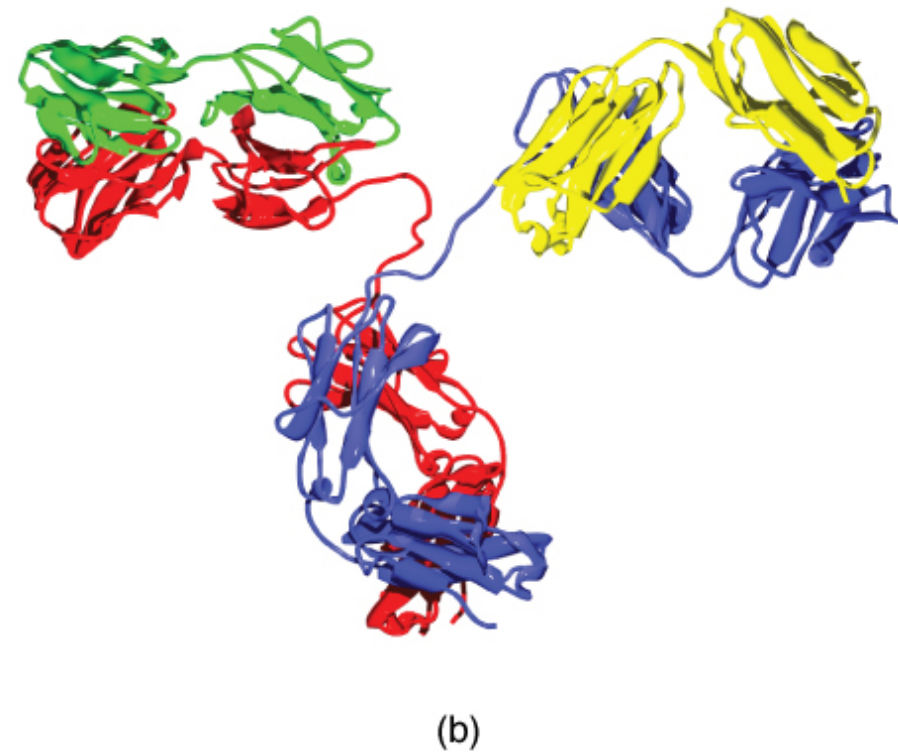
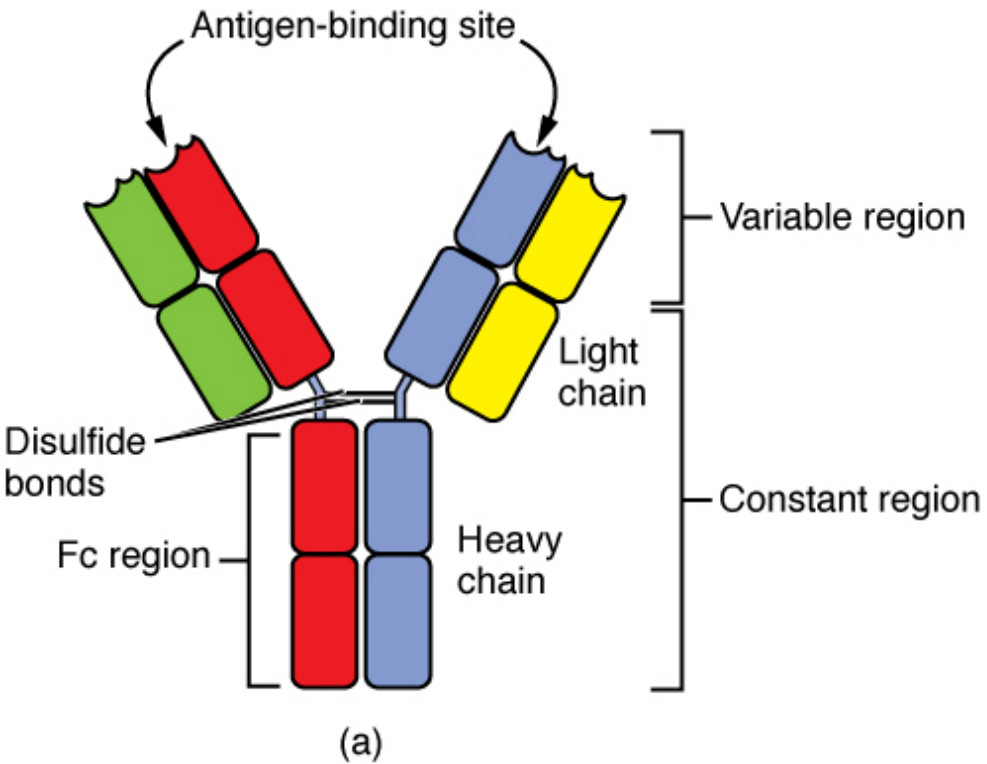


Antibody Structure & Diversity

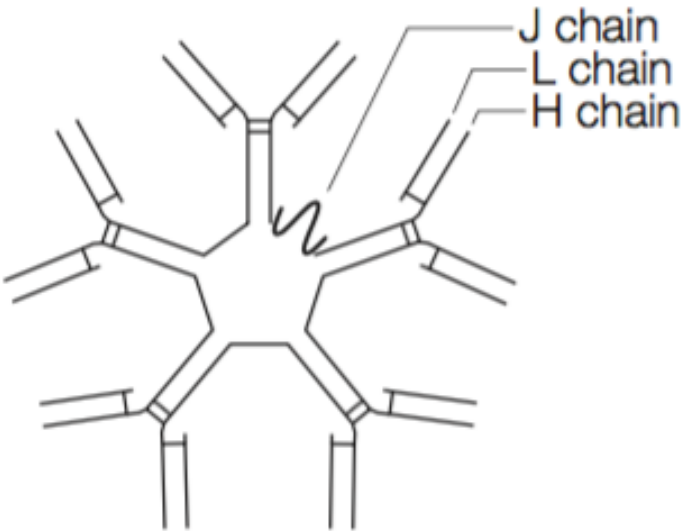
Antibody Molecule Structural Arrangement



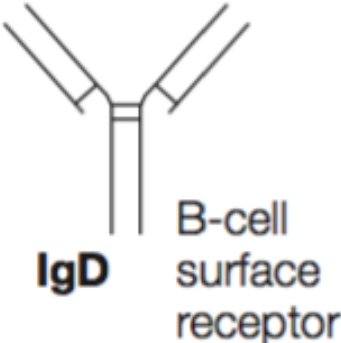
Properties of the human immunoglobulins

	IgG	IgA	IgM	IgD	IgE
Physical properties					
MW (kDa)	150	170–420	900	180	190
H-chain MW (kDa)	50–55	62	65	70	75
Physiological properties					
Normal adult serum (mg ml ⁻¹)	8–16	1.4–4.0	0.4–2.0	0.03	ng
Half-life in days	23	6	5	3	<3
Biological properties					
Complement-fixing capacity	+	–	++++	–	–
Anaphylactic (type I) hypersensitivity	–	–	–	–	++++
Placental transport to fetus	+	–	–	–	–

Chain structures of different classes of immunoglobulins

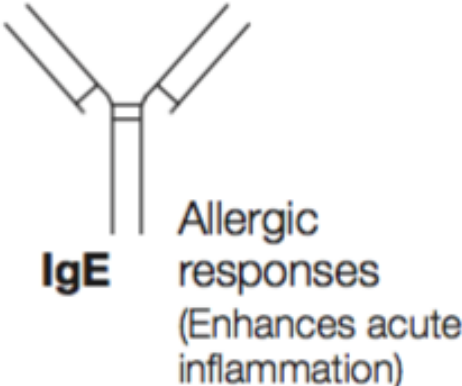


IgM immunoglobulin



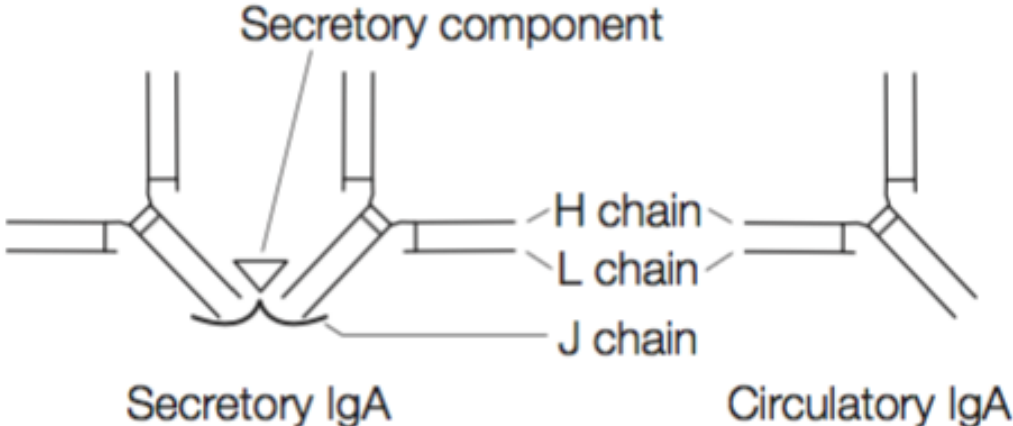
IgD

B-cell surface receptor



IgE

Allergic responses
(Enhances acute inflammation)

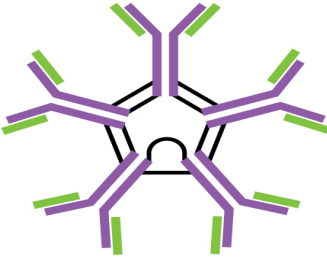

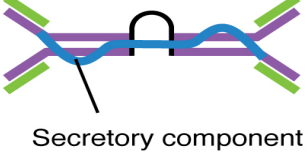
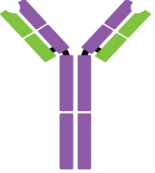



Secretory IgA

Circulatory IgA

IgA immunoglobulins

The Five Immunoglobulin Classes

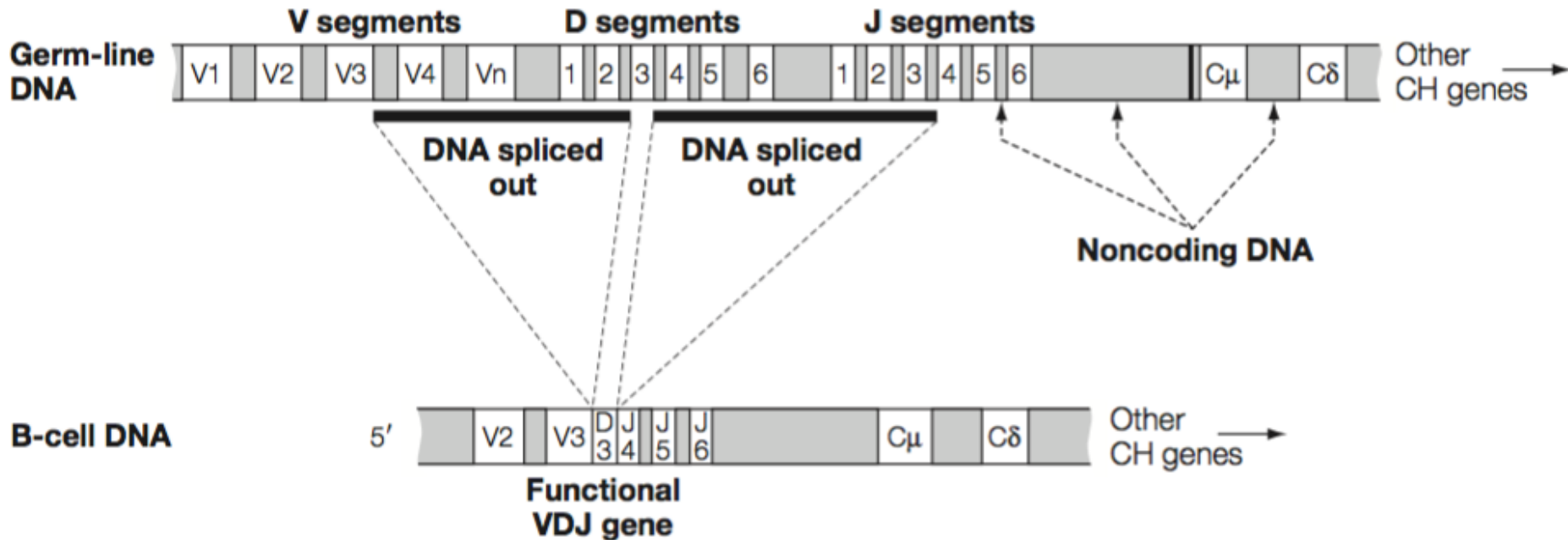
	IgM pentamer	IgG monomer	Secretory IgA dimer	IgE monomer	IgD monomer
					
Heavy chains	μ	γ	α	ϵ	δ
Number of antigen binding sites	10	2	4	2	2
Molecular weight (Daltons)	900,000	150,000	385,000	200,000	180,000
Percentage of total antibody in serum	6%	80%	13%	0.002%	1%
Crosses placenta	no	yes	no	no	no
Fixes complement	yes	yes	no	no	no
Fc binds to		phagocytes		mast cells and basophils	
Function	Main antibody of primary responses, best at fixing complement; the monomer form of IgM serves as the B cell receptor	Main blood antibody of secondary responses, neutralizes toxins, opsonization	Secreted into mucus, tears, saliva, colostrum	Antibody of allergy and antiparasitic activity	B cell receptor

Antibody Diversity

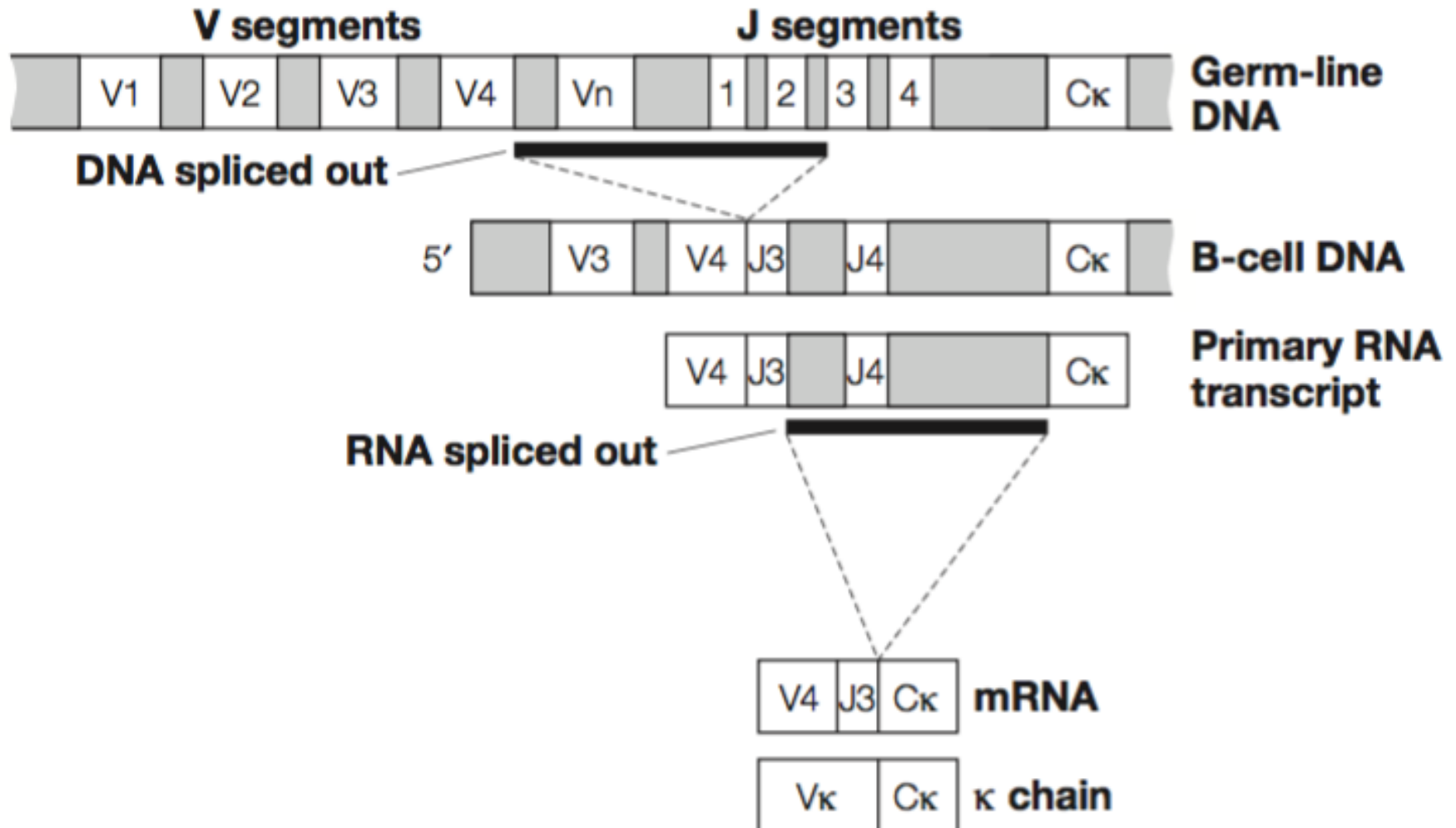
Genes For Human Immunoglobulins

Ig polypeptide	Chromosome
H chain	14
κ chain	2
λ chain	22

DNA Rearrangement in B-Cell

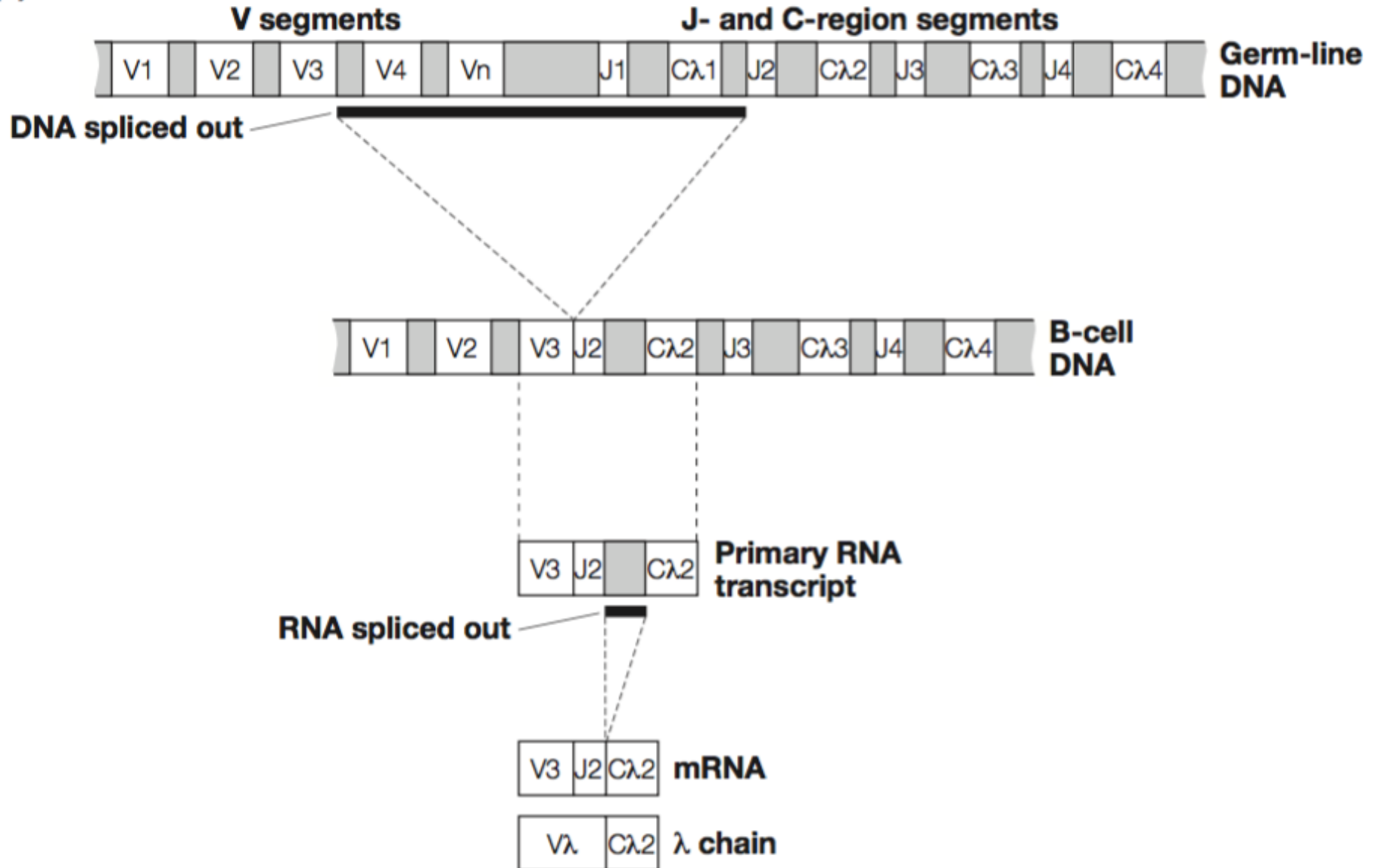


Allelic Exclusion I

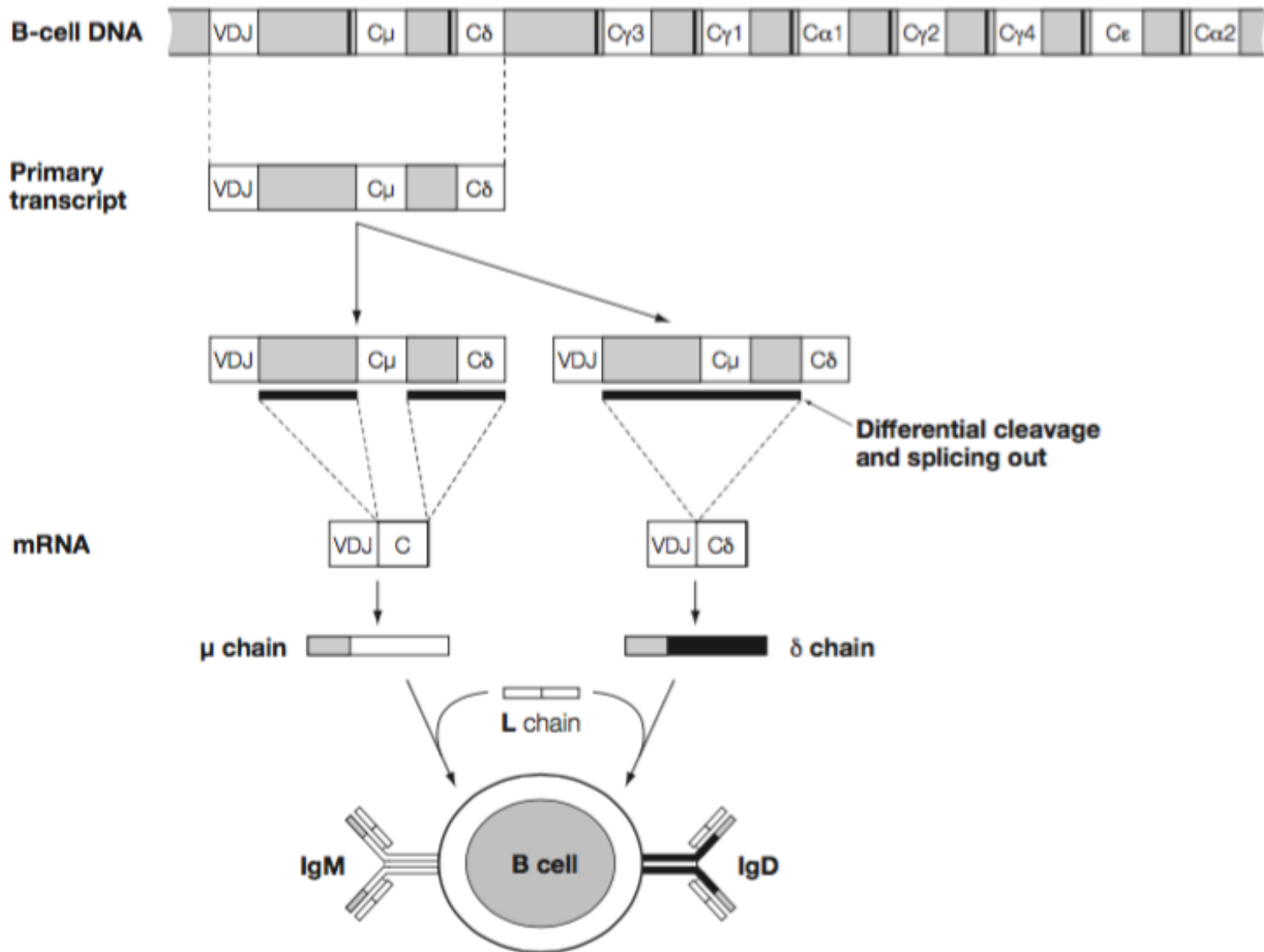


Allelic Exclusion II

(b)



Alternative Splicing & Class Switching



Reference

- BIOS Instant Notes Immunology by Peter Lydyard, Alex Whelan, Michael Fanger: 3rd Edition Taylor & Francis. ISBN: 9780415607537