

What is cancer immunotherapy?

SFB 1335 Aberrant Immune Signals in Cancer

Prof. Dr. Julia Jellusova

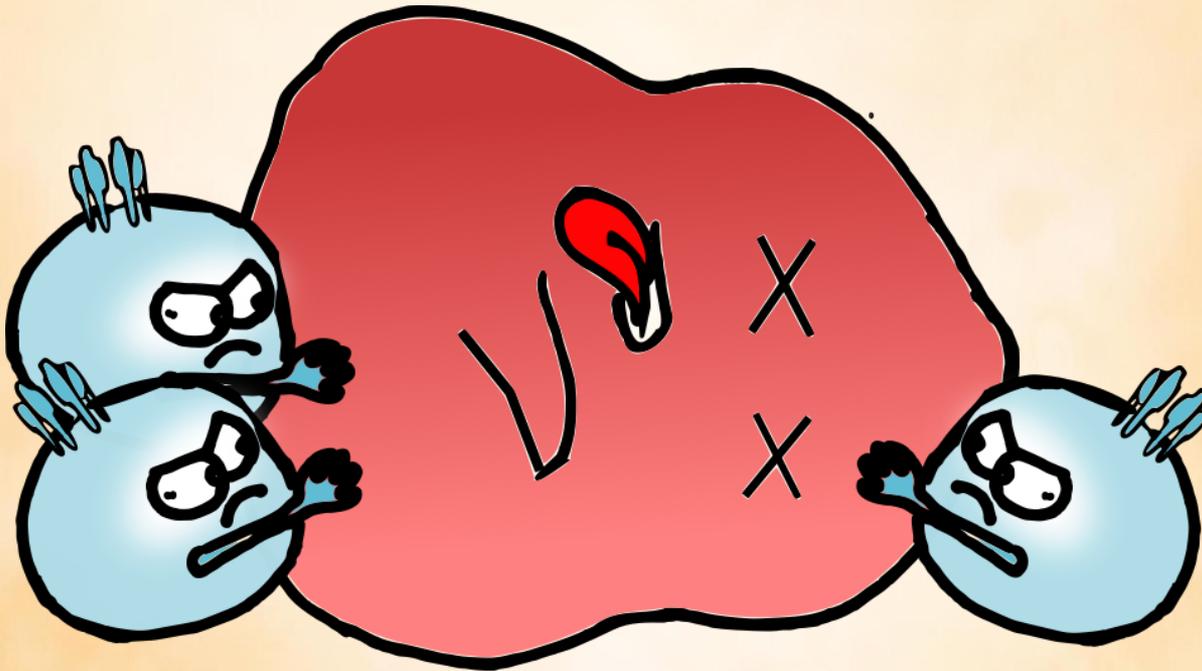
Institute for Clinical Chemistry and Pathobiochemistry

Klinikum Rechts der Isar

School of Medicine

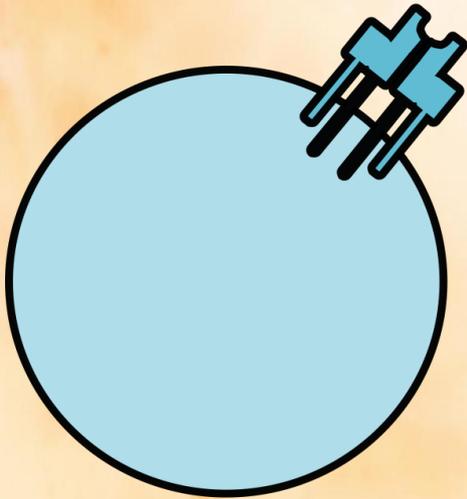
Technical University Munich

Our immune system can fight cancer.
T cells are able to recognize and kill cancer cells.

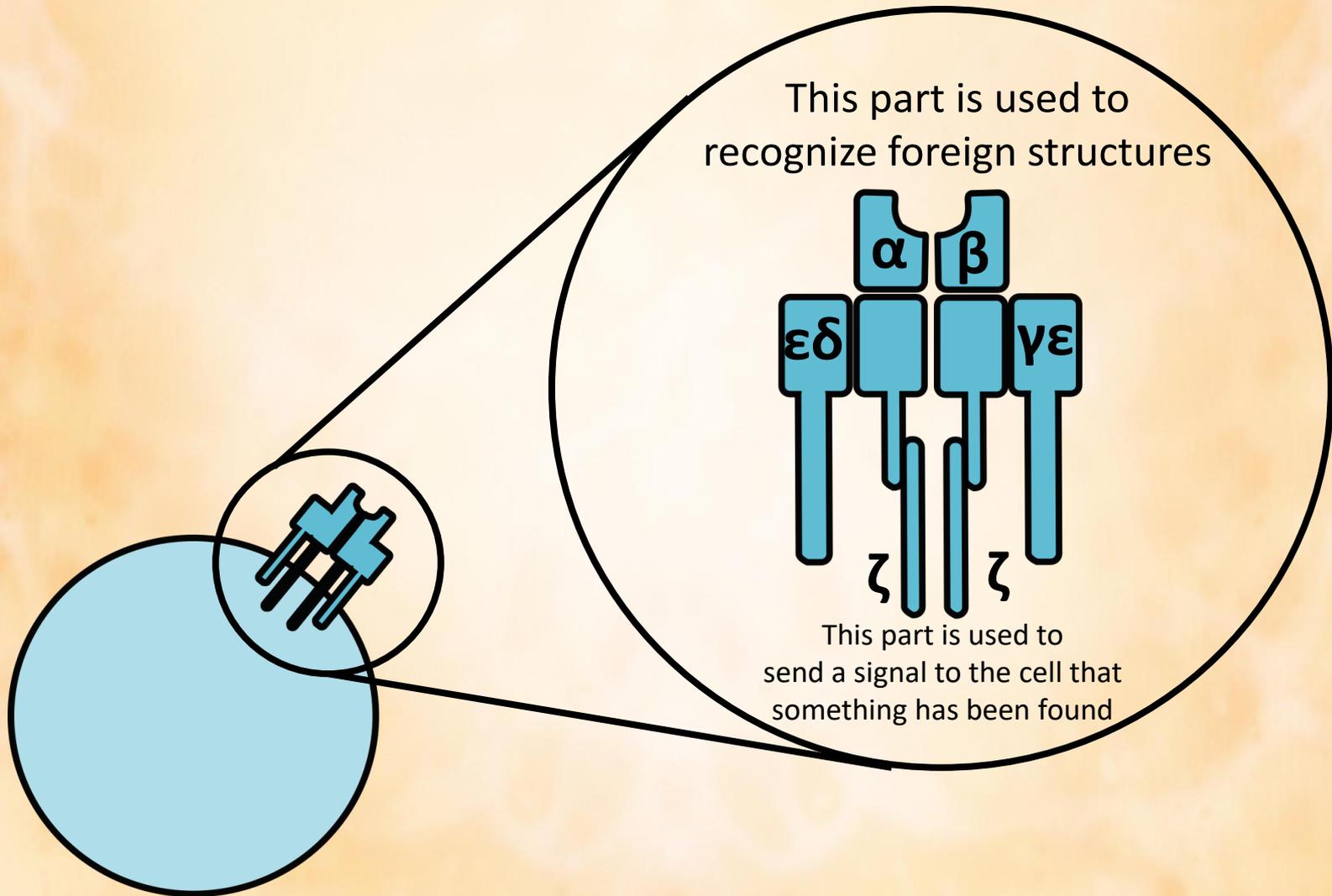


T cells are an important part of our adaptive immune system

- Every individual T cell recognizes a different structure- for example a protein on the surface of a virus
- We have many different T cells recognizing many different structures
- T cells can identify and kill virus infected cells or cancer cells and can support the function of other cells of the immune system

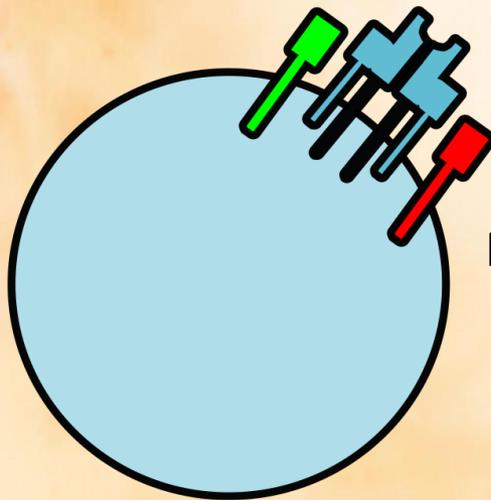


T cells use the “T cell receptor” to find infected cells or cancer cells



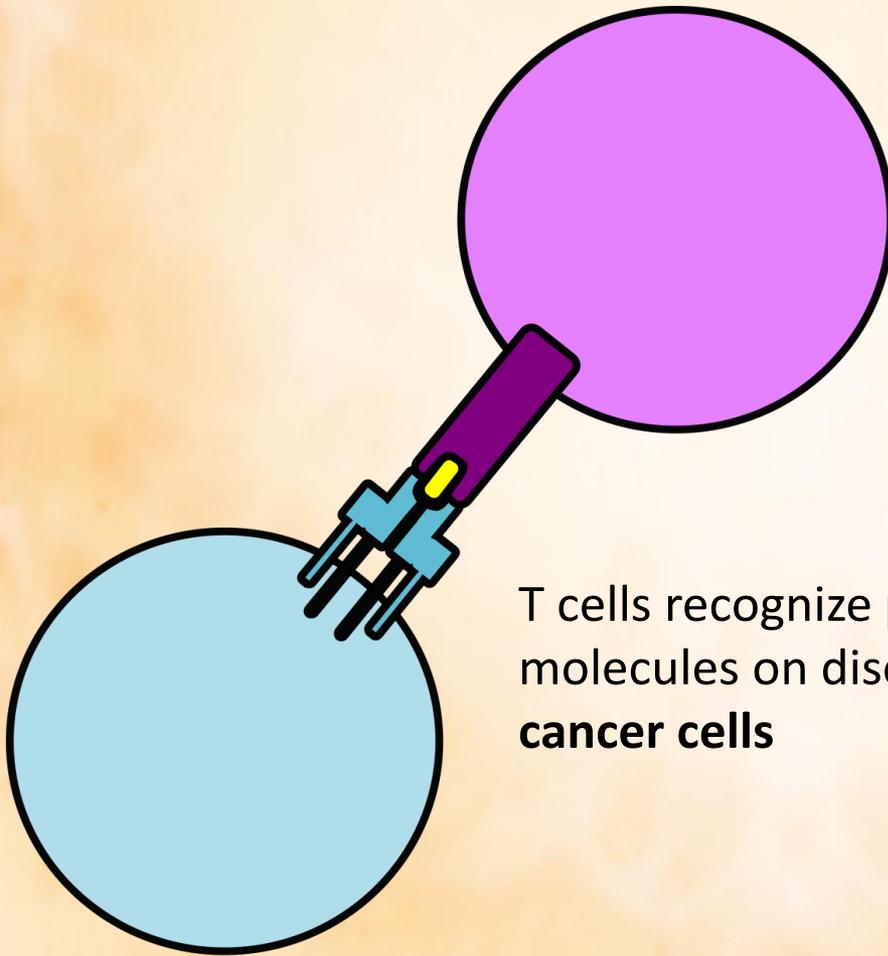
T cells use other receptors as well to get information

These receptors tell the cell to respond stronger:
CD28, 4-1BB



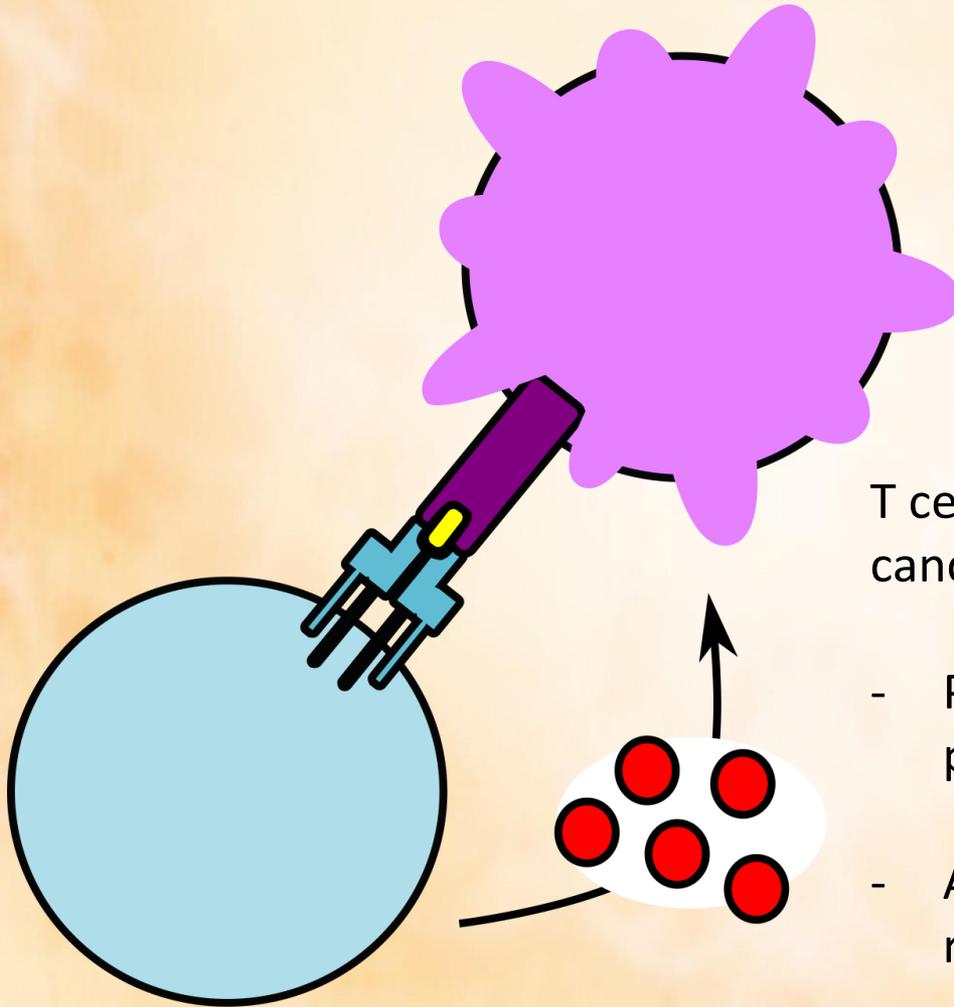
These receptors tell the cell to respond weaker:
PD1, CTLA4

T cells “know” a cell is a cancer cell because it makes proteins that normal cells don’t make. The T cell can recognize these proteins with their T cell receptor.



T cells recognize peptides presented on MHC-I molecules on diseased cells: Virus infected cells, **cancer cells**

T cells can kill cancer cells



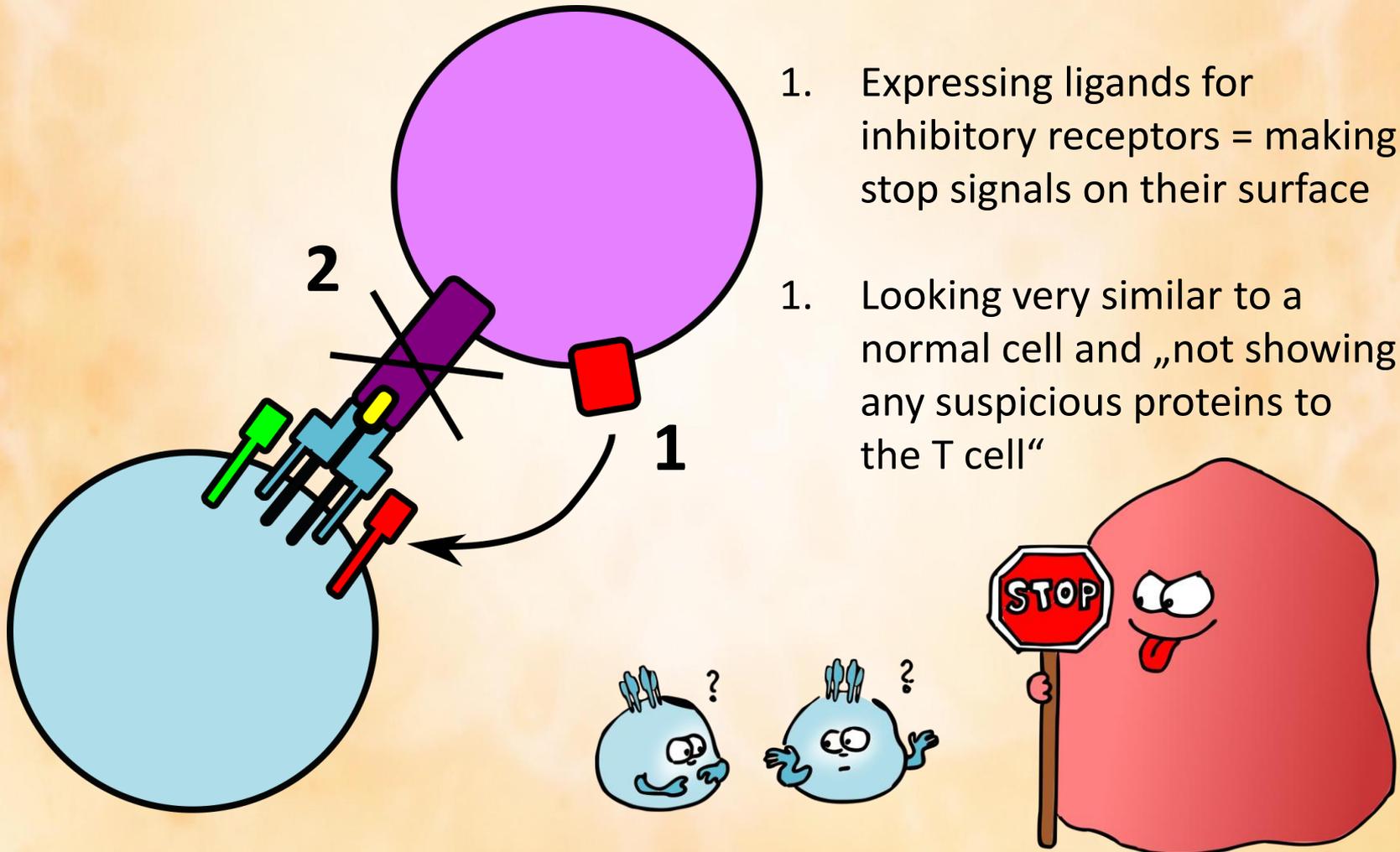
T cells can contribute to eliminating cancer cells by:

- Producing toxic proteins such as perforin and granzyme
- Activation of FAS (the „death receptor“) on the cell surface

Sometimes T cells fail to kill cancer cells

Cancer cells can evade the immune system by:

1. Expressing ligands for inhibitory receptors = making stop signals on their surface
1. Looking very similar to a normal cell and „not showing any suspicious proteins to the T cell“



How can we help the immune system fight cancer?

Different types of immune therapy:

- Checkpoint inhibitors
- CAR T cells

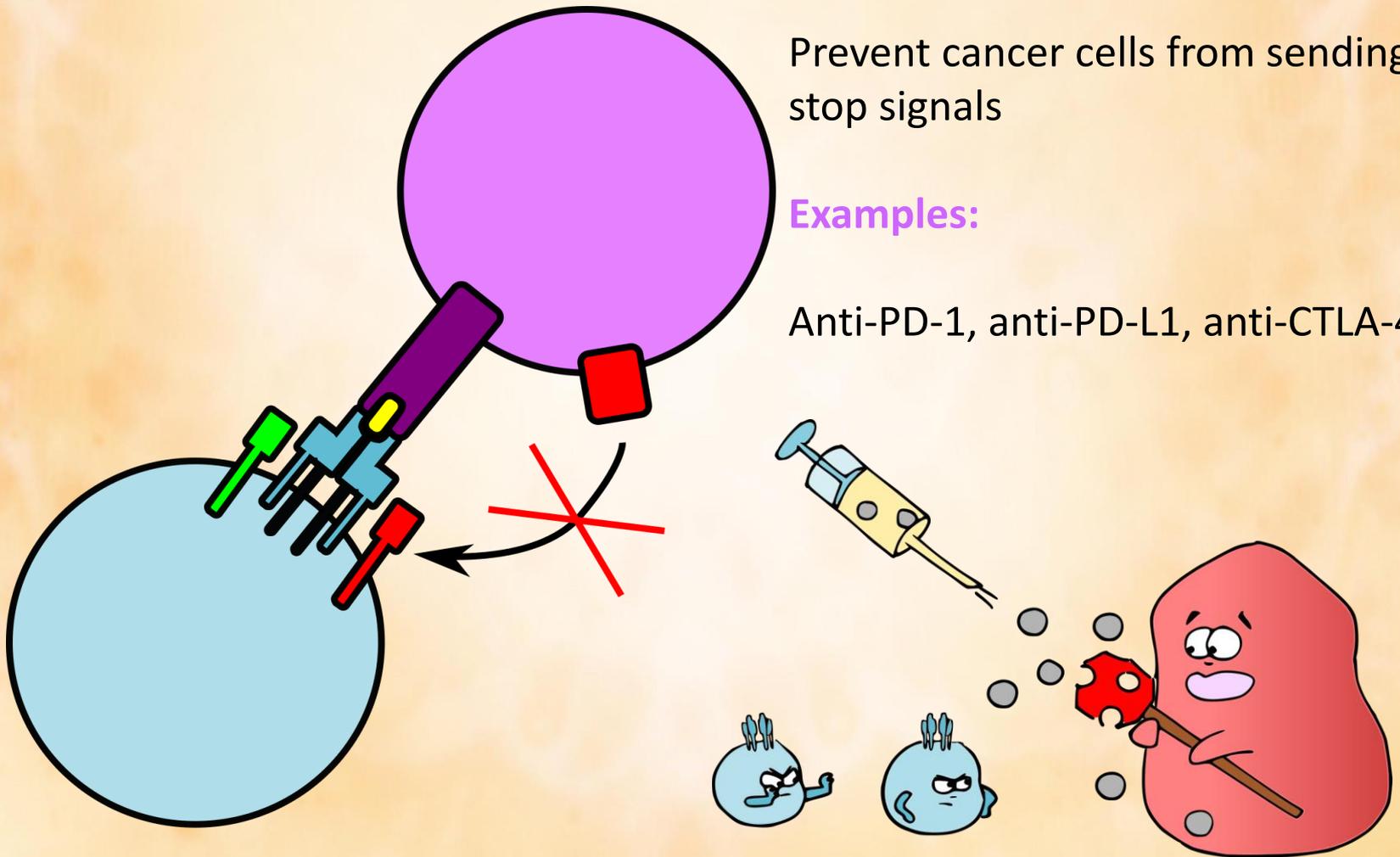
Checkpoint inhibitors

Mechanism of action:

Prevent cancer cells from sending stop signals

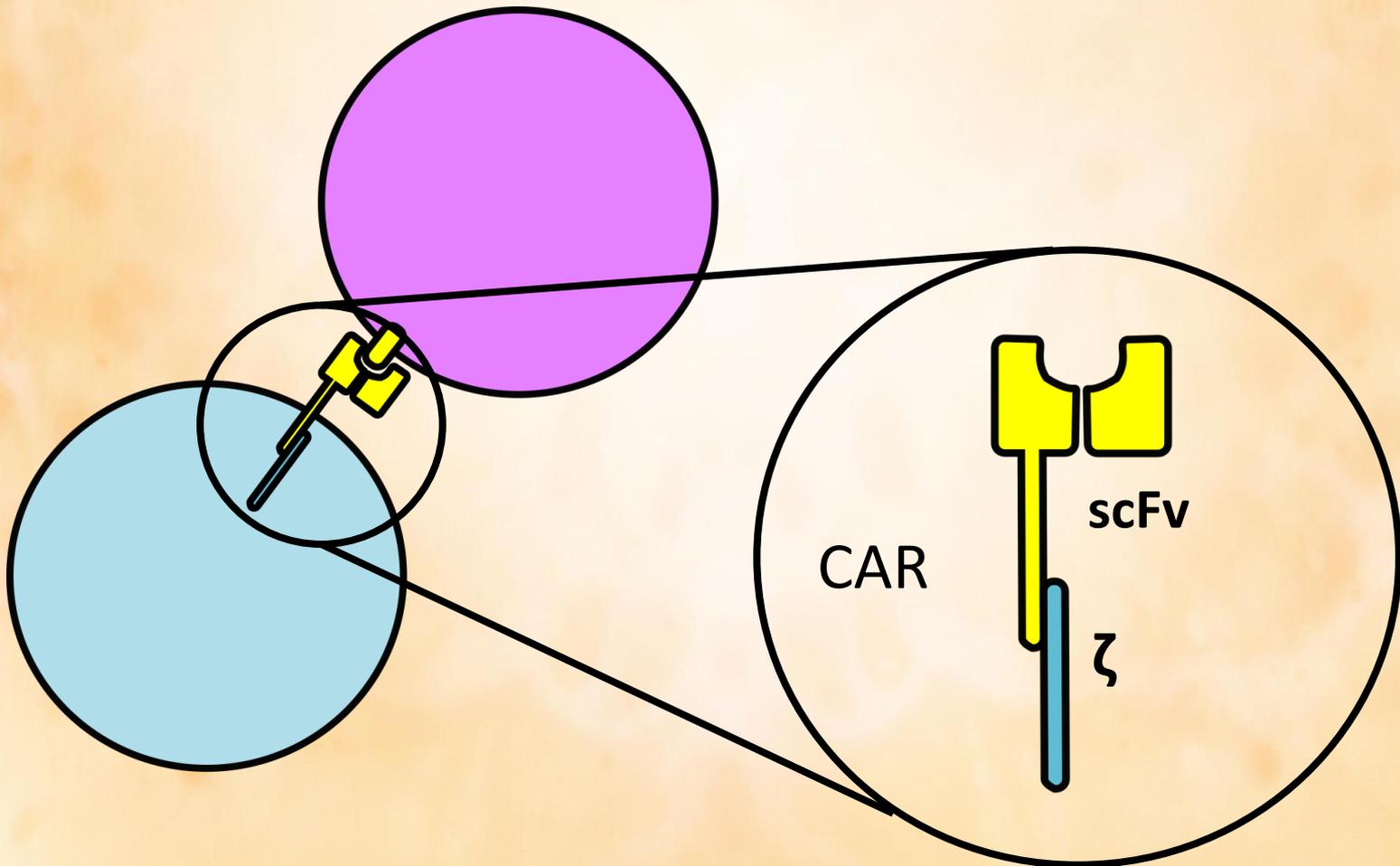
Examples:

Anti-PD-1, anti-PD-L1, anti-CTLA-4



CAR-T cells

New receptors are created by scientists to help T cells recognize cancer cells
These new receptors are called „chimeric antigen receptors“ i.e CAR



Research is focusing on making better and better CARs, which will boost T cell responses to cancer cells

