

Genomics Lite: T Cells in Focus

Learning Resources



These resources are designed to support and further attendees understanding of T Cell immunology, and are aimed at students in upper secondary years (e.g. year 10 and higher).

For further resources, visit yourgenome.org

What are T Cells

T Cells are an important part of the specific immune response and have four main roles: killing infected host cells, activating other immune cells, producing cytokines and regulating the immune response.

<https://www.khanacademy.org/science/high-school-biology/hs-human-body-systems/hs-the-immune-system/a/hs-the-immune-system-review>

T Cells are activated when they come across a host cell that has been infected by a pathogen and is displaying antigens on its cell membrane.

<https://youtu.be/6eMh0Vpyoik>

The production of and levels of T Cells is linked to disease - most recently with COVID-19. Some data from the US suggests that COVID-19 patients in intensive care had a decreased level of T Cells.

<https://www.news-medical.net/health/What-are-T-Cells.aspx>

T Cells are also linked to autoimmune diseases - some T Cell defects are linked to autoimmune conditions, leading to the immune system attacking the hosts own organs.

<https://www.immunopaedia.org.za/immunology/advanced/9-t-cell-mediated-autoimmune-diseases/>

How do we study T Cells?

CRISPR-Cas9 can be used to introduce genetic changes into T Cells to test the effects of the changes on the T Cells function. CRISPR is a genome editing technique that allows for precise alterations in the genome.

<https://publicengagement.wellcomeconnectingscience.org/events/genomics-lite-crispr-in-focus>

The Trynka Group at the Wellcome Sanger Institute specialises in studying Immune Genomics - how changes at the genome level might affect individuals' immune system and risk of disease. In this video, Gosia Trynka describes how she uses a combination of laboratory experiments and computer analyses to explore how genetic variants influence the immune system.

<https://youtu.be/NPeE9ucwd4s>