CD4

In molecular biology, CD4 (cluster of differentiation 4) is a glycoprotein found on the surface of immune cells such as T helper cells, monocytes, macrophages, and dendritic cells. It was discovered in the late 1970s and was originally known as leu-3 and T4 (after the OKT4 monoclonal antibody that reacted with it) before being named CD4 in 1984.

In humans, the CD4 protein is encoded by the CD4 gene.

CD4+ T helper cells are white blood cells that are an essential part of the human immune system. They are often referred to as CD4 cells, T-helper cells or T4 cells. They are called helper cells because one of their main roles is to send signals to other types of immune cells, including CD8 killer cells, which then destroy the infectious particle. If CD4 cells become depleted, for example in untreated HIV infection, or following immune suppression prior to a transplant, the body is left vulnerable to a wide range of infections that it would otherwise have been able to fight.

Tregs express the biomarkers CD4, FOXP3, and CD25 and are thought to be derived from the same lineage as naïve CD4 cells.

Because effector T cells also express CD4 and CD25, Tregs are very difficult to effectively discern from effector CD4+, making them difficult to study. Recent research has found that the cytokine TGFβ is essential for Tregs to differentiate from naïve CD4+ cells and is important in maintaining Treg homeostasis.

Findings demonstrated that Acute Traumatic Brain Injury activated the sympathetic nervous system (SNS), and further upregulated the expression of PD-1 on CD4+ and CD8+ T cells, which, in turn, impaired their function and contributed to immunosuppression [1].

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Yang Y, Ye Y, Chen C, Kong C, Su X, Zhang X, Bai W, He X. Acute Traumatic Brain Injury Induces CD4+ and CD8+ T Cell Functional Impairment by Upregulating the Expression of PD-1 via the Activated Sympathetic Nervous System. Neuroimmunomodulation. 2019 Jan 29:1-15. doi: 10.1159/000495465. [Epub ahead of print] PubMed PMID: 30695785.