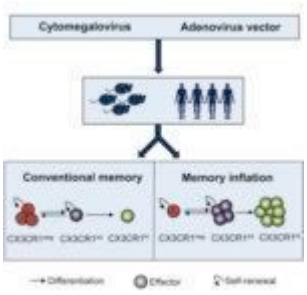
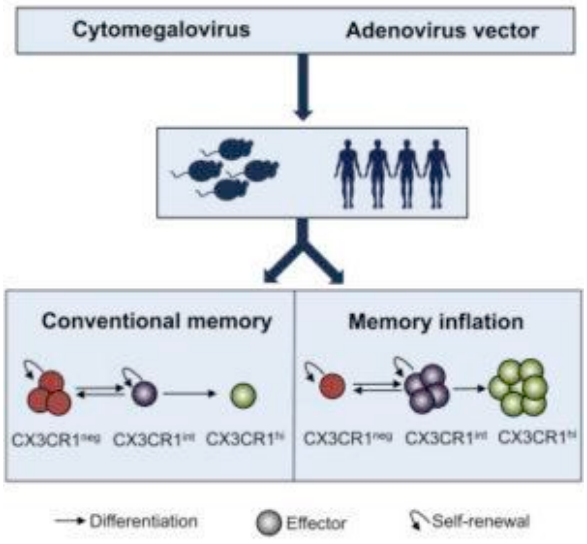
Have you heard of TPMs?





Gorden et al., Graphical Abstract.

Recent studies suggest the addition of “new” memory phenotype termed peripheral memory T cells (TPM) to the repertoire of memory T cells. TPMs express intermediate levels of CX3CR1 ($CX3CR1^{int}$), and are thought to be the main memory T cell subset responsible for surveying peripheral tissues. Unlike effector memory T cells (T_{EM}) that express high levels of CX3CR1 (CX3CR1hi), TPMs have superior homeostatic and differentiation capacity, including the ability to expand into CX3CR1negative central memory cells (T_{CM}). These properties make TPMs an ideal potential candidate for vaccination.

Gordon et al., aimed to determine the role of $CX3CR1^{int}$ TPMs in the induction and maintenance of conventional and inflating

(see definition below) memory T cell population during persistent viral infection and non-replicative viral vector vaccination. Researchers utilised an in vitro mouse model of mouse cytomegalovirus (MCMV) to illustrate that high and low doses MCMV infections drive induction of conventional and inflating memory cells that are predominantly CX3CR1hi and CX3CR1^{int}, respectively. However, differences between conventional and inflating memory T cells were observed in response to adenovirus vaccination. Where adenovirus vaccination induced conventional memory T cells that were predominantly CX3CR1neg and resembled T_{CM} (CD62L-, CD27-, CD127-), while inflating memory T cells were both CX3CR1^{int} and CX3CR1hi with a T_{EM} (CD62L-, CD27-, CD127-) phenotype. This suggested a relationship between high antigen load and differentiation/accumulation of CX3CR1$^{int/hi}$. Researchers were able to confirm this by illustrating that memory T cells observed in spleen, liver and lung (main sites of CMV replication) had predominantly CX3CR1$^{int/hi}$ inflating memory T cells. Gordon et al, also showed that though CX3CR1 was not required for induction of vaccine responses. However, absence of CX3CR1 resulted in suboptimal levels of inflating memory T cells. Similar results were observed in cohort analysis of humans infected with CMV and vaccinated with adenovirus.

In summary this study shows that viral infection and vaccination with viral vectors results in a significant induction of CX3CR1^{int} memory T cells that share characteristics with T_{EM}. This highlights the need for studies to determine the long term functional contribution of these cells during vaccination.

Journal Article: Gordon et al. 2018, Induction and Maintenance of CX3CR1-Intermediate Peripheral Memory CD8+ T Cells by Persistent Viruses and Vaccines. Cell Reports.

Article by Cheleka AM Mpande

Inflating memory cells are an expanded population of T cells that maintain effector functions, ability to proliferate and lack features of exhausted T cells. Unlike conventional memory cell populations that contract over time, proportions of inflating memory T cells steadily increase with time.