Complementary Interactions between Proteins and Ligands

The Immune System and **Immunoglobins**

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Antibody

Immune System

- ✓ Capable of distinguishing molecular "**self**" from "**nonself**".
- ✓ Cellular immune system
  - ◆ Derived from T lymphocytes (T cells)
  - ◆ T cell receptor
- ✓ Humoral immune system
  - ◆ Derived from B lymphocytes (B cells)
    - ✓ Immunoglobin (Ig) or antibody (Ab)

IgG

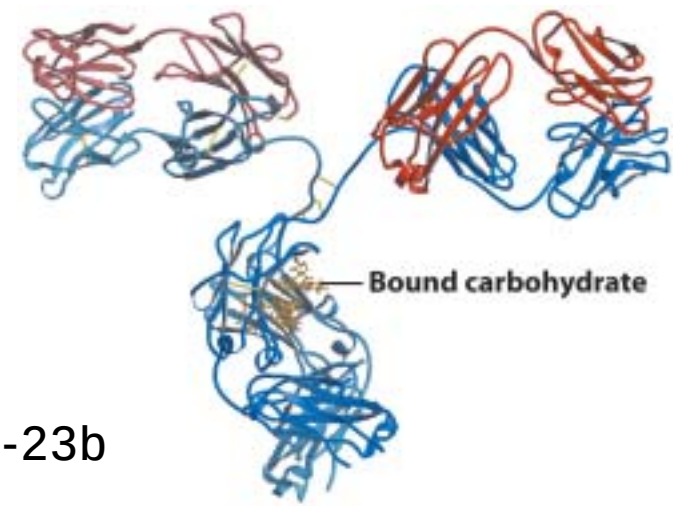

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Fig 5-23b

Lexicons in immunology

- Antigen (Ag)
  - Any molecule or pathogen capable of eliciting an immune response
  - Recognized by antibody or T-cell receptor
- Antigenic determinant (epitope)

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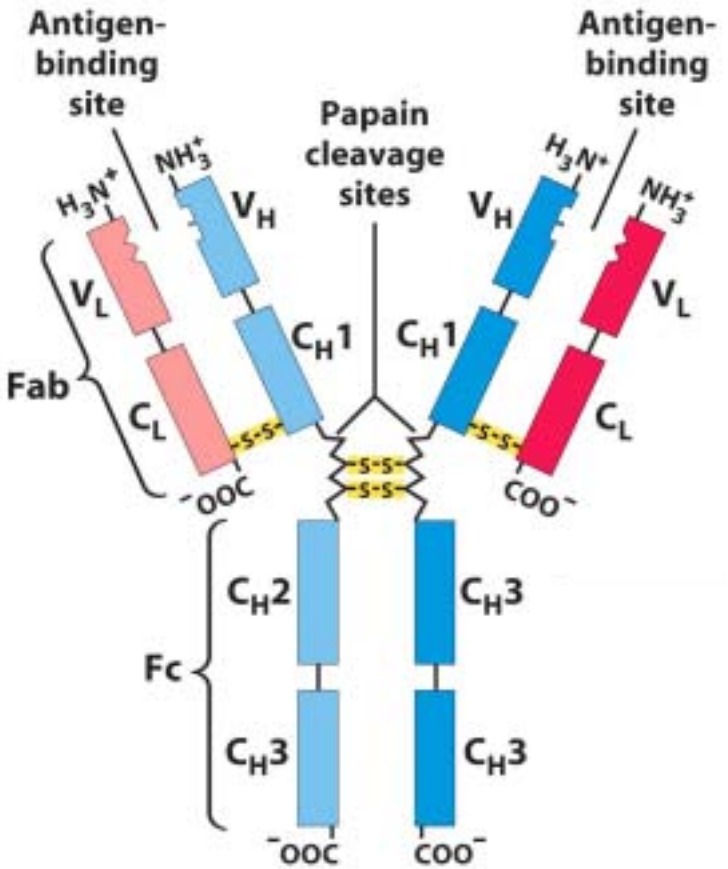
Structure of antibody

- Immunoglobulin (Ig)
  - IgA (α)
  - IgD (δ)
  - IgE (ε)
  - IgG (γ)
  - IgM (μ)
- Y shape structure
  - 4 polypeptide chains
  - 2 heavy chains + 2 light chains
  - Fc: basal fragment
  - Fab: the Ag-binding fragment

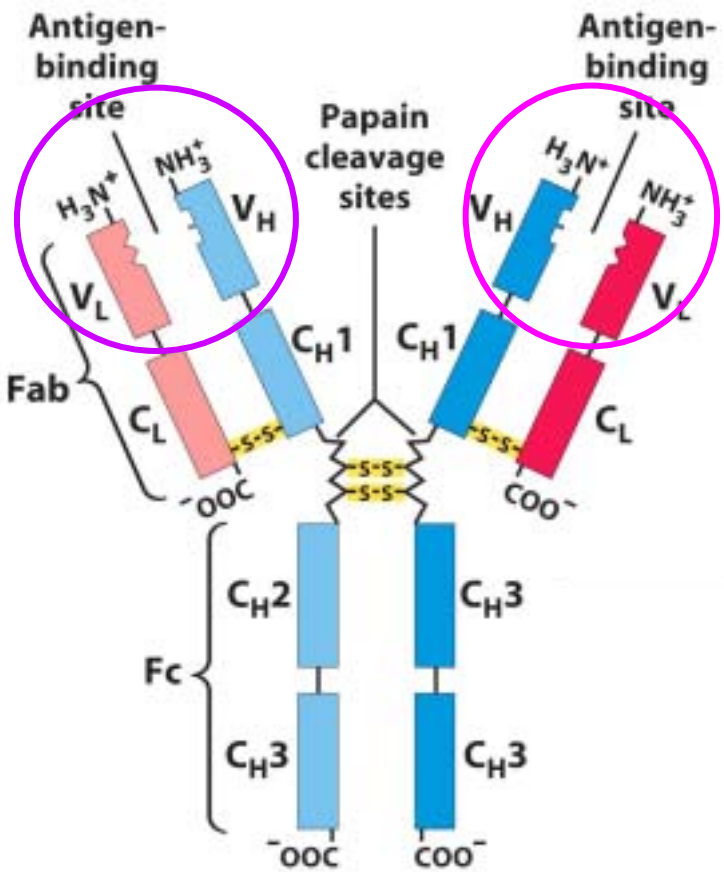
Fig 5-23a, p. 178



IgG structure

- Constant domain
  - Immunoglobin fold (β conformation)
- Variable domain
  - V_H and V_L associate to form the Ag-binding site

Fig 5-23a, p. 178

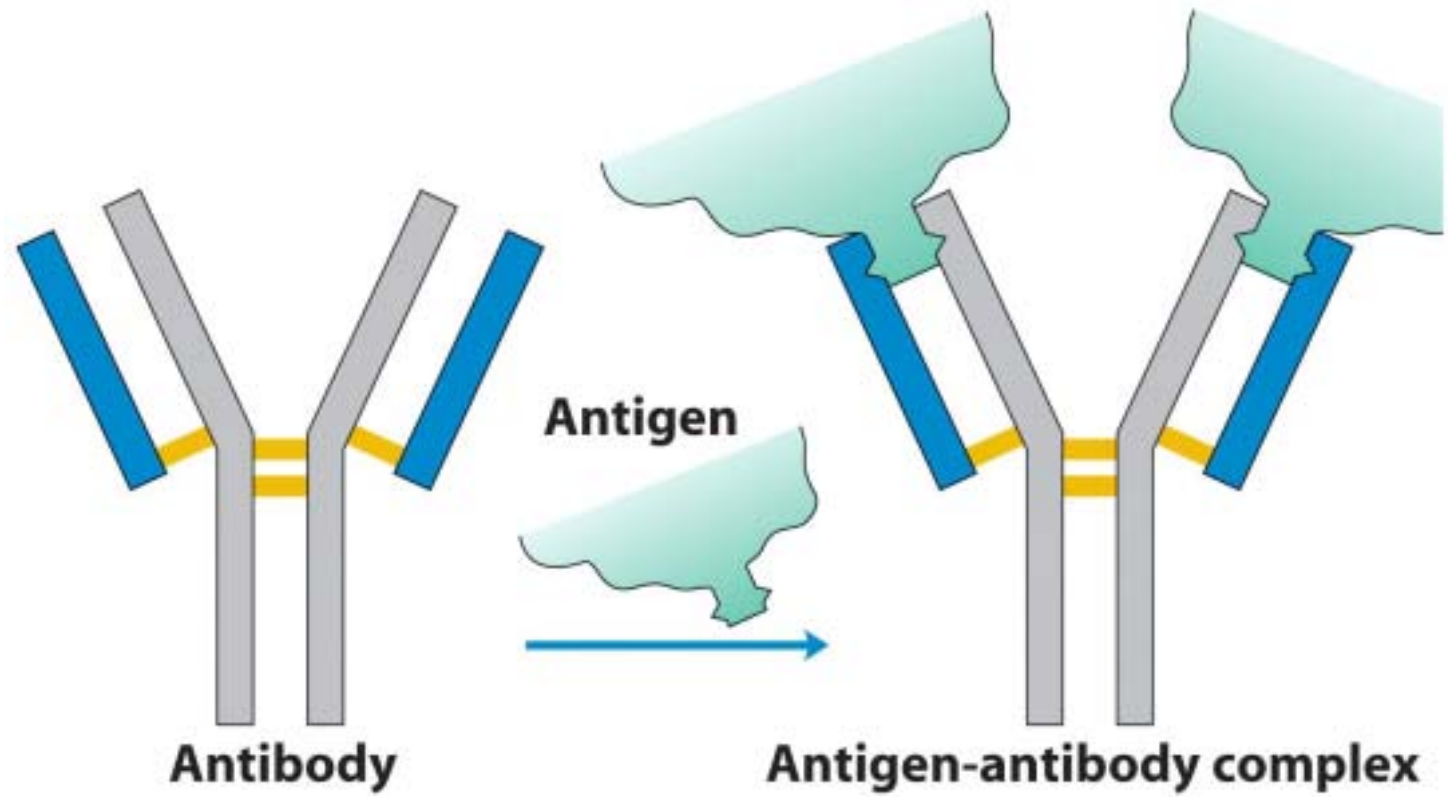


C: constant domain
V: variable domain
H: heavy chain
L: light chain

Ag-Ab complex

- Complimentary structure
- Affinity and specificity
- Induced fit

Fig 5-24



Applications (I)

- Polyclonal Ab
  - Ab Mixture
- Monoclonal Ab
  - Synthesized by one clone of B cells
  - Homogeneous Ab
  - Recognizing the same epitope

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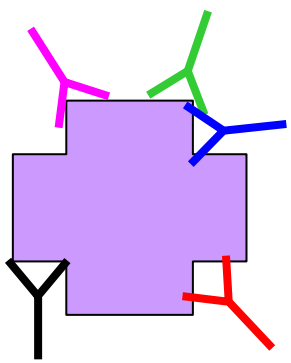
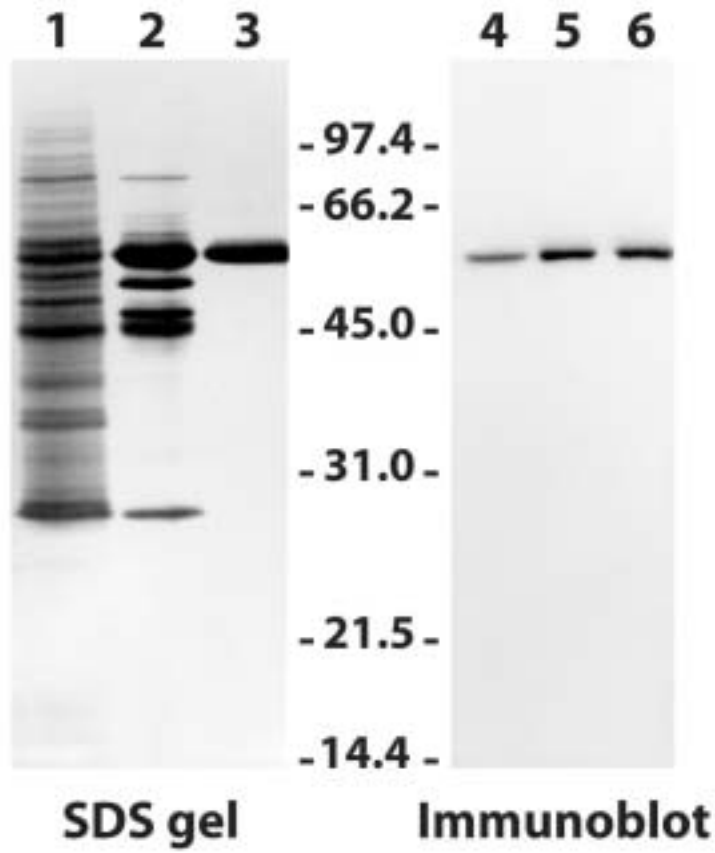


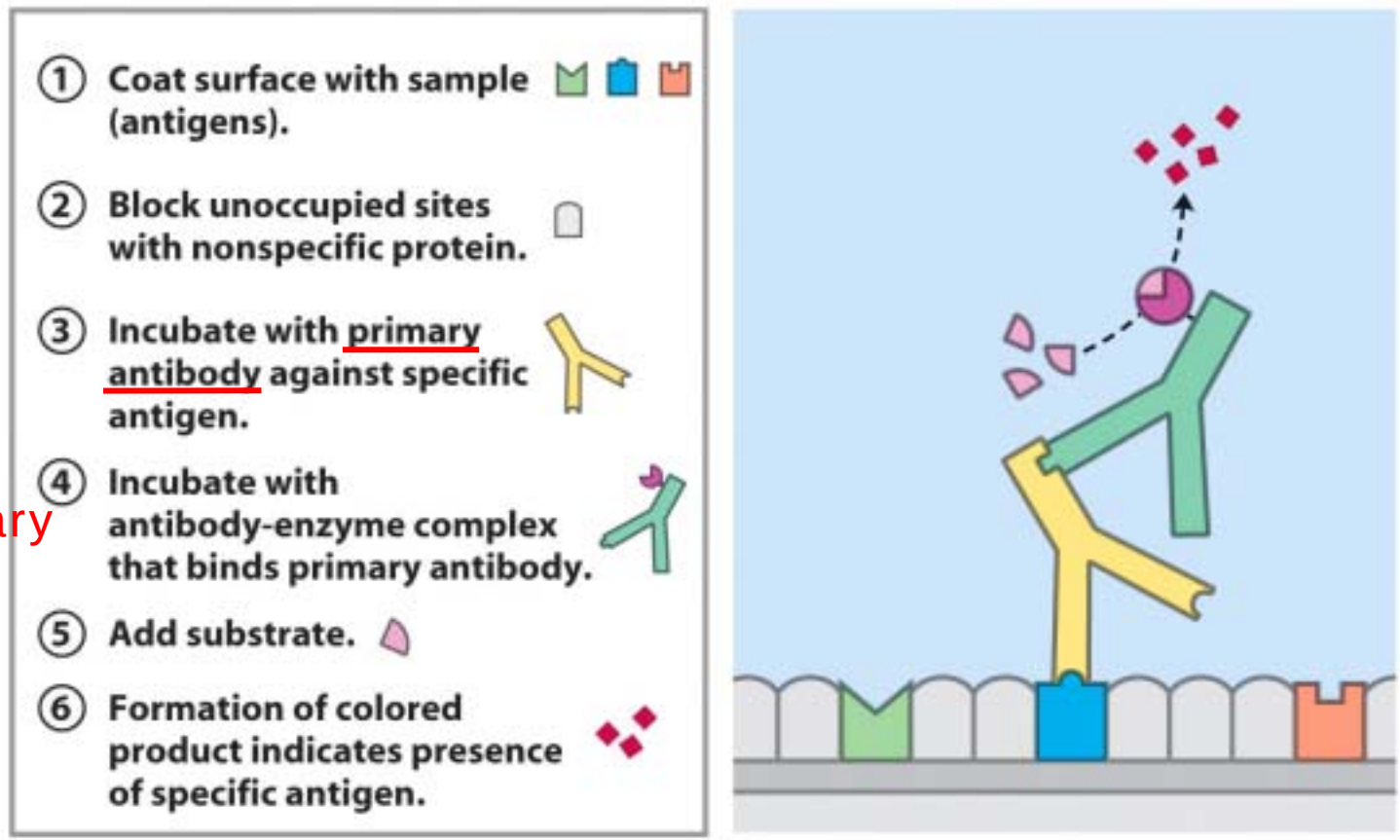
Fig 5-28c



Applications (II)

- Antibody techniques p. 181
  - Affinity chromatography (Fig 3-18c, p. 91)
  - Immunoblot (Western blot)
  - ELISA (enzyme-linked immunosorbent assay)

Fig 5-28a



Secondary Ab