Award ID:
RP160384

Project Title:
Promoting The Functions of Memory T cells for Adoptive T cell Therapy

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
Baylor College of Medicine

Lay Summary:

Vaccines have been successful in protecting humans against infection by many deadly pathogens. The cell types generated after vaccination and responsible for the protection are called immune memory cells. After re-encountering the same pathogens, the immune memory cells can mount robust immune responses to attack the pathogens, thereby protecting us from future infections. Based on the success of vaccination against pathogens, vaccines have been used to immunize patients with components present in tumor but not normal tissues. The patients would generate immune memory cells against cancer. Due to limited number of memory T cells generated in the patients, activating immune cells with tumor components in test tubes can produce a larger number of these cells. Transferring the activated immune memory cells back to cancer patients can induce significant immune responses against cancer. However, the success in improving the survival of cancer patients is achieved in only a small portion of cancer patients due to limited survival of the transferred cells. We aim to define the novel approaches in improving the efficacy of cell therapy for cancer patients. We have found that memory cells against pathogens require a process called autophagy to survive for a long period of time after vaccination. Autophagy (self-digestion) is a self-cleaning process for the cells to maintain the quality of proteins and organelles, such as mitochondria, in the cells. It helps to to protect the long-term survival of immune memory cells. Immune memory cells critically depend on autophagy for long-term survival and functions. We will test whether autophagy is critical for the long term-survival and function of tumor-specific immune memory cells. We will also determine whether promoting autophagy improves the functions of tumor-specific memory cells that can help to prevent the recurrence and to improve the eradication of cancer.