
GRANT LYTHER, University of Leeds

How many TCR clonotypes does a body maintain?

There are approximately 400000000000 naive CD4 T cells in your body, about the same as the number of stars in our galaxy. On the other hand, the number of cells of one TCR clonotype is a small integer that increases or decreases by one cell at a time, when cells divide or die. New clonotypes are released from the thymus and compete with other clonotypes in the periphery for specific and non-specific resources. Mean clonal sizes can therefore be calculated from mean clonal lifetimes. For example, if the ratio of thymic production to peripheral division is four percent, then the number of distinct T-cell clonotypes in the human body is about nine percent of the total number of (naive CD4) T cells. In mice, most TCR clonotypes may consist of just one or two T cells.