

Immune response against tumors

Tumor antigens

- Tumor-specific antigens – new antigens which develop in tumor cells.
- Tumor associated antigens – „normal“ body antigens, but their expression is markedly increased in malignancies (e.g. carcinoembryonic antigens).

Tumor antigens in different types of tumors

- Virus-induced tumors: Antigens are usually virus-specific.
- Carcinogen-induced: no inducer-related specificity of antigens.
- Spontaneous tumors: antigens are usually very variable.

Immune Response to Tumors

- Cytotoxic T-lymphocytes (Tc)
- Natural killer (NK) cells
- Antibody-dependent cellular cytotoxicity (ADCC)
- Activated macrophages
- Antibody response – minor importance

Protective Mechanisms of Tumors

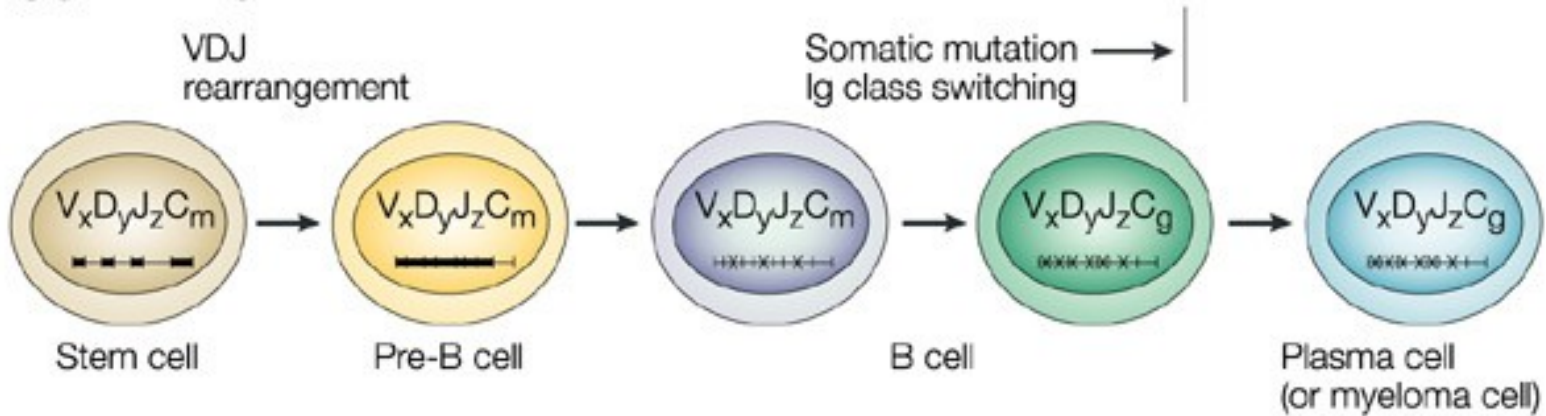
- Low immunogenicity of tumor antigens
- Low expression of HLA I molecules
- Antigenic modulation
- Immunosuppression – prostaglandins, IL-10 and TGF- β like cytokines, stimulation of Ts lymphocytes
- Large tumor mass

Immunodiagnostic of tumours

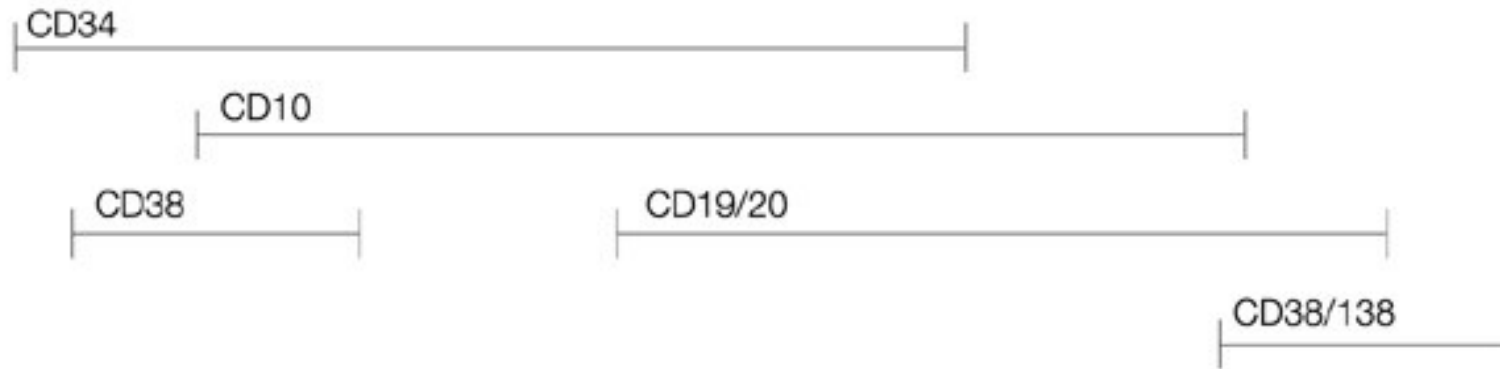
- Detection of tumor associated/specific antigens
- Monoclonal gammopathy
- Alpha-feto protein
- Carcinoembryonic antigens (CEA...)
- Specific prostatic antigen.....
- Immunophenotyping of lymphoid malignancies.

B- cell development

Ig gene changes



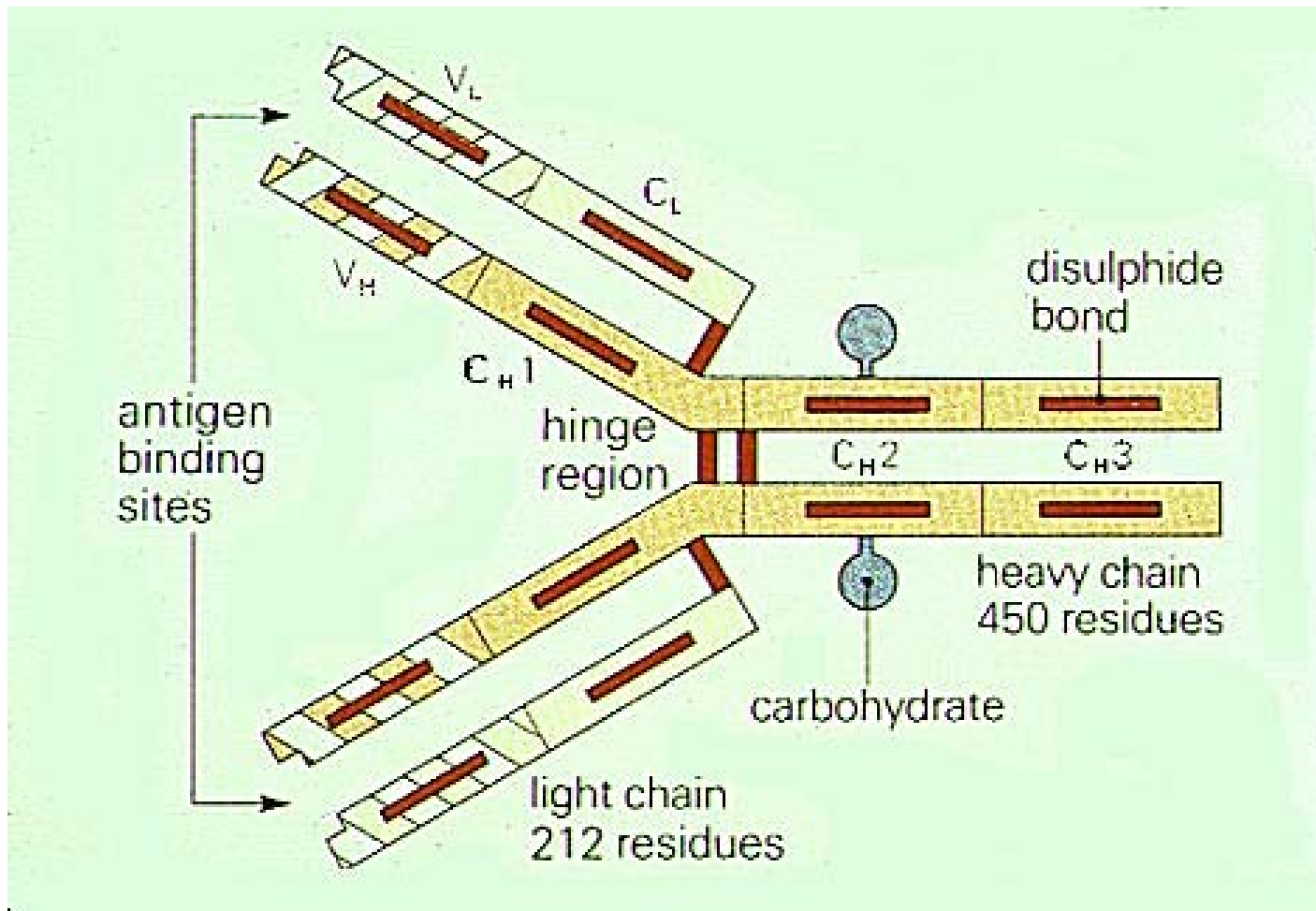
Cell-surface markers



Immunomodulatory treatment of tumors

- Cytokines – IL-2
- Interferon alpha
- BCG vaccine
- Tumor vaccination – mainly using dendritic cells

Structure of immunoglobulin molecule

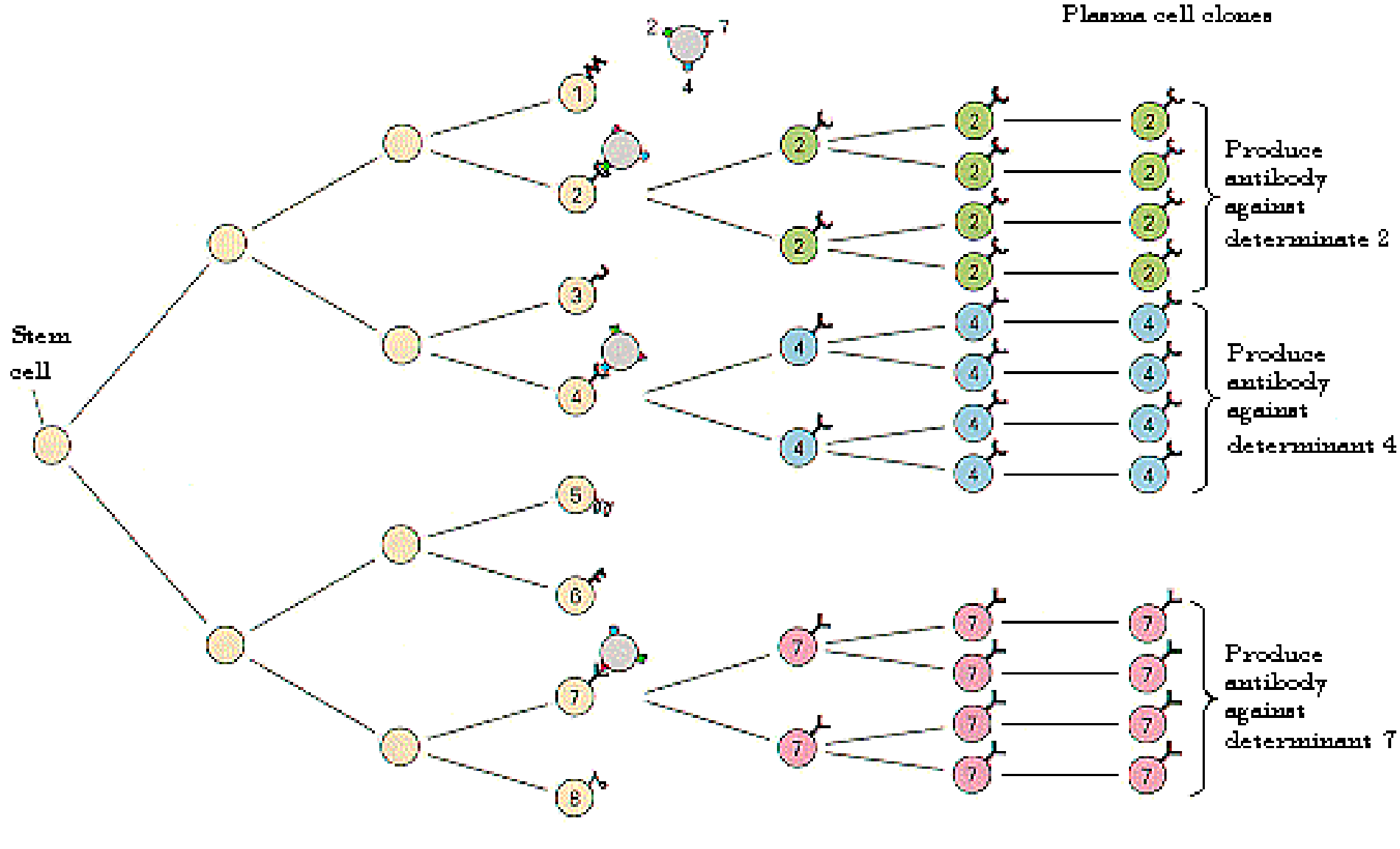


Antigen-independent differentiation

Antigen with 3 determinants

Antigen-dependent differentiation

Plasma cell clones



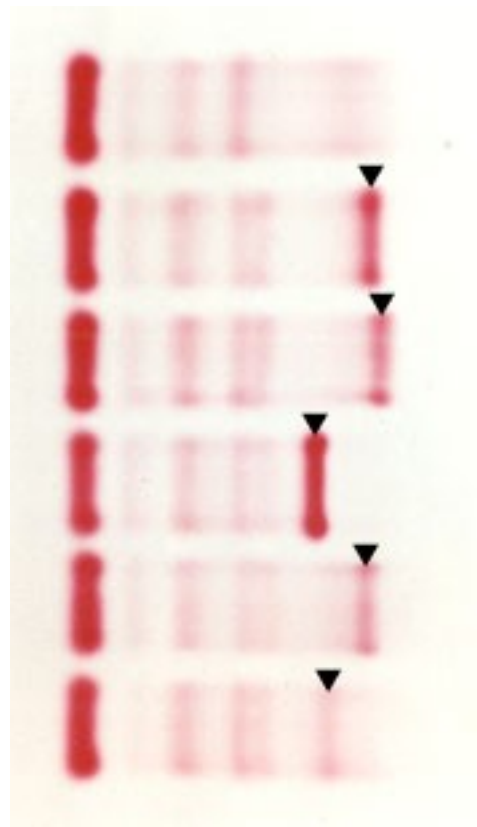
Antigen-independent phase in bone marrow

Antigen-dependent phase in peripheral lymphoid tissues

Myeloma

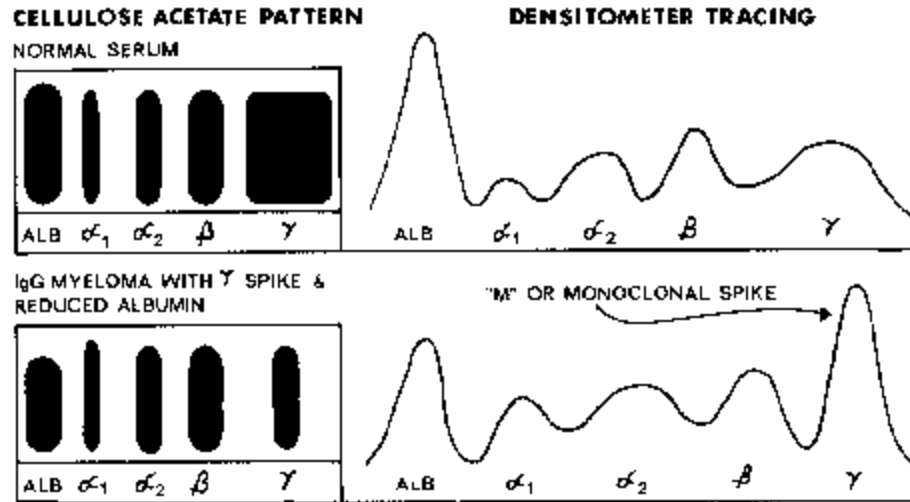
- Tumor that evolves from plasma cells
- Paraprotein in serum
- Increase in plasma cells in bone marrow
- Kidney failure
- Pathologic fractures
- Secondary immunodeficiency

Electrophoresis of human serum



Electrophoresis

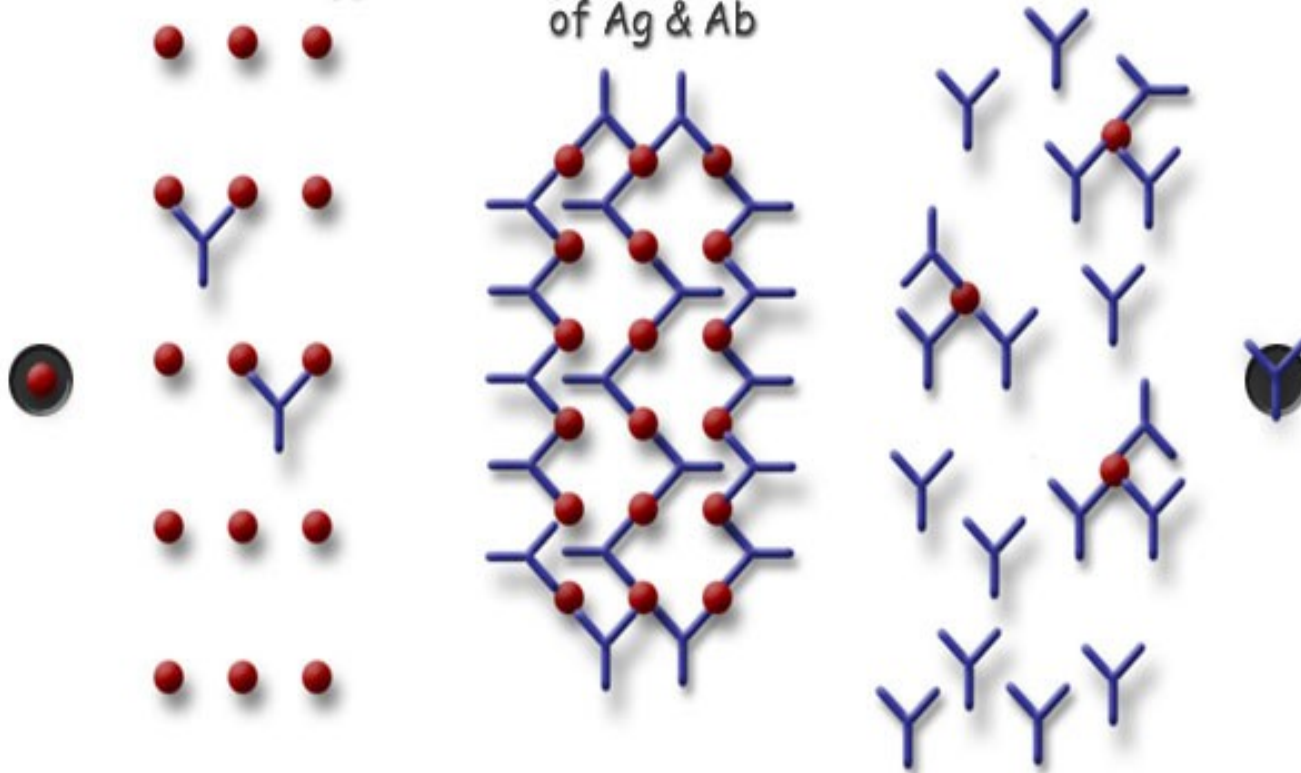
- paraprotein



Immunodiffusion - II

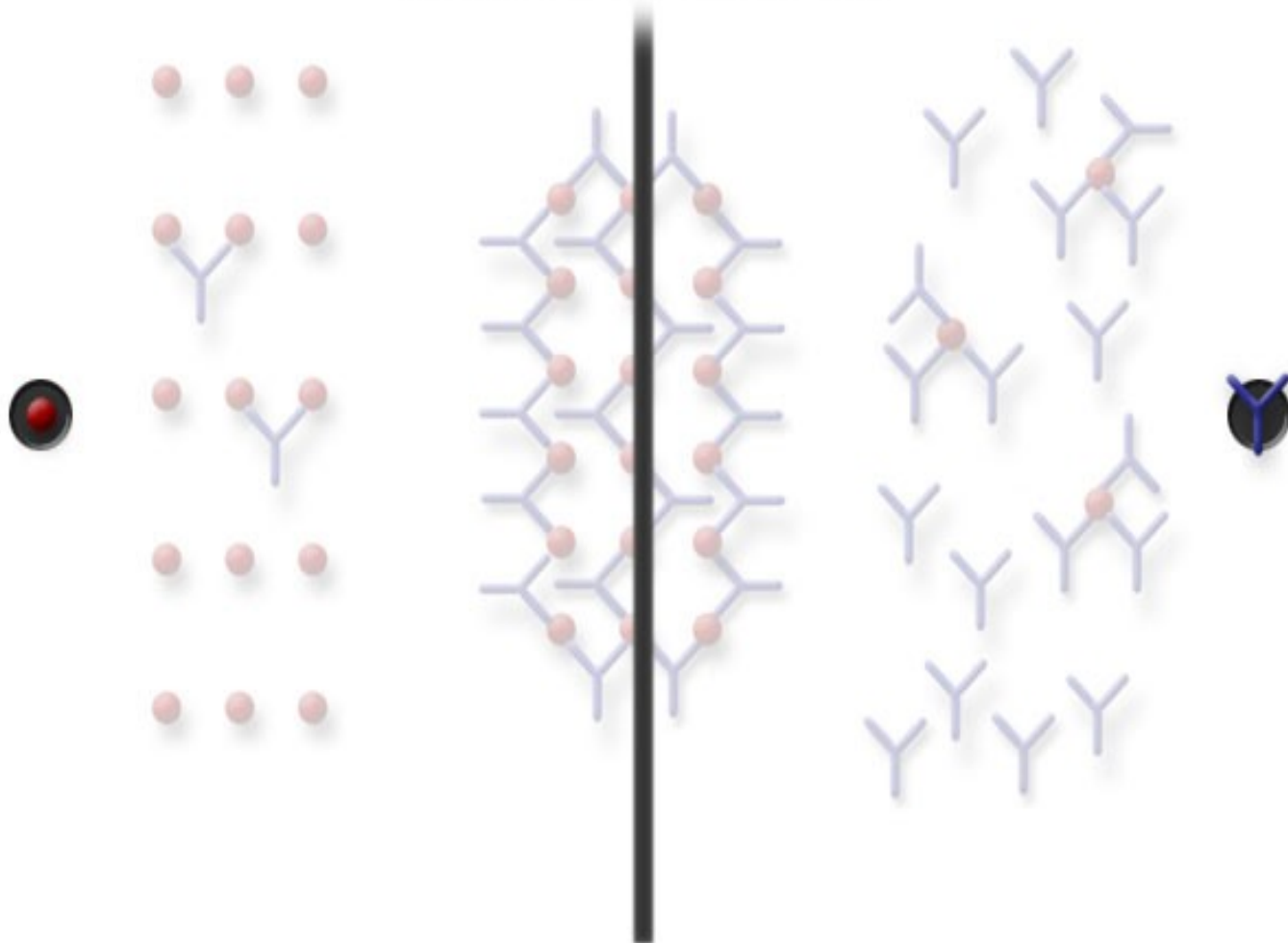
Ags & Abs combine

large aggregates form
at approximately equimolar concentrations
of Ag & Ab

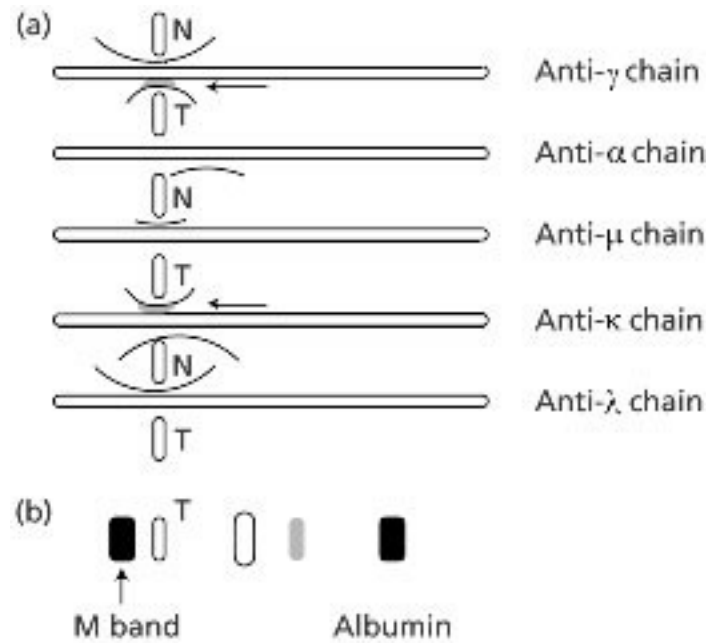


Immunodiffusion - III

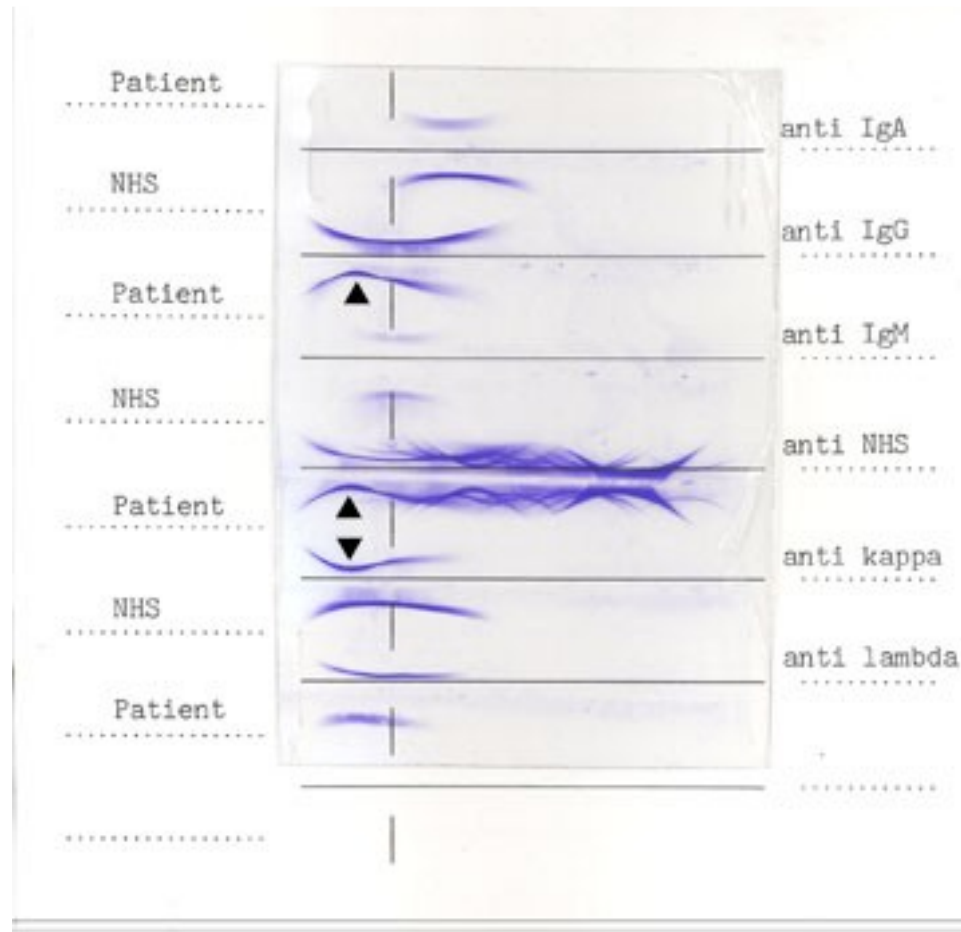
precipitation of large Ag:Ab aggregates
forms the "precipitin" line



Imunoelectrophoresis

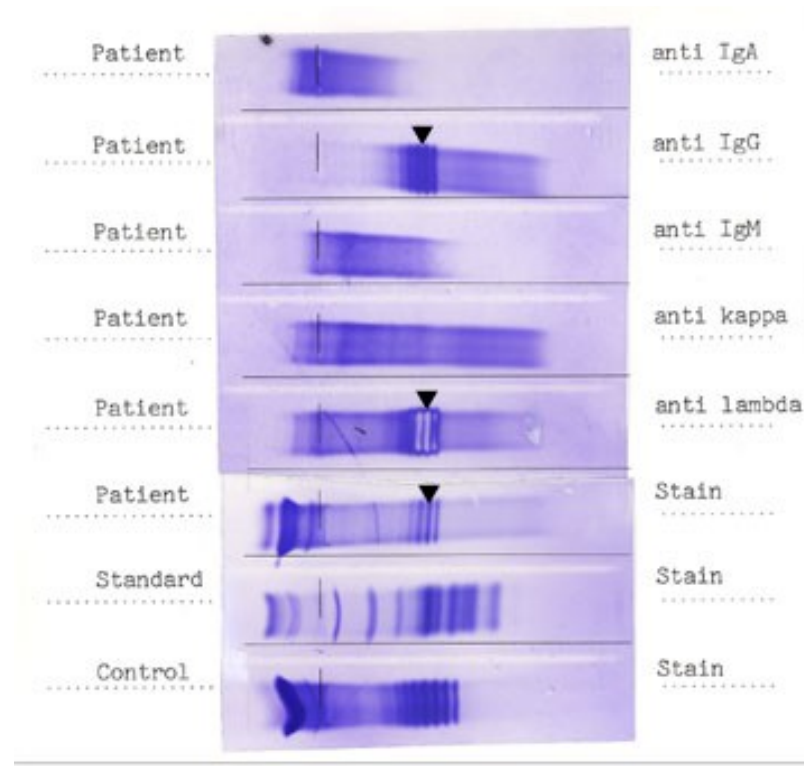


Imunoelectrophoresis



Imunofixation

(antisérum IgG Lambda)



Paraproteins

- Monoclonal immunoglobulins in human serum.
- Malignant – in myeloma
- Benign – mainly in old people, patients with chronic inflammation, idiopathic (MGUS – monoclonal gammopathy of unknown significance)
- Detected by immunoelectrophoresis, immunofixation