

Antibody

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Antibody (Ig)

- Production induced by an antigen
- React with antigen specifically and in observable manner

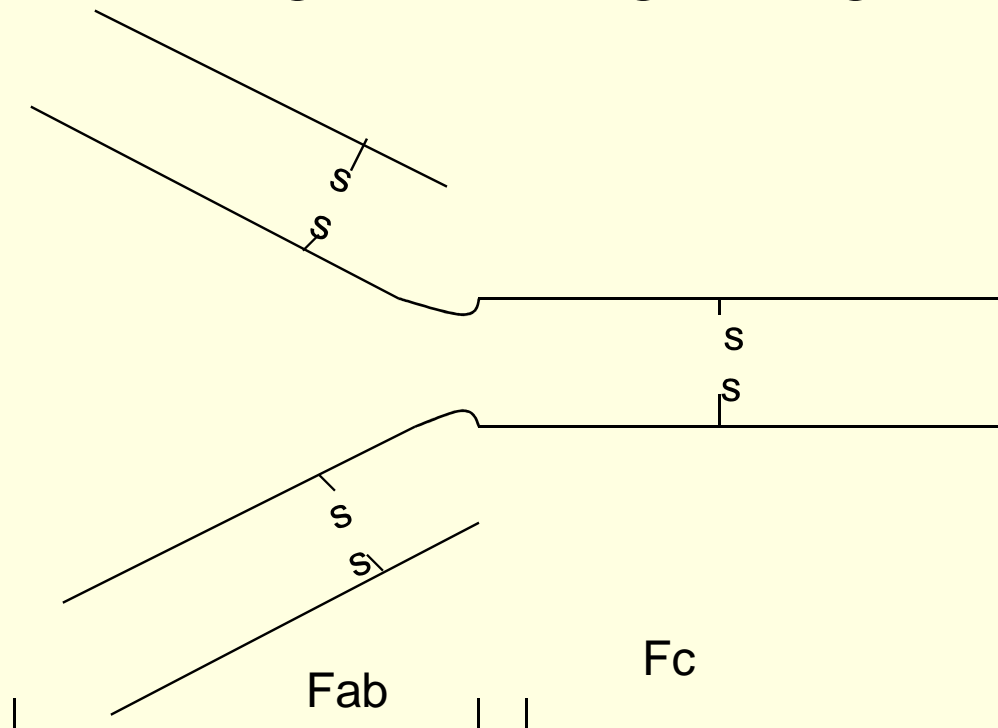
Antibody

- Globulin – in nature
- Immunoglobulin – proteins of animal origin endowed with known antibody activity and also some other chemically related proteins
- All antibodies are immunoglobulin but all immunoglobulin are not antibodies
- Immunoglobulin – structural / chemical concept
- Antibody – function / biological concept
- Synthesized by Plasma cells (B lymphocytes)

Structure of immunoglobulin

Two part:

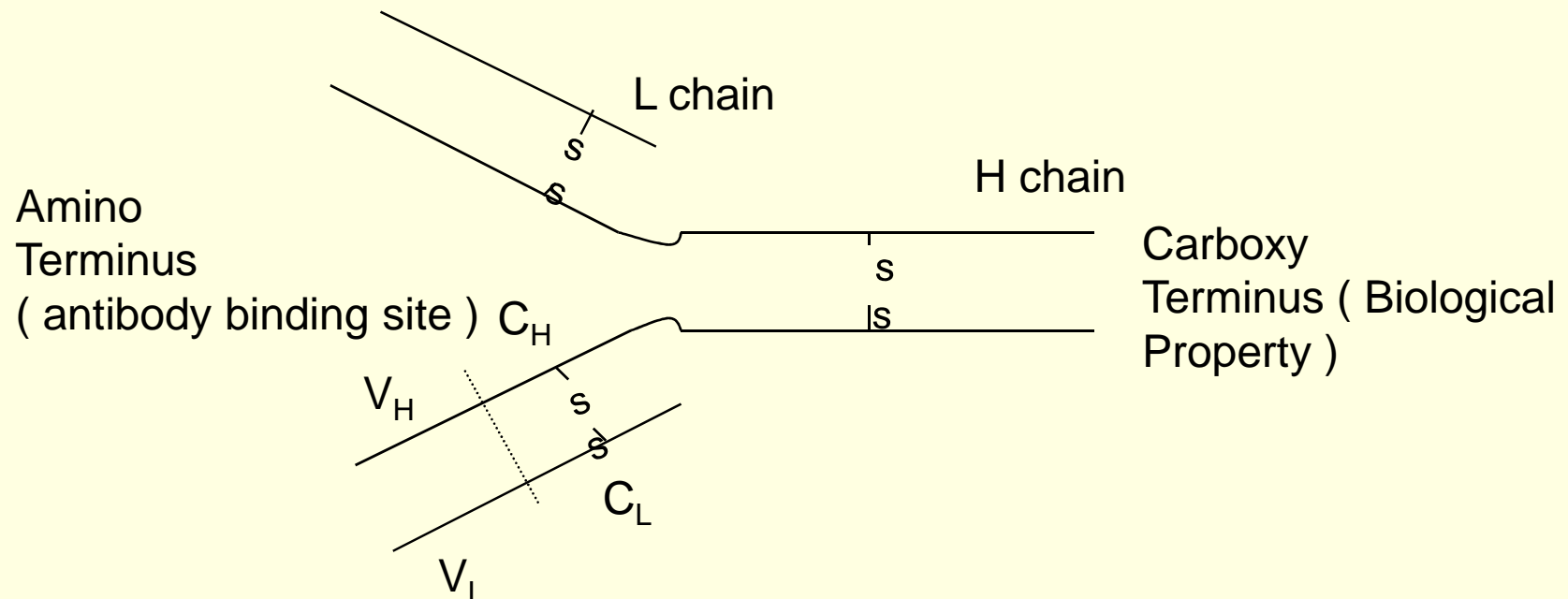
- Fc (crystallisable fragment) - one
- Fab (antigen binding – fragment) two



Immunoglobulin

Made up of two type of chain

- Heavy (H) chains – two
- Light (L) chains – two
- Each chain has two regions: variable and constant



Immunoglobulin

Two ends

- Amino terminus – variable

variable region of both type of chains form antigen binding sites

- Carboxyterminus – constant

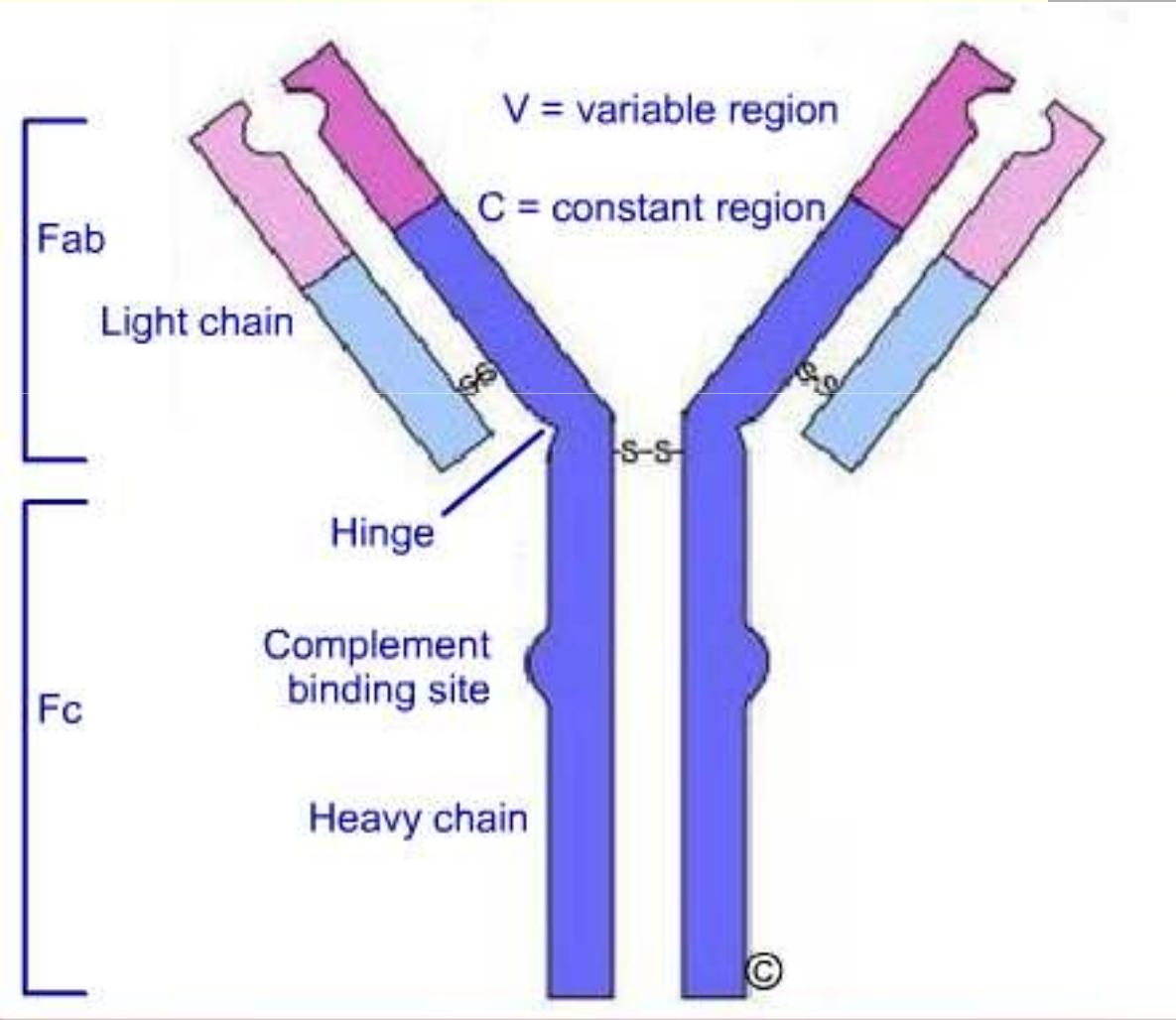
- In L chain - kappa / lambda

In H chain – gamma (IgG) / alpha (IgA)

mu (IgM)/ delta (IgD)/ epsilon (IgE)

Having biological properties like complement fixation, placental transfer, catabolic rate etc.

Immunoglobulin



Immunoglobulin classes

- IgG (80 %)
- IgA (10 – 13 %)
- IgM (5 – 8 %)
- IgD
- IgE

IgG

- Serum conc. 8 – 16 mg / ml
- Distributed equally intravascular and extravascularly.
- Catabolism varies with serum concentration.
- Half life approx. 23 days
- Four subclasses – IgG1, IgG2, IgG3, IgG4

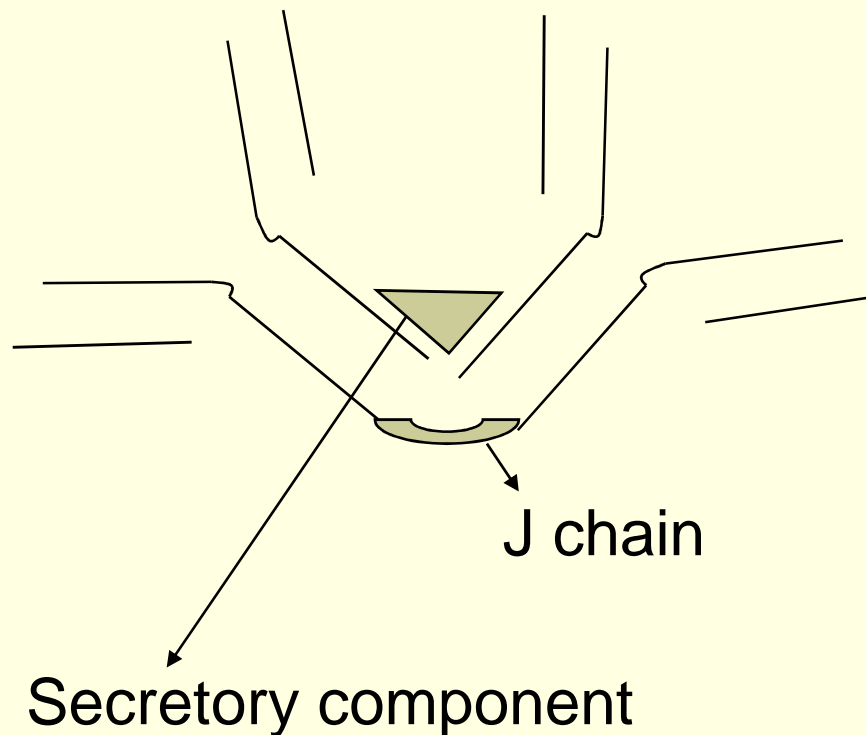
IgG

- Only maternal antibody which can cross placenta
 - Provides natural passive immunity to newborn.
- Binds microorganism, enhance phagocytosis
- Helps K cell function
- Leads platelets aggregation and vasoactive amine release
- Participate in complement fixation, precipitation, neutralization of toxins and viruses.

IgG

- General purpose antibody, protective against those infectious agents active in blood and tissue;
- But after exposure to antigens it appears late – after – IgM

IgA



- Two form – in serum monomeric
– IgA found in mucosal surface and secretion are dimeric
- Both units joined by J chain
- Acquire Secretory component at time of secretion at mucosal surface – which protects IgA from bacterial proteases

IgA

- 10 – 13 % of Total
- Serum conc.: 0.6 – 4.2 mg / ml
- Half life 6 – 8 days
- Two subclasses IgA1, IgA2

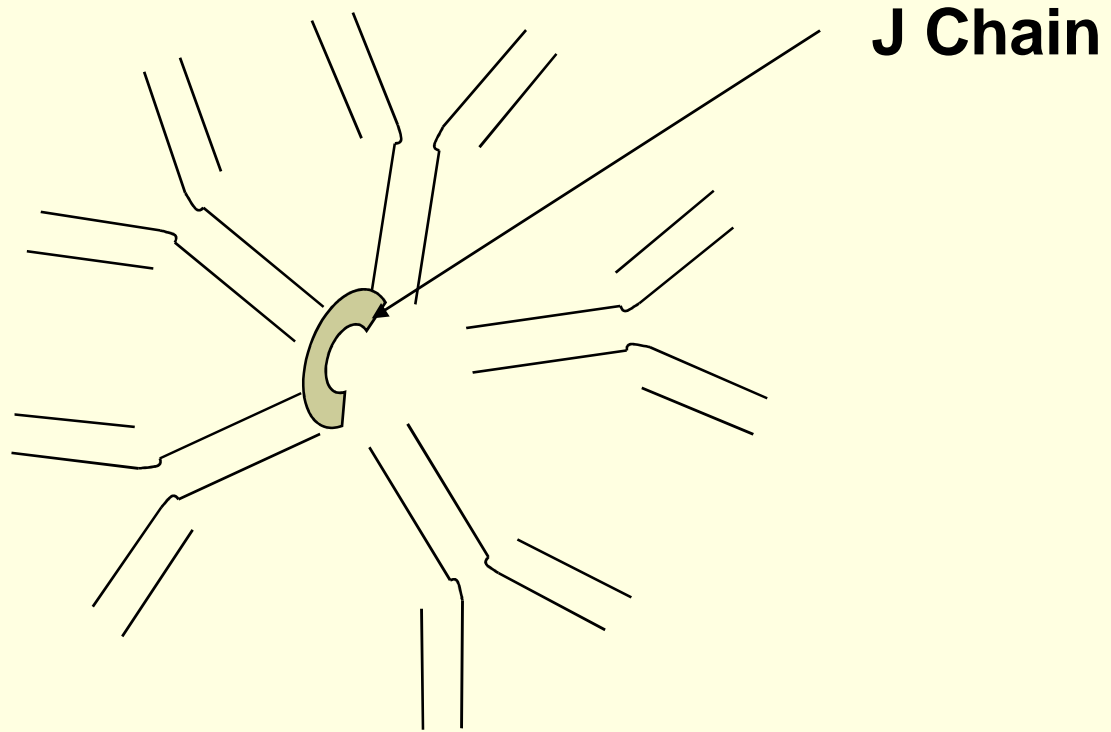
IgA

- Selectively concentrated in secretions and on mucus surface forming an “antibody paste”
- Provide local immunity on Respiratory, GI mucus lining.
- Major Ig in colostrums, saliva, tears.
- Secretory IgA relatively resistant to digestive enzyme and inhibit adherence of microorganism to mucosal surface – prevent entry.
- Can promote phagocytosis and intracellular killing of microorganisms.

IgM

- 5 – 8 % of Total Immunoglobulins
- Normal serum level 0.5 – 2 mg / ml
- Half life 5 days
- 80 % is intravascular in distribution.
- Heaviest molecule – ‘the millionaire molecule’
- Pentamer

IgM



IgM

- Earliest antibody synthesized by fetus (by 20 weeks of age)
- Not transported by Placenta.
- Short life – so its presence suggests recent infection.
- First antibody appears after infection.
- Responsible for protection against blood invasion by microorganisms.

IgM

Better than IgG for

- Cell lysing activity (1000 times higher)
- Opsonisation (500 times higher)
- 100 times more effective in bactericidal action.
- 20 times more effective for bacterial agglutination.

Less active than IgG for

- Neutralization of toxins and viruses.

IgD

- Structurally resembling to IgG
- Conc. 0.03 mg / 1 ml
- Half life 3 days.
- IgD and monomeric IgM present on unstimulated B lymphocytes recognize non-self antigen; subsequently this B lymphocytes activated – cloning – converted in to large no. of antibody producing cell (plasma cells) and memory cells.

IgE

- Half life 2 days
- Conc. Variable
- Conc. Increase in asthma, eczema etc. allergic conditions.
- Responsible for allergy, hypersensitivity reaction, anaphylaxis.
- Cause mast cell degranulation and release of inflammatory mediators.
- ??? Role against helminthic infections.



Thank You