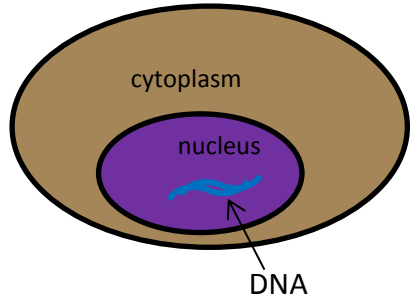


## What is the T-cell receptor (TCR)? Analogy

## Overview:

- The **T-cell receptor (TCR)** is a protein that is made up of many parts. Its job is to recognize an antigen (foreign substance in the body).
- In this analogy, we will say that T-cells are like factories and the TCR is the product it manufactures, which in this case will be a bag.
- Each factory makes a different type of bag. Depending on the market, the demand for one type of bag may cause the factory that produces it to build new factories to manufacture more bags.
- The T-cell can be considered in the same way: whichever T-cell has the right TCR on its surface to recognize an antigen will cause that cell population to increase (clonally expand) to try and clear the antigen.

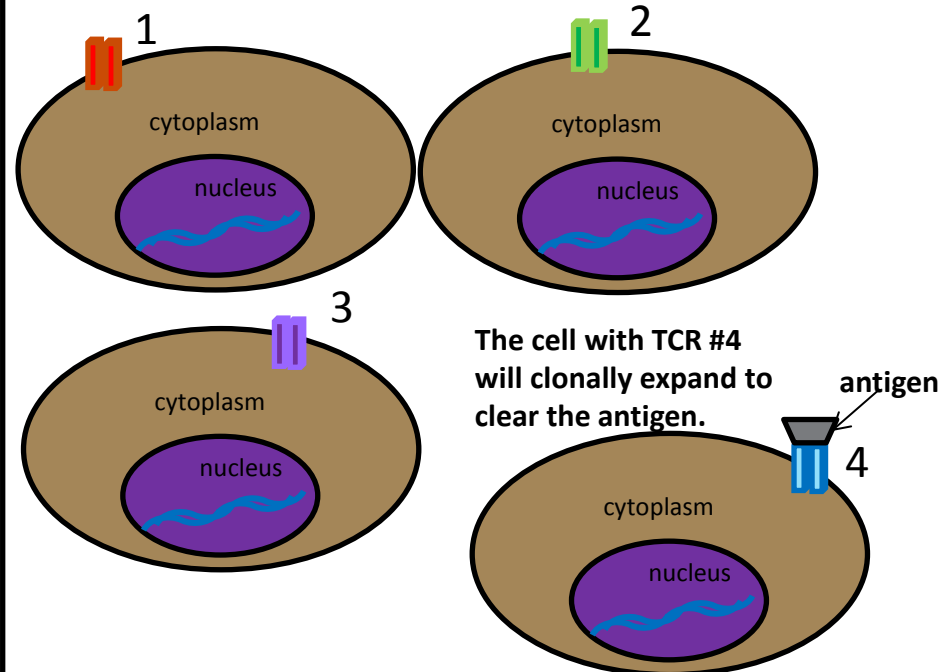
### T-cell in the bone marrow



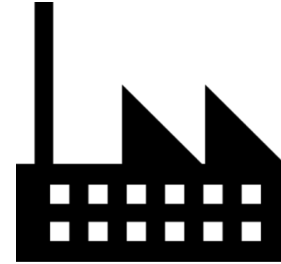
- The TCR is a protein product created from DNA (blue wavy lines). It is composed of 2 proteins which are either  $\alpha\beta$  or  $\gamma\delta$ .
- A T-cell from the bone marrow has the potential to produce all the TCR types.

### T-cell in the thymus

1, 2, 3, 4 in the diagram represent the different TCRs on each cell. In this case, "4" is the right one for identifying the antigen.



### Factory without a specific market



- The factory has just been built but is not manufacturing bags yet.
- The factory has all the correct machinery installed and a large inventory of material to manufacture bags, but has not configured these resources to produce a particular product.

### Factory with a specific market

Each factory manufactures a different type of bag. The current market demand is for bags that can accommodate a textbook. The textbook is like an antigen. The brown paper bag, purse, and small shopping bag cannot accommodate a textbook. Only the backpack can do this.

