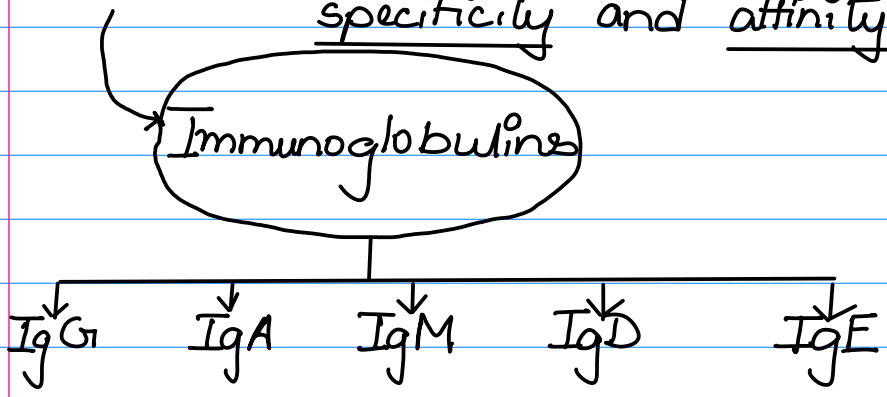
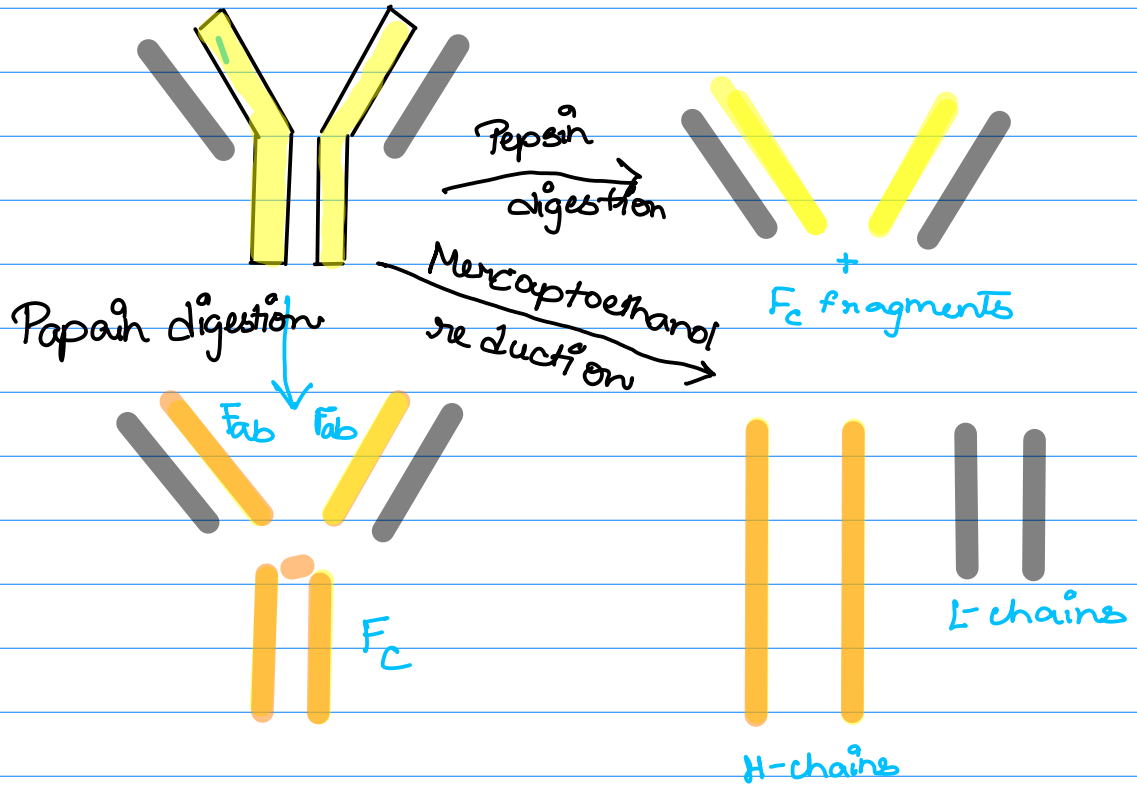
Immunology Notes — Antibodies

- Antibodies → glycoproteins that bind antigens with high specificity and affinity



Potter and Edelman's Experiment



Antibody Structure

(1) Antibody molecules have Two separate regions

What characterises the immunoglobulin domain?

- organised series of antiparallel β-plated strands
- within a domain, strands arranged into β-sheets

↓

Stabilised by intrachain S-S-bond.

Immunoglobulin domain provides a single scaffold into which multiple different antigen-binding sites can be built.

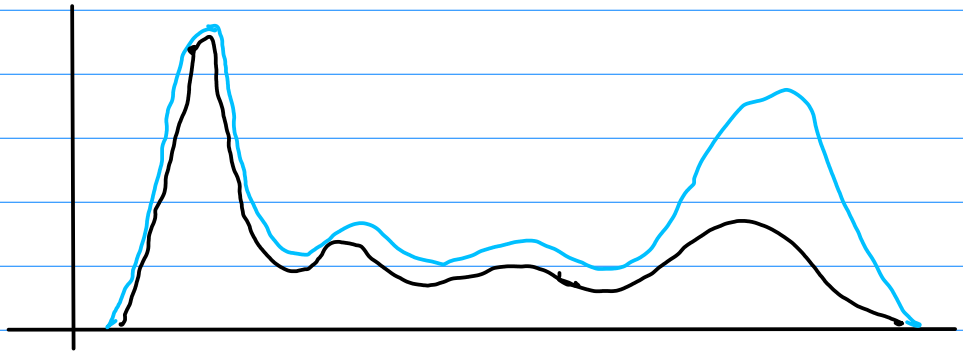
Two heavy chains & two light chains

- 4 polypeptide chains — 2 identical heavy chains (H) & 2 identical light chains (L)
- each light chain is bound to its partner heavy chain by a disulphide bond, as well as non-covalent interactions between V_H & V_L domains & C_H1 & C_L domains

⇓

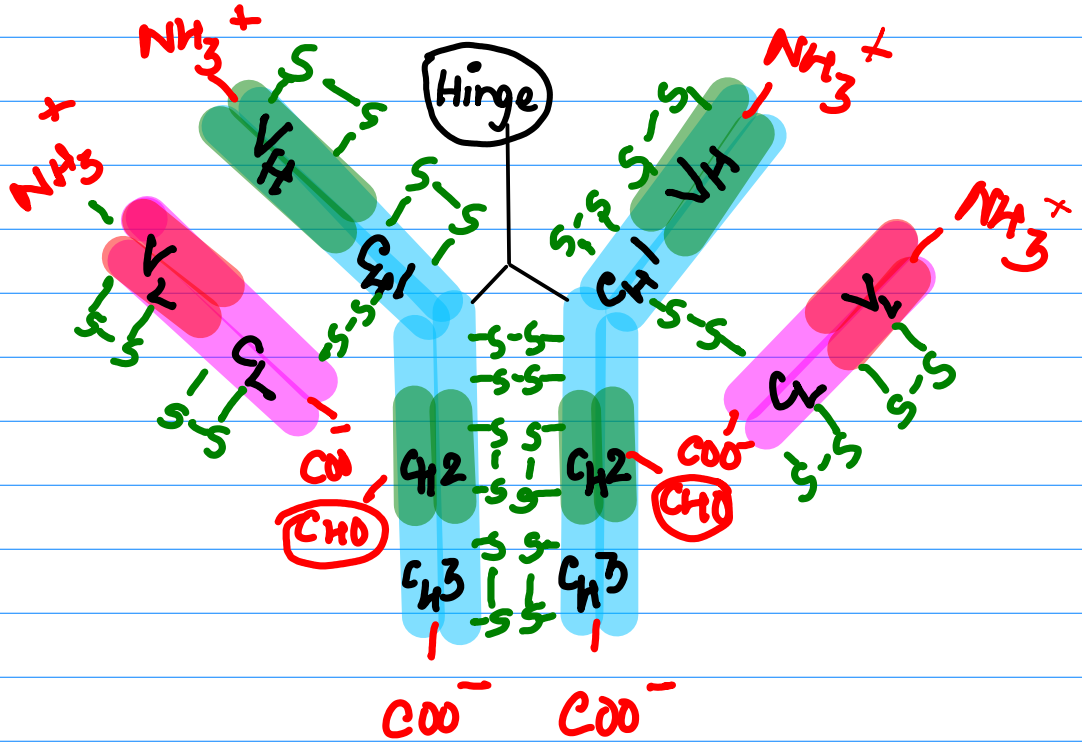
Heterodimer formation (H-L)

Tiselius and Pederson Experiment



Experimental demonstration that most antibodies are in the γ-globulin fraction of serum proteins. After rabbits were immunized with ovalbumin (OVA), their antisera were pooled and electrophoresed, which separated the serum proteins according to their electric charge and mass. The blue line shows the electrophoretic pattern of untreated antiserum. The black line shows the pattern of antiserum that was first incubated with OVA to remove anti-OVA antibody and then subjected to electrophoresis. *[Adapted from A. Tiselius and E. A. Kabat, 1939, Journal of Experimental Medicine* **69***:119, with copyright permission of the Rockefeller University Press.]*

The Hinge Region



- the hinge region is flexible – susceptible to cleavage by papain
  - ↳ divides antibody molecule into Fab & Fc
    - Fab → retains antigen-binding specificity
    - Fc → Fragment crystallisable

Functions of F_{ab} & F_c regions:

1. F_{ab} - binds to antigen
2. F_c - binds to phagocytic cell F_c receptors - signal for destruction