Investigating Memory T Cell Subtypes for the Regulation of Inflammatory Responses in Asthma Pathogenesis

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Asthma, a chronic inflammatory disorder of the lung, is associated with airway remodeling and hyper-responsiveness. T cells play a key role in regulating inflammatory responses in asthma. The role of memory T cells, central (TCM) or effector memory (TEM), in asthma remains elusive. Contrary to TEM, TCM cells reside mostly in lymph nodes and are not expected to reside in the lungs. Moreover, preliminary data confirmed an increase in TCM cells in the bronchial lavage of asthmatic patients. This research investigated whether TCM cell number increases in the asthmatic lungs and becomes more persistent. Lung tissues from asthma induced mouse models and controls were processed using isolation of T-cells from lung tissues protocol. Cells were stained with TCM specific antibodies and analyzed by flow-cytometry to determine TCM population size. TCM were also treated with 5μM Dexamethasone for 24 hours, then analyzed using Flow Assorted Cell Sorter (FACS) after staining with PI and Annexin-V to determine the frequency of Dexamethasone responsive/resistant TCM. The results indicated significantly elevated levels of lung residing TCM cells ($p \leq 0.014$) in asthmatic based tissue ($n=13$) versus control ($n=13$). Moreover, TCM cells from asthmatic lung tissues were more persistent even in the presence of dexamethasone treatment comparing to control ($p \leq 0.013$). The current study indicates that TCM cells in the lung contribute to the pathogenesis of severe asthma. This study paves the way for medical drug interference to control and prevent memory T cell induced inflammation in severe asthma. This could open new horizons for asthma therapy.