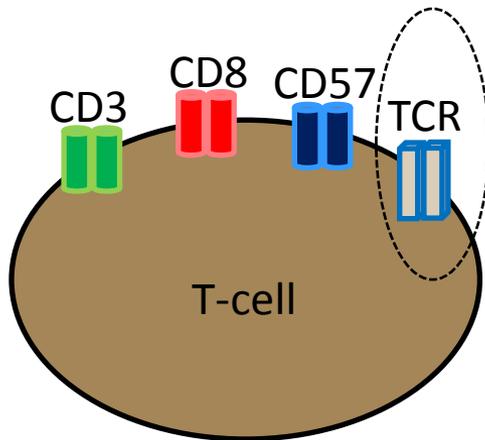


What is the T-cell receptor (TCR)? (abridged version)

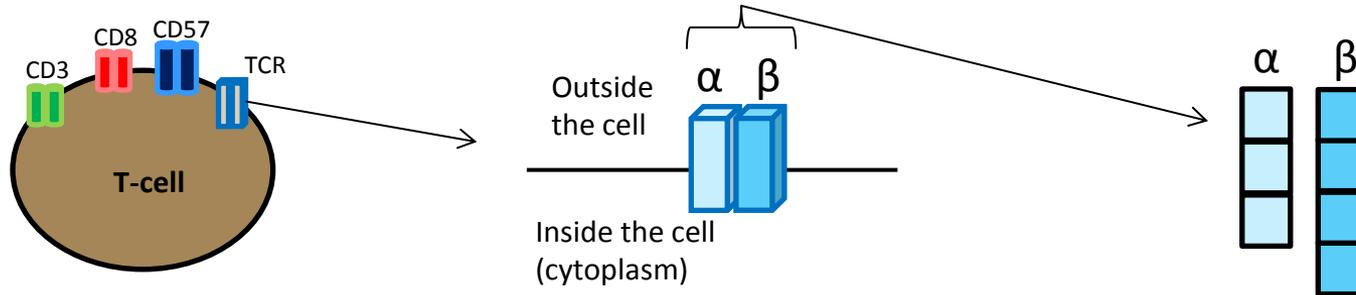
T-cell with CD3, CD8, CD57
markers and TCR.



Introduction:

- LGLL is typically diagnosed by the presence of either a T-cell or NK-cell clone in the blood (rarely, both can be present).
- For T-cell LGLL, the presence of a clone is established by a test called **T-cell receptor** gene rearrangement test (or **TCR** test). The TCR is circled in this diagram. If the test cannot confirm that the cells are clones of each other then it may not be LGLL.
- The TCR is not expressed on an NK-cell, therefore clonality of NK-LGLL is more difficult to establish. However, chromosomal abnormalities or skewed expression of killer-cell immunoglobulin-like receptors (KIRs) may suggest clonality in NK-LGLL. Future content will discuss this topic in more depth.
- **The TCR is a protein that is a receptor.** Its job is to recognize a specific antigen. An antigen is a portion of a microbe or an allergen, basically something foreign to the body. Recognition of the antigen will cause an immune response.
- As an example, LGLL Patient A and Patient B will have the same sequence for the CD3, CD8, or CD57 markers. However, Patient A's clonally expanded T-cell population will have a unique TCR sequence compared to Patient B.

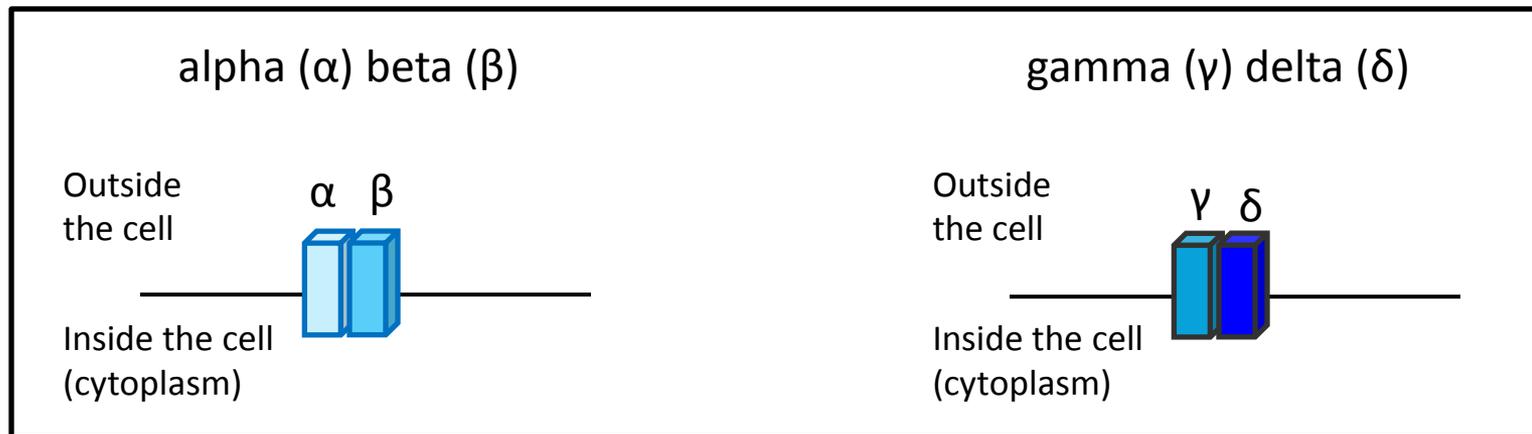
What does the TCR look like?



- After T-cells are produced in the bone marrow, they go to the thymus to mature.
- This maturation process will include the TCR rearrangement.
- The TCR is composed of two proteins, which in this case are alpha (α) and beta (β).
- The α and β proteins are composed of 3 or 4, respectively protein sub units.
- The unabridged version of this content describes how it is possible to have different combinations of these sub units. This generates a diverse set of T-cells to recognize a variety of foreign things (microbes, allergens, etc). In other words, diversity is the norm.
- If every T-cell has the same TCR protein subunits, this tells you a T-cell copied itself over and over due to an immune response to a specific antigen (for example, in the case of an infection).
- In LGLL, this large population of T-cells with the same TCR subunits persist in the bloodstream.

The TCR: $\alpha\beta$ vs. $\gamma\delta$

- The $\alpha\beta$ version of the TCR was described on the previous page. The $\alpha\beta$ type is more common, however another TCR type called $\gamma\delta$ can also exist. This type of receptor is made up of gamma (γ) and delta (δ) proteins. These are also composed of subunits, but are different from $\alpha\beta$. The type of TCR that is found in a patient's diagnostic test is not known to affect prognosis (likely outcome of the disease). It just means some patients create a different TCR type.
- Below, you can see the TCR now depicted as either an $\alpha\beta$ or $\gamma\delta$ type.



- To visually see how TCR clonality in T-cells differs between LGLL and a healthy individual, you can refer to *“What does clonality look like in LGL leukemia?”*
- To get a more in-depth look at the TCR, you can view the unabridged version of this content.