in response to the same signals. This technology identifies anticholinergic drugs, which can block these growth-stimulating signals, as a potential adjuvant for traditional chemotherapy approaches in the treatment of gastric cancers.

Anticholinergics may increase effectiveness of existing gastric cancer therapies with no added toxicity

In the course of normal development, stem cells of the stomach receive growth-stimulating signals from the nervous system through muscarinic acetylcholine receptors. This technology uses in vitro studies of gastric cancer organoids to show that blockade of cholinergic signaling may be able to inhibit the growth of gastric cancer stem cells, and in some cases may even be able to reverse their growth. Broad-spectrum blockers of acetylcholine signaling, such as scopolamine, amitryptiline and other tricyclic antidepressants, are already marketed and well-tolerated, with minimal harmful side effects. Adding these drugs to standard gastric cancer therapeutic regimens has the potential to significantly improve patient outcomes with minimal additional cost or risk to the patient. The identification of the role of acetylcholine signaling in gastric cancer progression furthermore provides new potential therapeutic targets, which could be developed into highly specific cancer treatments in the future.

This technology has been tested in vitro in human tissue-based organoid models, and further in vivo testing in mouse models is planned.
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Applications:

• Adjuvant treatment for patients with gastric cancer undergoing chemo- and/or radiotherapy
• Pre-symptomatic treatment for patients at high risk of developing gastric cancer
• Neoadjuvant (pre-surgical) treatment for patients with resectable gastric tumors
• Alternative conservative therapy for gastric cancer in place of invasive surgery
• Research tool for examining the molecular biology and cellular pathogenesis of gastric cancer
• Research tool for investigating the effects of neurotransmitters, innervation, and cholinergic blockade on other types of cancer
• Novel target for specific therapeutic agents and medications

Advantages:

• Anticholinergic drugs are readily available and well-tolerated
• As an adjuvant, may increase the effectiveness of current standard-of-care therapies such as chemotherapy, radiotherapy and surgery
• Inexpensive and already-approved anticholinergic drugs will have minimal effects on cost of treatment

Patent Information:


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Related Publications:


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