

TUMOR IMMUNOLOGY

How does cancer arise? II

Q: What causes dysregulated cell growth & proliferation?

- **Intrinsic factors** - Genetic mutations on Oncogenes & Tumor suppressor genes
- **Environmental factors** - Radiation, and others Carcinogens
- **Microbial infections** - Viruses (viral oncogenes) and Bacteria

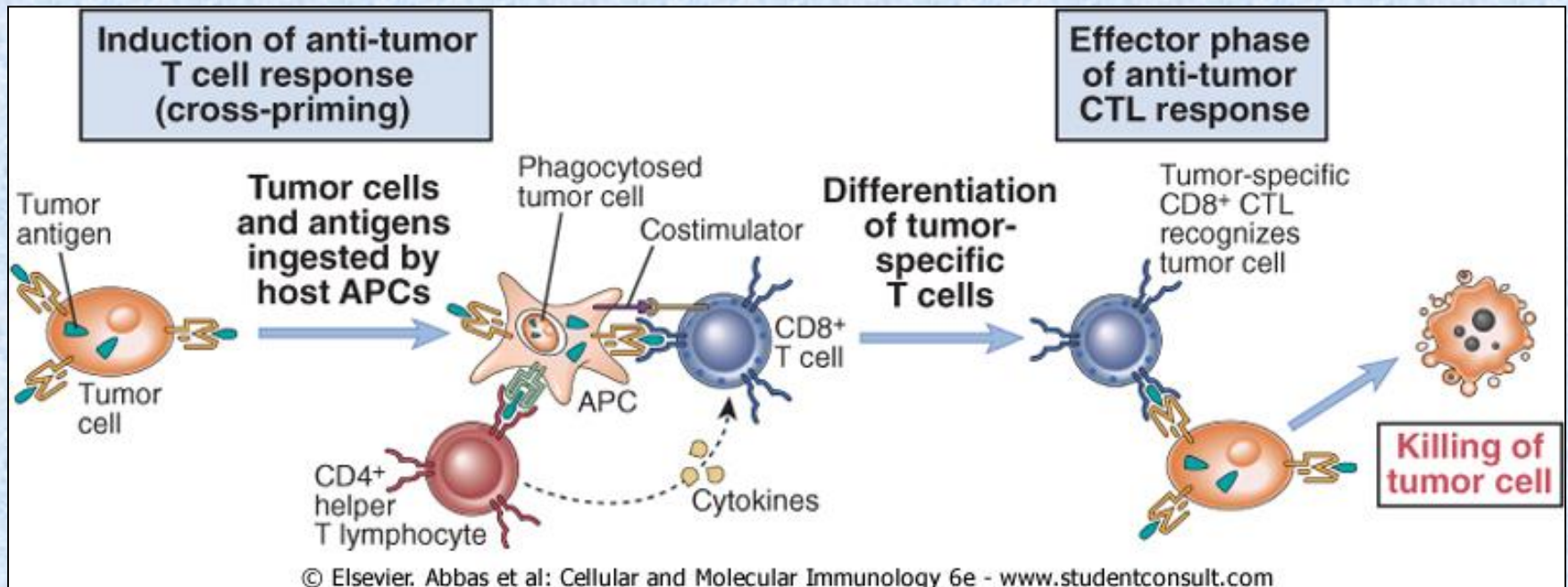
The Strategies for Cancer Therapy

The best scenario - Kill all the tumor cells without destroy others in the body

1. Surgery - remove tumor cells & tissues physically
2. Radiotherapy - non-selective, strong side effect
3. Chemotherapy - non-selective, strong side effect
4. **Gene therapy** - relatively selective
5. **Targeted therapy** - relatively selective to cancer cells
6. **Immunotherapy** => manipulate an immune response against tumor cells but not normal cells
=> quite selective

Induction of T cell responses to tumors

Cross-priming (cross-presentation) mediated by APCs, ex. DCs

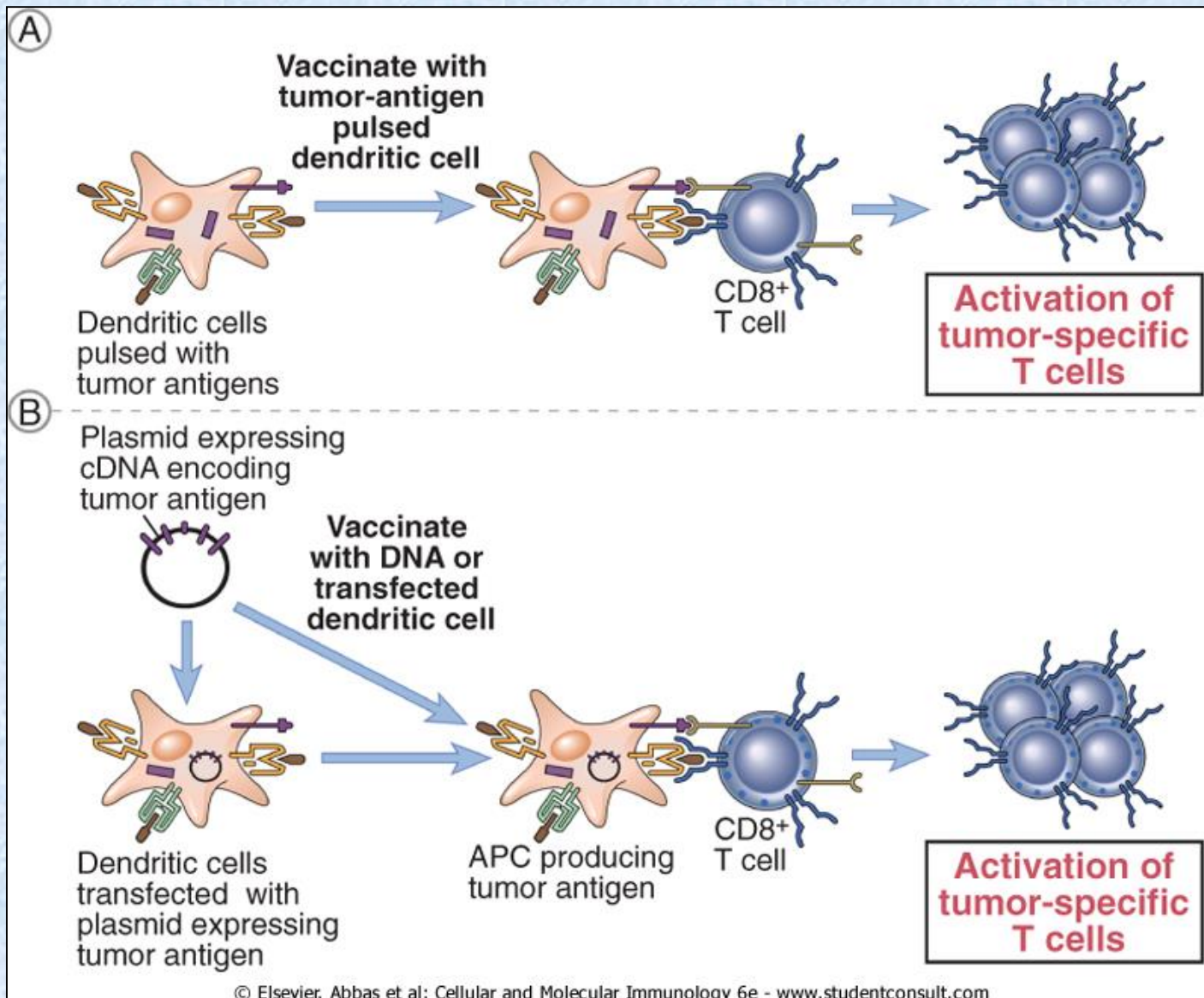


Immune responses to tumors

1. Adaptive immune responses to tumors:
 - a. CD8 CTLs are the key players on the killing effect of tumors.
 - b. CD4 T helper cells => cytokines => CTLs
 - c. Abs => activating complements or Ab-dep cell-med toxicity
=> preventing oncogenic viruses

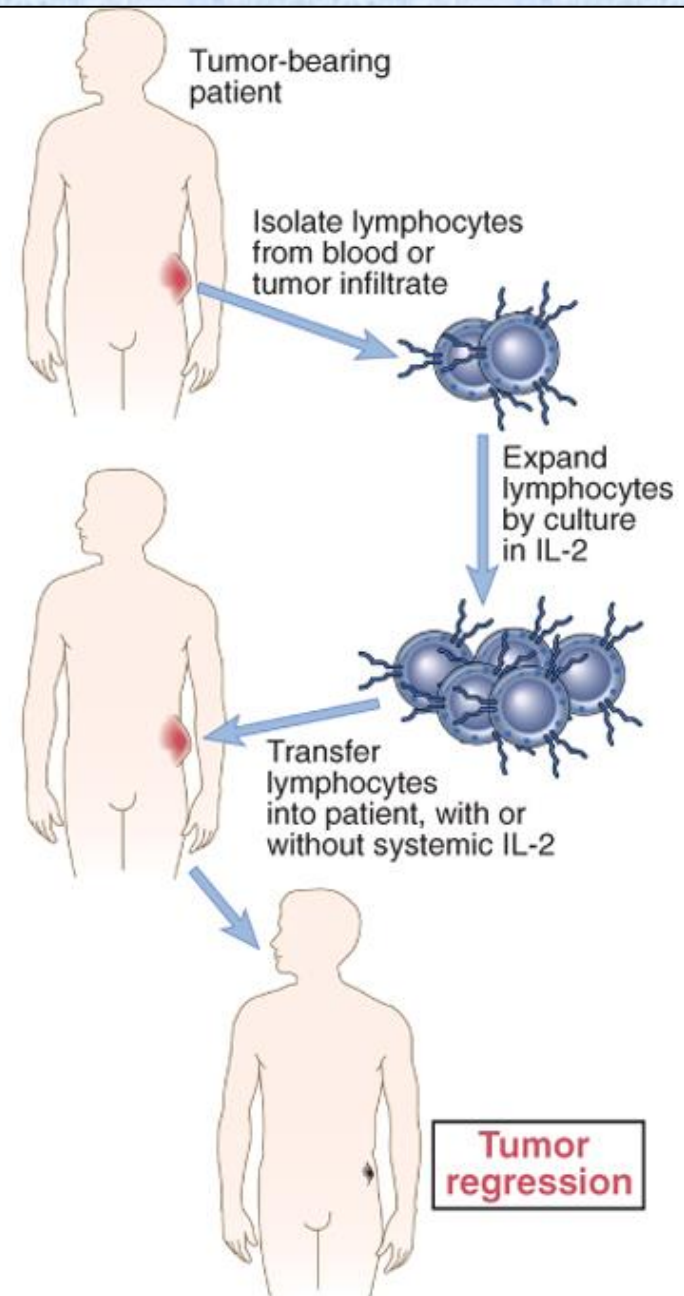
2. Innate immune responses to tumors:
 - a. NK cells kill many types of tumor cells that have reduced class-I but express ligands for activating NK cells.
 - b. Macrophages => Ab-med phagocytosis
=> Cytokines (TNF-a)

Tumor vaccines-Targeting DCs



Passive Immunotherapy for tumors

Adoptive cellular therapy



Therapy with Anti-tumor Monoclonal Abs

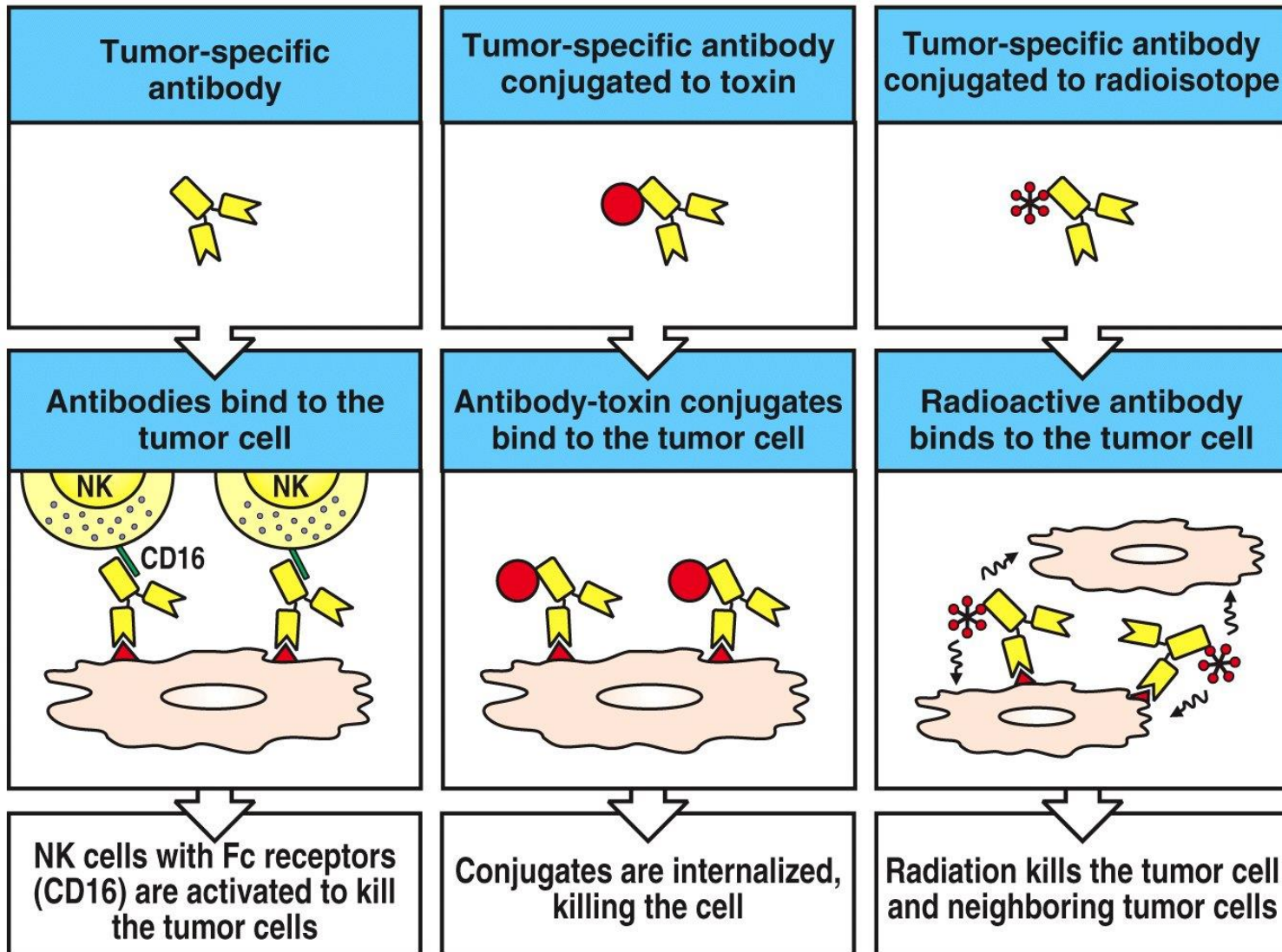


Figure 14-17 Immunobiology, 6/e. (© Garland Science 2005)

Approved Anti-tumor mAb

Specificity of antibody	Form of antibody used	Clinical trials
Her-2/Neu	Humanized mouse monoclonal	Breast cancer (approved for clinical use)
CD20 (B cell marker)	Humanized mouse monoclonal	B cell lymphoma
CD10	Humanized mouse monoclonal, immunotoxin	B cell lymphoma; in routine use to purge bone marrow of residual tumor cells
CEA	Humanized mouse monoclonal	Gastrointestinal cancers, lung cancer
CA-125	Mouse monoclonal	Ovarian cancer
GD3 ganglioside	Humanized mouse monoclonal	Melanoma

Abbreviation: CEA, carcinoembryonic antigen.