# NEOANTIGENS

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# Scope

- ✓ Introduction to cancer antigens
- ✓ Definition and source of neoantigens
- ✓ Discovery of neoantigens; using bioinformatical approaches
- ✓ Kinds of neoantigen-based therapies
- ✓ Production of neoantigen-based immunotherapies

# What is an antigen?

An antigen is any substance which causes the immune system to produce antibodies against it

The immune system doesn't recognize it, and tries to fight it

Antigens could arise from the environment, such as; chemicals, bacteria, viruses, or pollen

They may also form from inside the body

# Cancer antigens

Cancer cells "abnormal cells" produce antigens – they get stack on cancer cell surfaces.

Antigens "uniquely" mark tumor cells from normal cells, and present tumor cells to the immune system

| | Tumor antigens | Central tolerance | Autoimmune toxicities |
|---|---|---|---|
| Tumor-associated antigens (TAAs) | Overexpressed proteins, lineage-specific differentiation markers | The central and peripheral tolerance | Colitis, renal impairment, severe hepatitis, rapid respiratory failure, treatment-related death |
| | Cancer germline antigens (CGAs) | The central and peripheral tolerance | Colitis, renal impairment, severe hepatitis, rapid respiratory failure, treatment-related death |
| Tumor-specific-antigens (TSAs) | Oncoviral antigens | Non-central tolerance | Less |
| | Neoantigens | Non-central tolerance | Less |

Neoantigens: promising targets for cancer therapy; Xie *et al.*, 2023

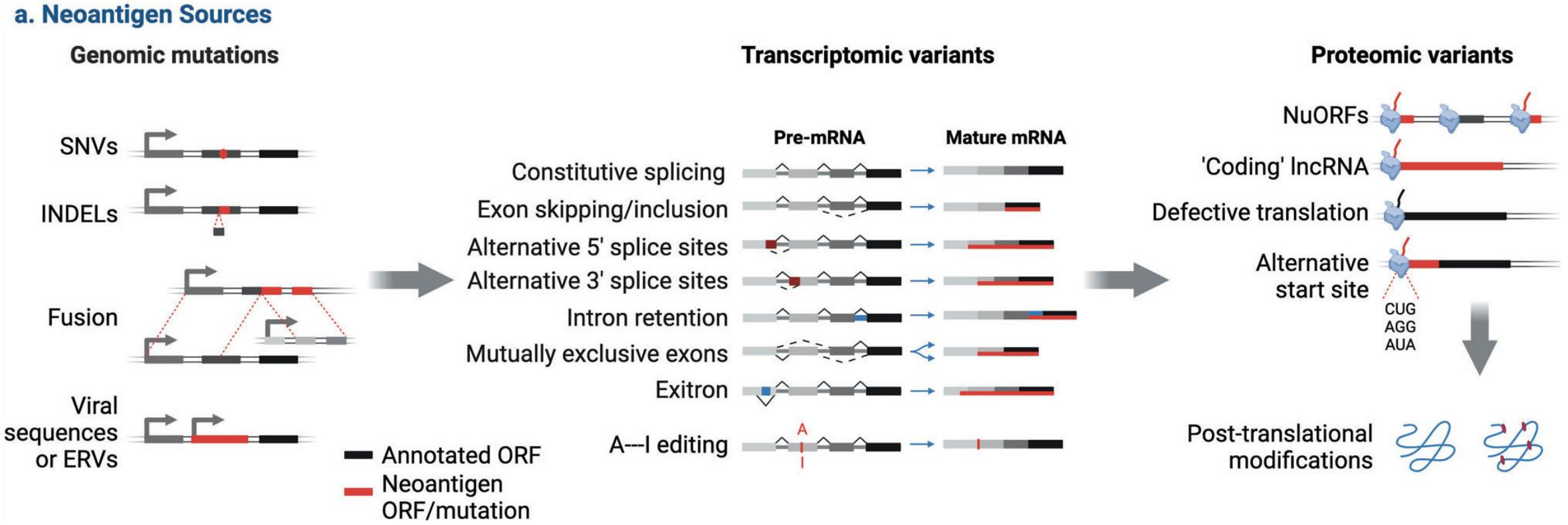
# What are neoantigens?

Neoantigens are mutated (or aberrant) peptides (proteins) derived from tumor cells

They may arise due to;

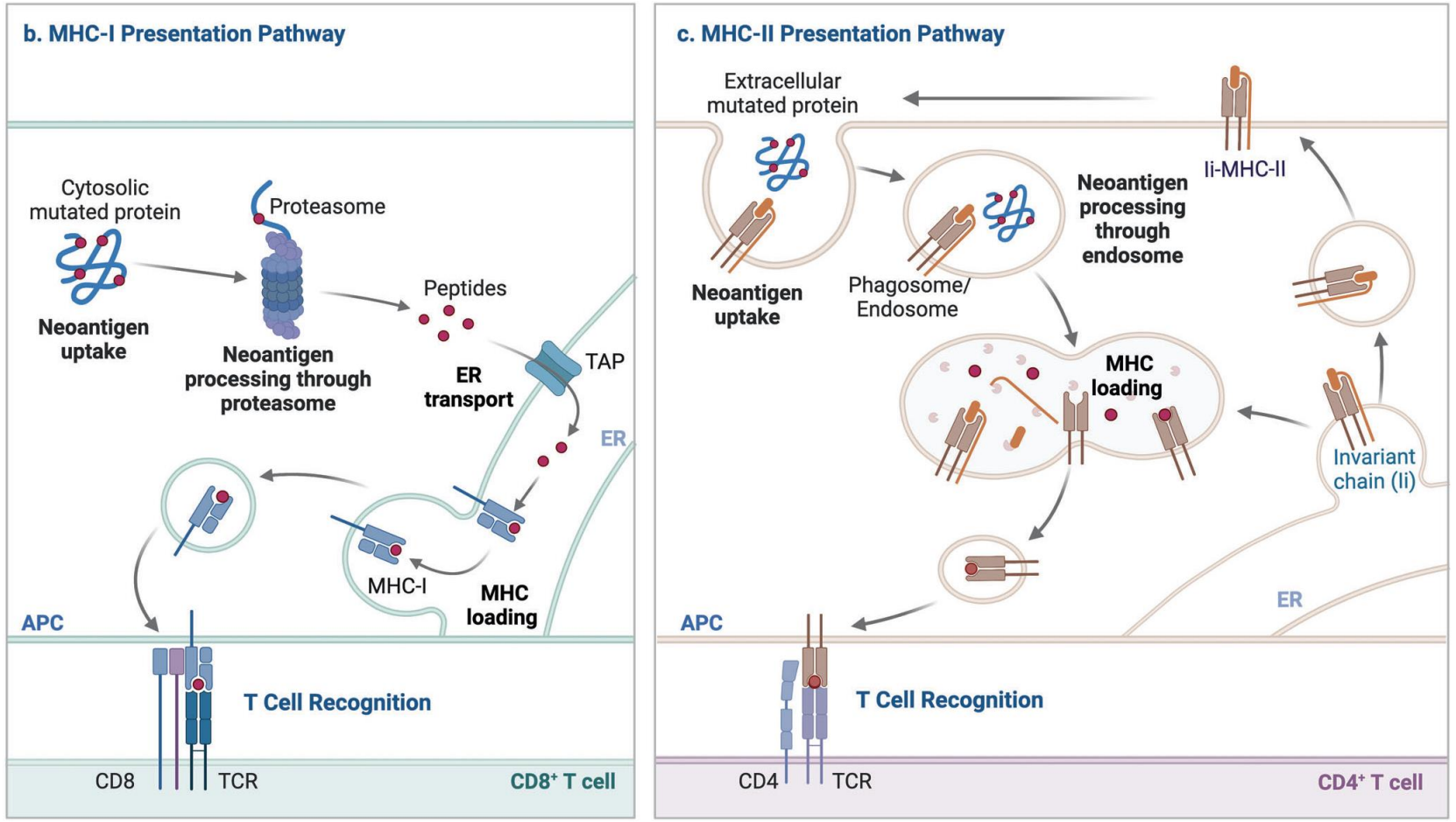
- ✓ Somatic mutations
- ✓Dysregulated RNA splicing
- ✓Dysregulated translation
- ✓Disordered post translational modifications

# Sources of neoantigens



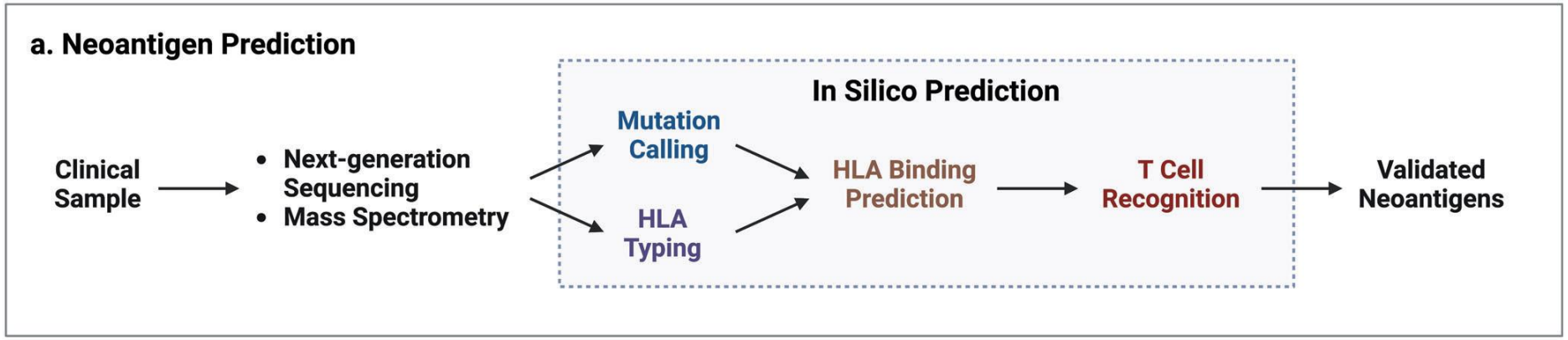

Neoantigens: promising targets for cancer therapy; Xie *et al.*, 2023

# Presentation of neoantigens on APCs




Xie et al., 2023

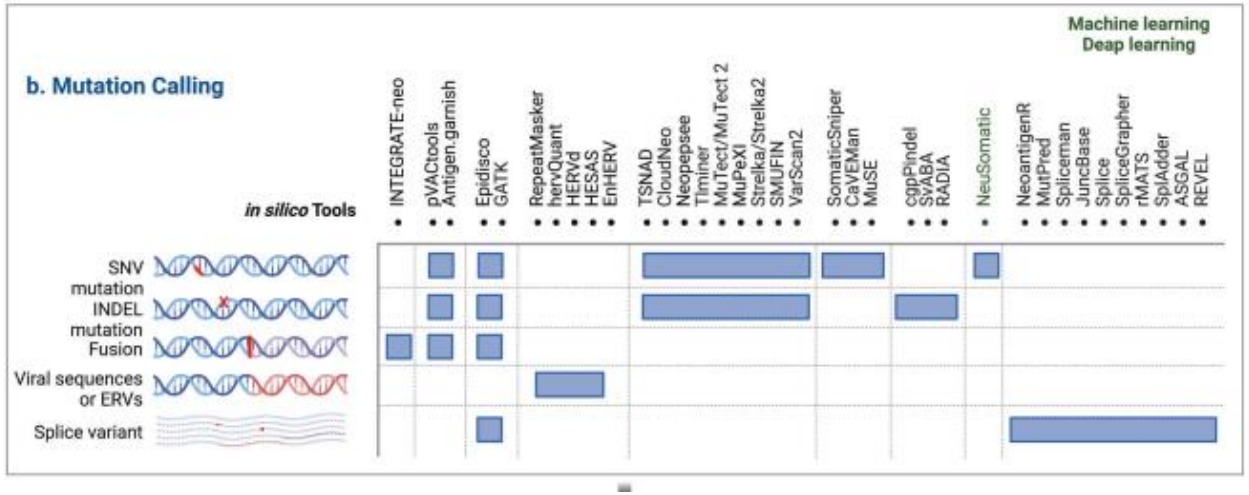
# Identification of neoantigens

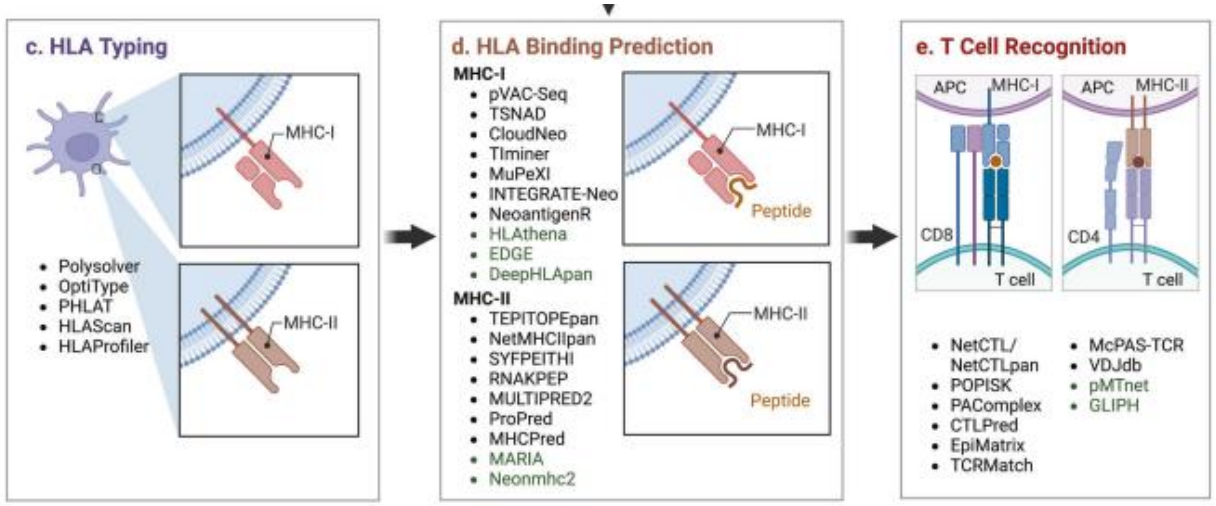



Approaches used;

- Immunogenomic
- Immunopeptidomic

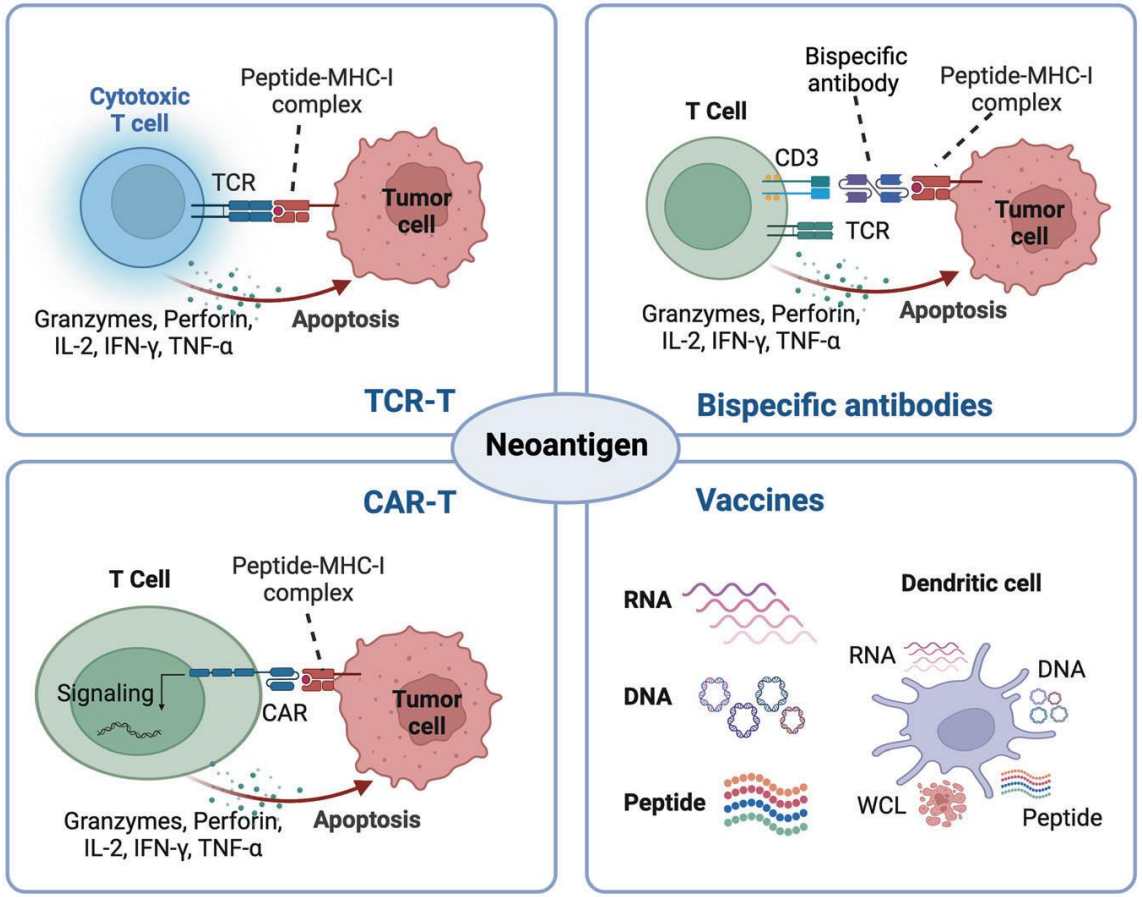
# The Pipeline



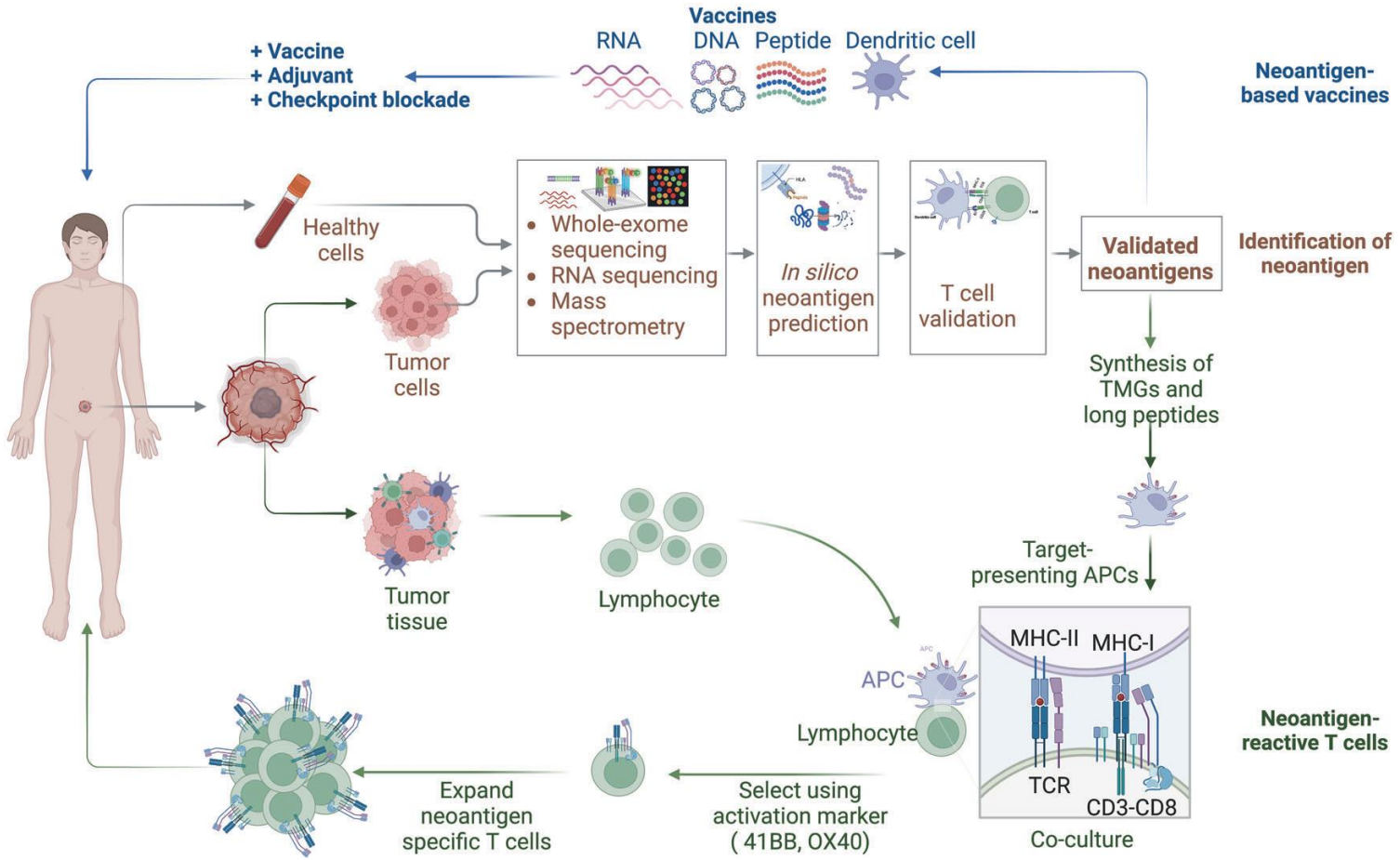




- **HLA Typing**
  - Patient HLA alleles determine the tumor-specific neoantigen repertoire presented for T-cell recognition
- Cut-offs for Binding Peptides

# Neoantigen-based therapies



# Production of neoantigen-based therapies



# THANK YOU