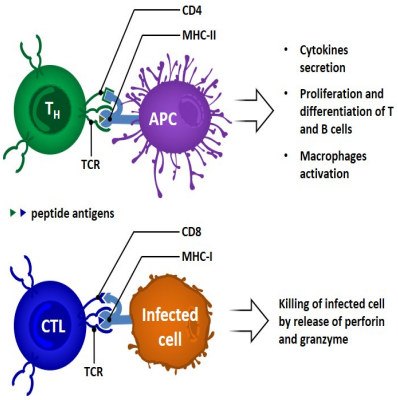

Cellular adaptive immune responses

Description

Cellular immunity is mediated by T lymphocytes (T cells). Intracellular microbes (eg. viruses) which are able to survive and proliferate inside phagocytes are not accessible to circulating antibodies; the evolutionary function of this type of adaptive response is meant to eradicate reservoirs of infection. Some T-cells also contribute to the clearance of extracellular microbes by recruiting effector leukocytes and by helping B cells to produce more effective antibodies. They can also respond by promoting phagocytosis or directly killing targeted cells.

A fundamental difference from B lymphocytes is that T cells aren’t able to recognize antigens in their native form: they recognize peptides derived from processed proteins, which are presented upon host proteins called major histocompatibility complex (MHC). T cells are divided into four distinct populations: helper T-cells (TH), cytotoxic T lymphocytes (CTLs), regulatory T cells (TREG) and a small population called natural killer T cells (NKT).

TH cells are involved in several innate and adaptive cellular responses: following interaction with antigen presenting cells (APCs), they are able to induce proliferation and differentiation of themselves, B cells, macrophages and other leukocytes through secretion of stimulatory cytokines (e.g. IL-2). They are also indicated as CD4+, as their coreceptor for the interaction between T cell receptor (TCR) and the complex antigen-MHC class II protein (Figure 5).

CTLs destroy cells exposing peptide antigens in association with MHC class I proteins; because of the coreceptor associated to their TCR they are also called CD8+ (Figure 5). groscurth & filgueira, 1998 groscurth

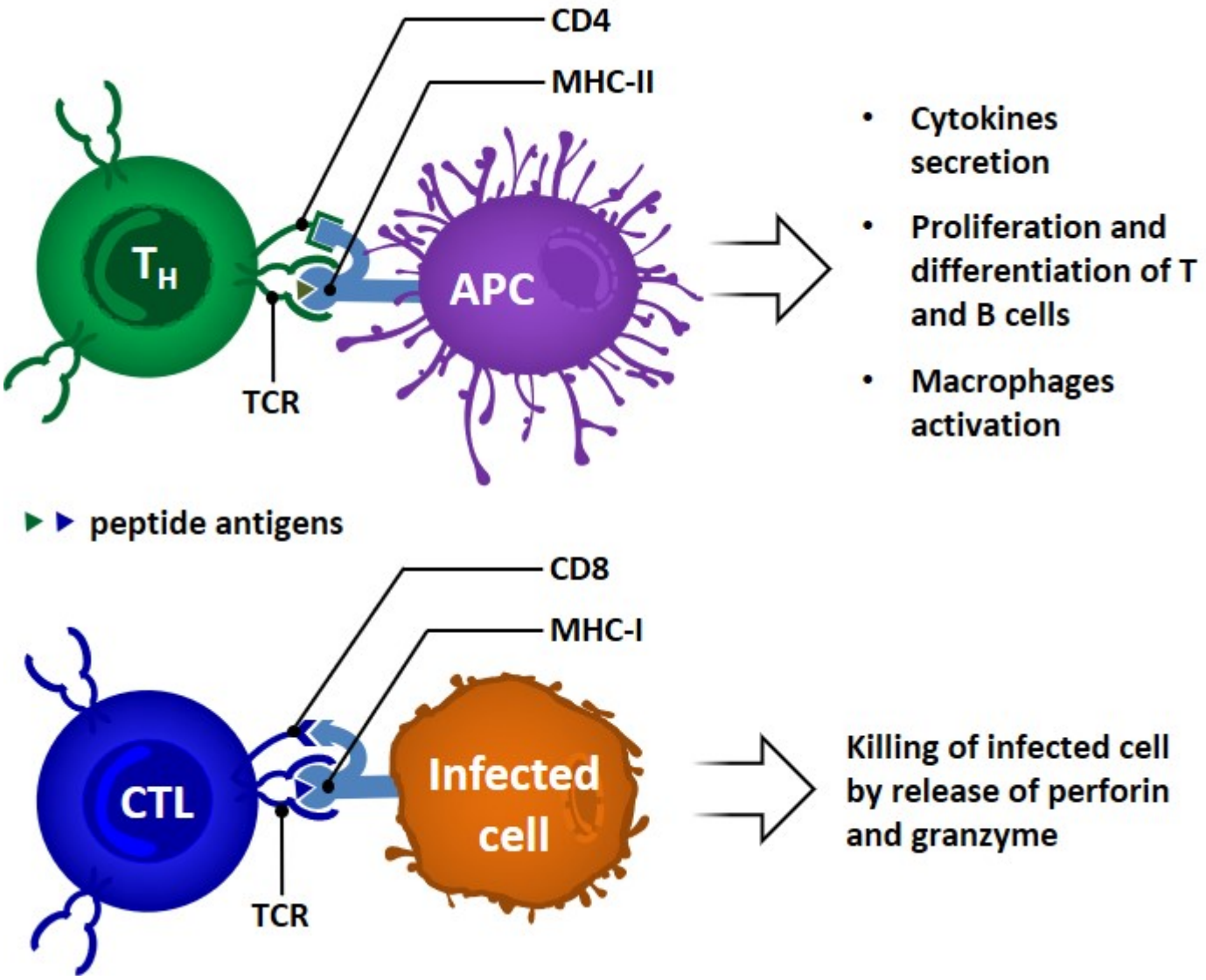

Figure 5. Effector functions of TH (T helper) cells and CTLs (cytotoxic T cells) require the interaction with peptide antigens associated to MHC class I or II (major histocompatibility complex) molecules and involve co-receptors such CD8 or CD4, respectively.

TREG cells modify their down-regulating activity towards effector T cells to maintain tolerance towards self-antigens and avoid over-reaction situations.
NKT cells express invariant TCRs and other markers related to NK cells; unlike classical T cells they do not interact with MHC complexes and show the ability to recognize lipids and glycolipids (e.g. ?-galactosylceramide). This still not well-known subpopulation is thought to modulate immunity in a broad spectrum of diseases, although NKT cells numbers vary substantially across individuals. bendelac, savage & teyton, 2007 bendelac,

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