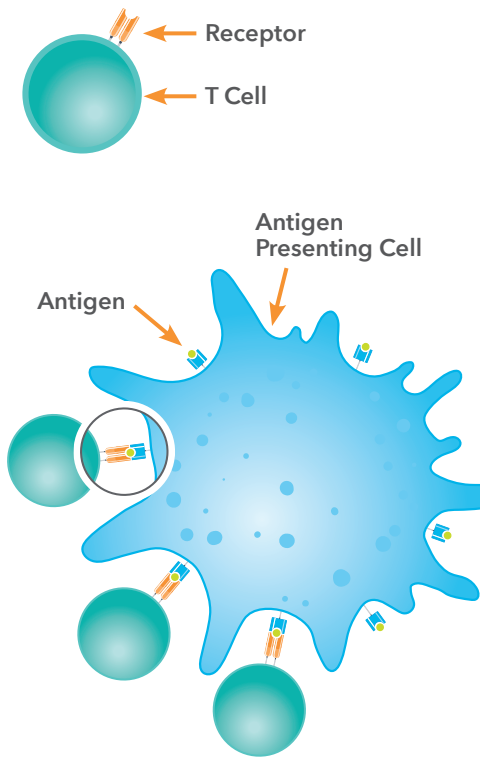


LEARNING TO "READ" THE IMMUNE SYSTEM TO DIAGNOSE DISEASE

The immune system is nature's most finely-tuned diagnostic which defends the body against disease



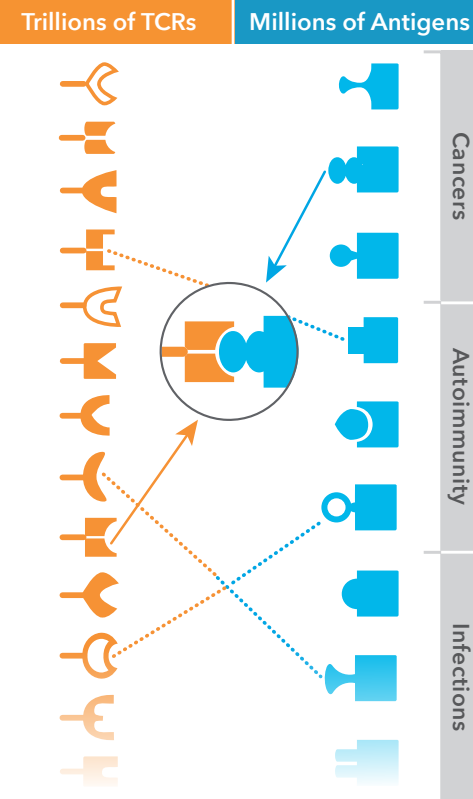
Key immune cells have receptors (T Cell Receptors, or TCRs) that have a genetic code, or sequence, that reads signals of disease



- A T cell is a type of immune cell that recognizes signals of disease, called antigens, using receptors on their surface.
- When the T cell receptor (TCR) binds to an antigen, the T cell replicates and attacks the disease.
- After an immune reaction, some T cells remain in the blood for many years.

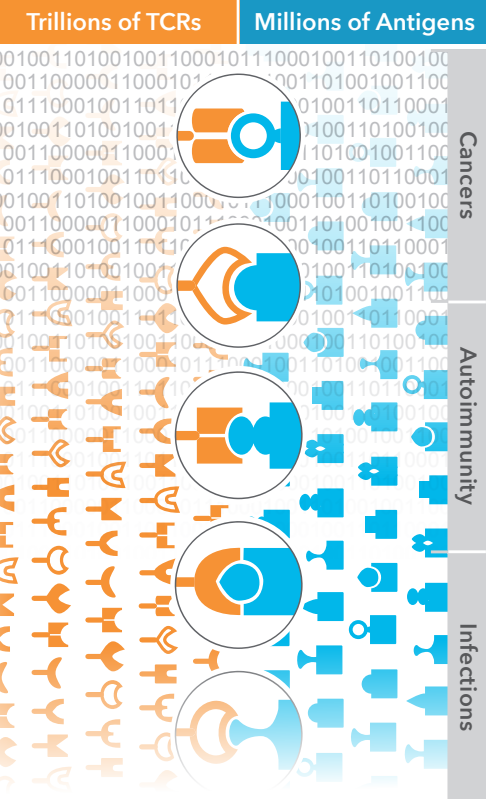
- Healthy individuals have an estimated 50+ million TCRs in their blood.
- Until recently, we have not been able to "read" this code to understand how the immune system detects disease.
- With new technologies like immune sequencing, we can now see the genetic code of millions of different T cells.

By matching TCR sequences to the antigens they bind, we can advance our understanding of the immune system



- The immune system is designed to scan for and respond to the antigens that a person encounters.
- There are approximately one million clinically relevant antigens.
- Recent advances in immune sequencing have enabled an ability to match TCRs to the antigens they recognize for hundreds of antigens.

Combining immunosequencing with machine learning will allow us to map immune cells to antigens on a massive scale



- Machine learning can help us extend the number of TCR-antigen matches from hundreds to trillions.
- This unprecedented amount of biological data will reveal how the immune system detects most diseases across the population.
- In the future, a simple blood test should show which diseases a person has seen or is developing.