Molecules d'adhesion

Dr. Naci D.

References:

- Pr. Barker B. lectures, NJ, USA.
- Abbas Textbook

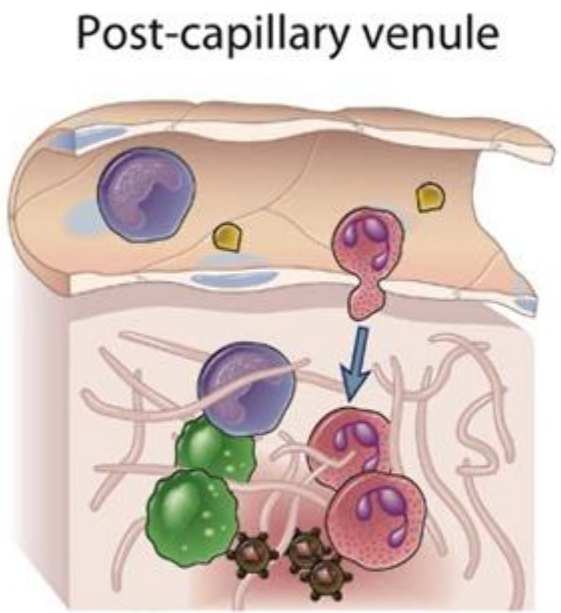
2024-04-16

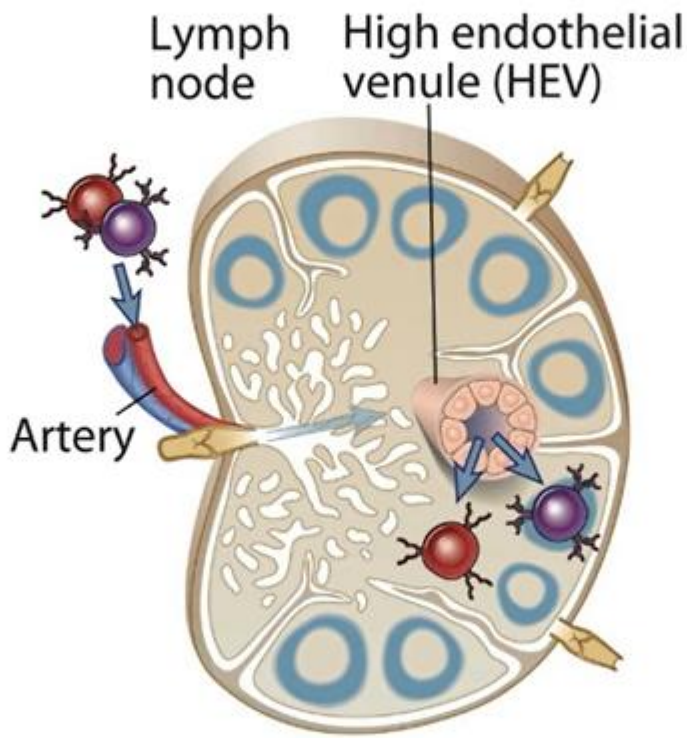
Introduction: Flux sanguin

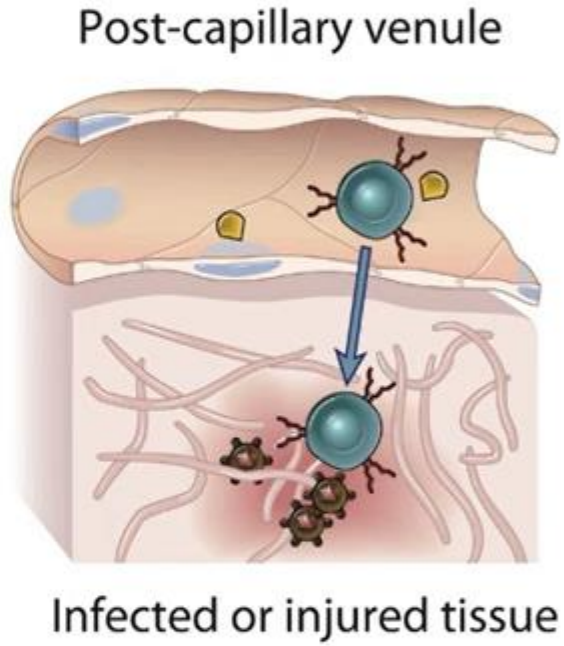
https://www.britannica.com/video/22214/Red-blood-cells-arteries-capillaries-tissues-oxygen

https://www.youtube.com/watch?v=GHzk9TZ-E7w

Leukocyte trafficking





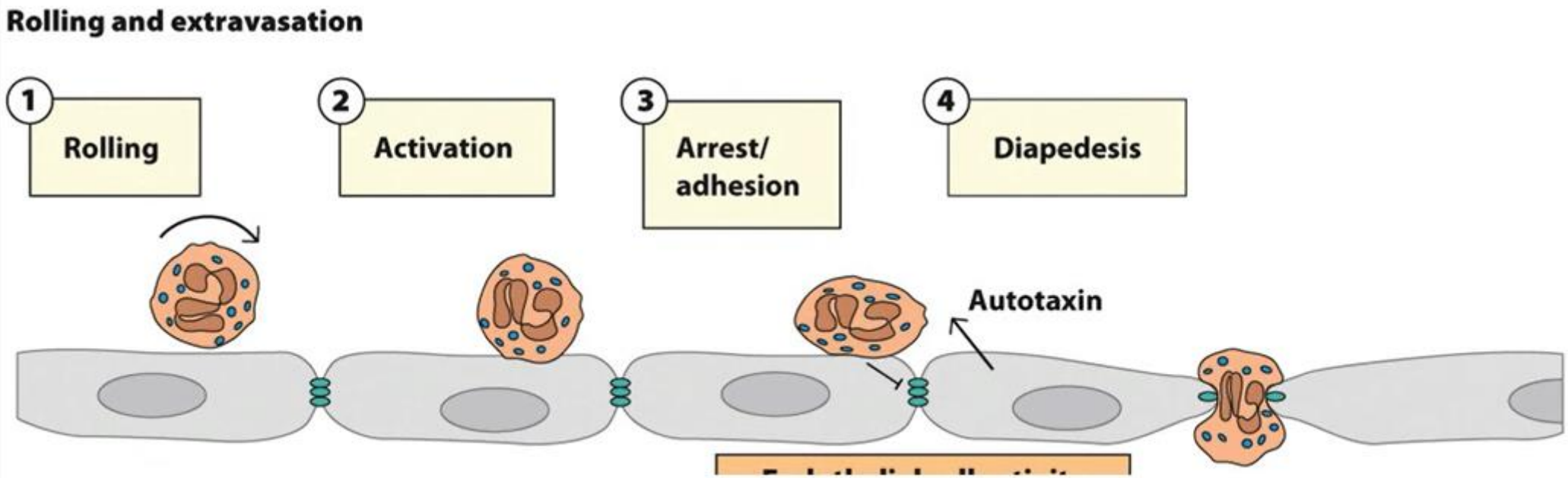


Neutrophils and monocytes migrate to sites of infection and tissue injury: inflammation

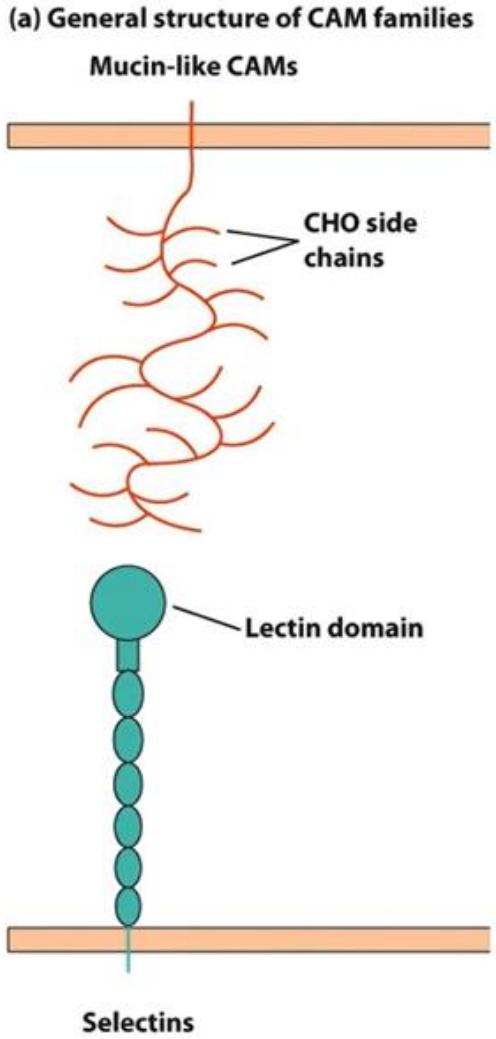
Naive T and B cells migrate into secondary lymphoid tissues: initiation of adaptive immune responses

Effector and memory T cells migrate into sites of infection and tissue injury: cell-mediated immunity

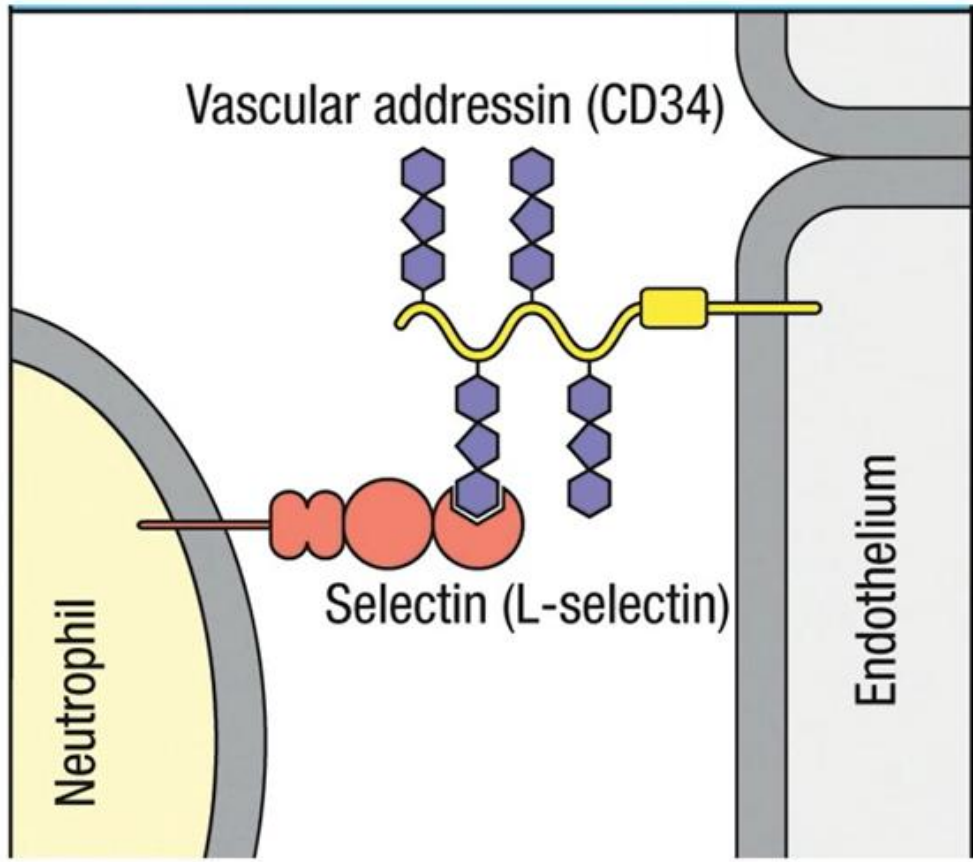
Stages of leukocyte trafficking



Rolling is mediated by selectins



Kuby Figure 14-1



Parham Figure 3.23

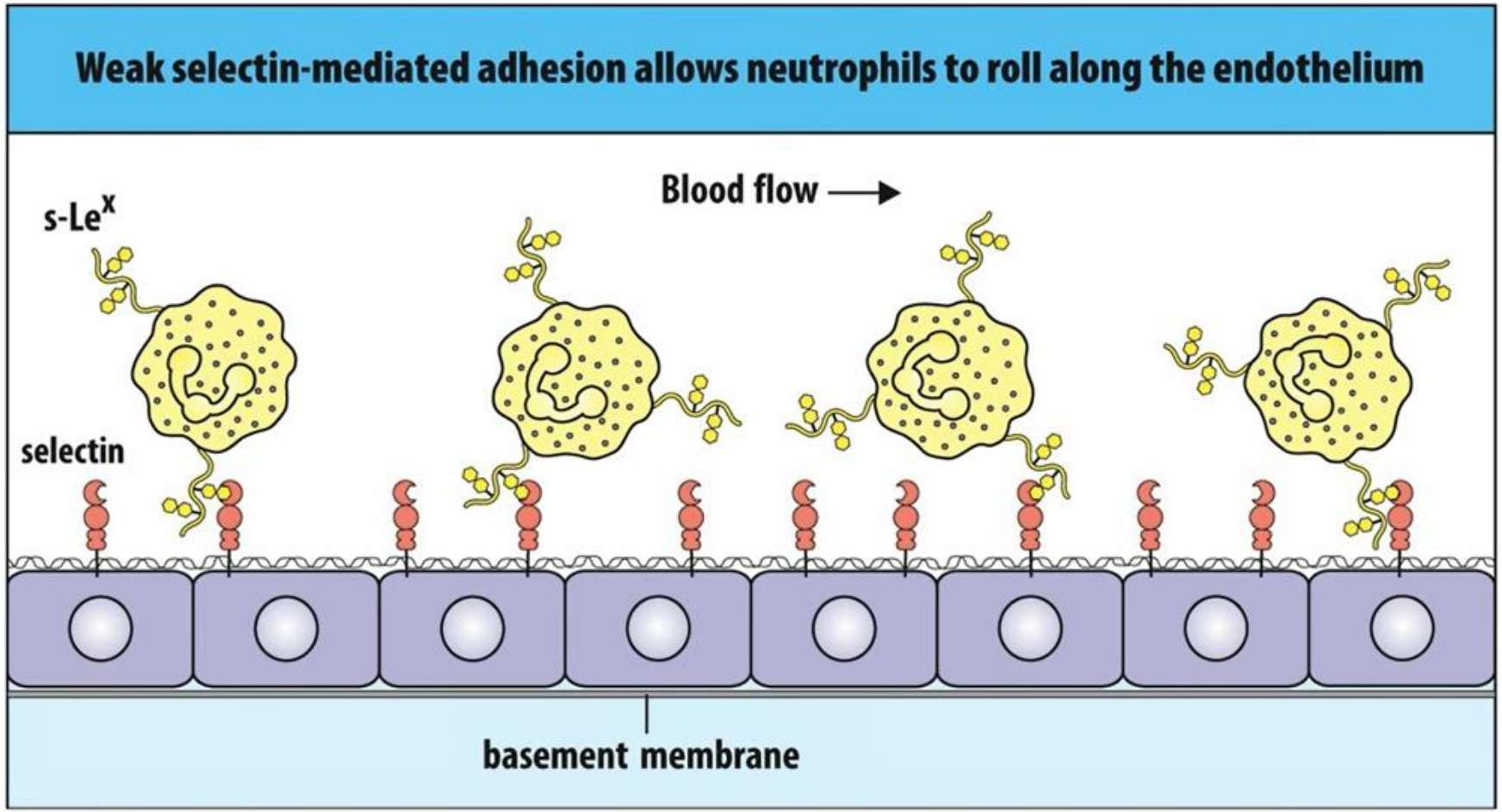
Selectins and example selectin ligands

(b) Selected CAMs belonging to each family

Mucin-like CAMs:	Selectins:
GlyCAM-1	L-selectin (CD62L)
CD34	P-selectin
PSGL-1	E-selectin
MAdCAM-1	Cutaneous leukocyte antigen (CLA)

Kuby Figure 14-1

Rolling

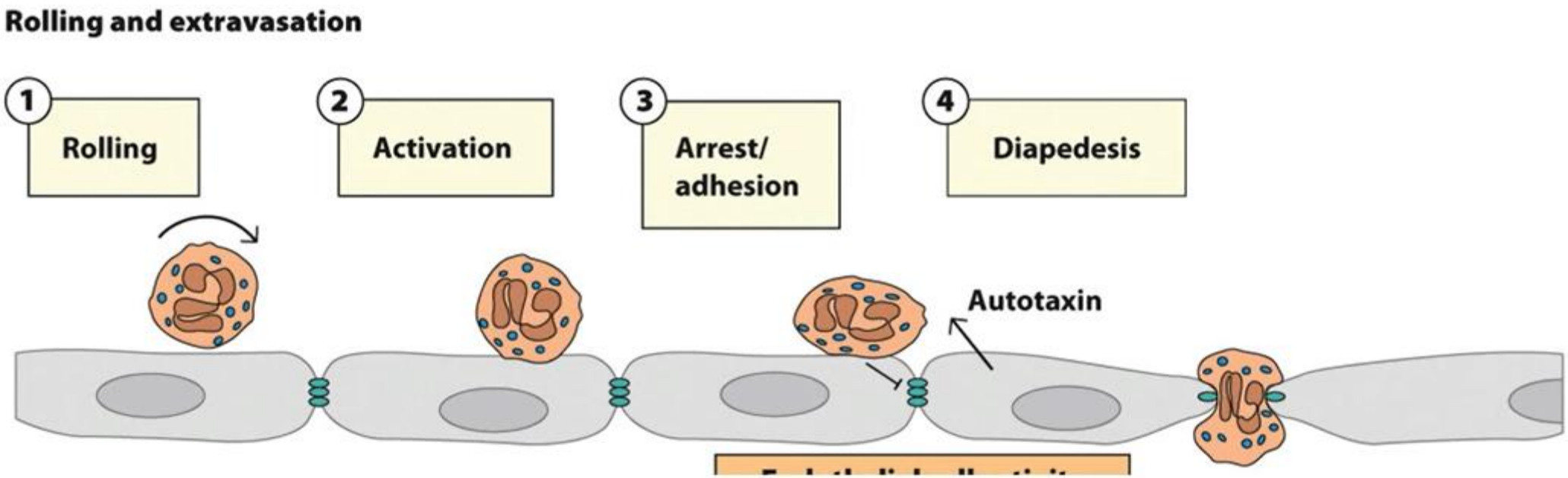


Parham 4th Edition Figure 3.13

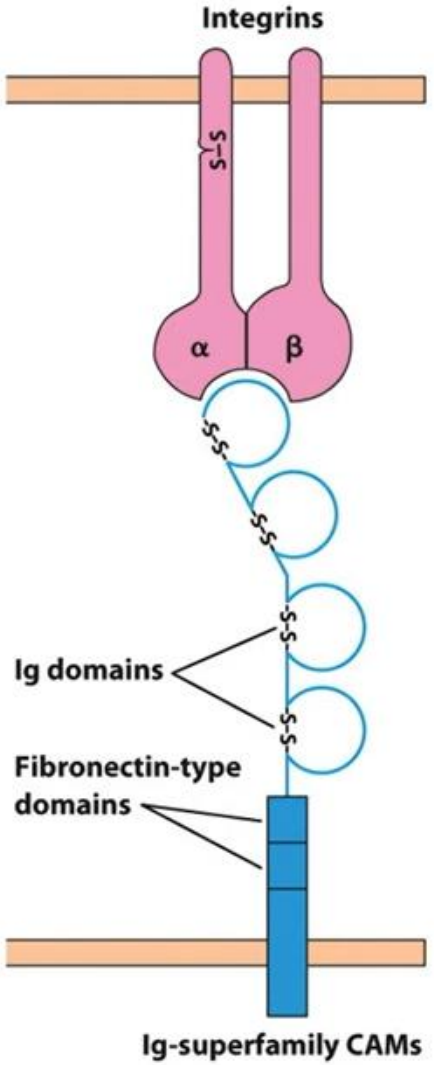
3 7 leucocyte rolling

https://www.youtube.com/watch?v=kSBrreaO9Tw

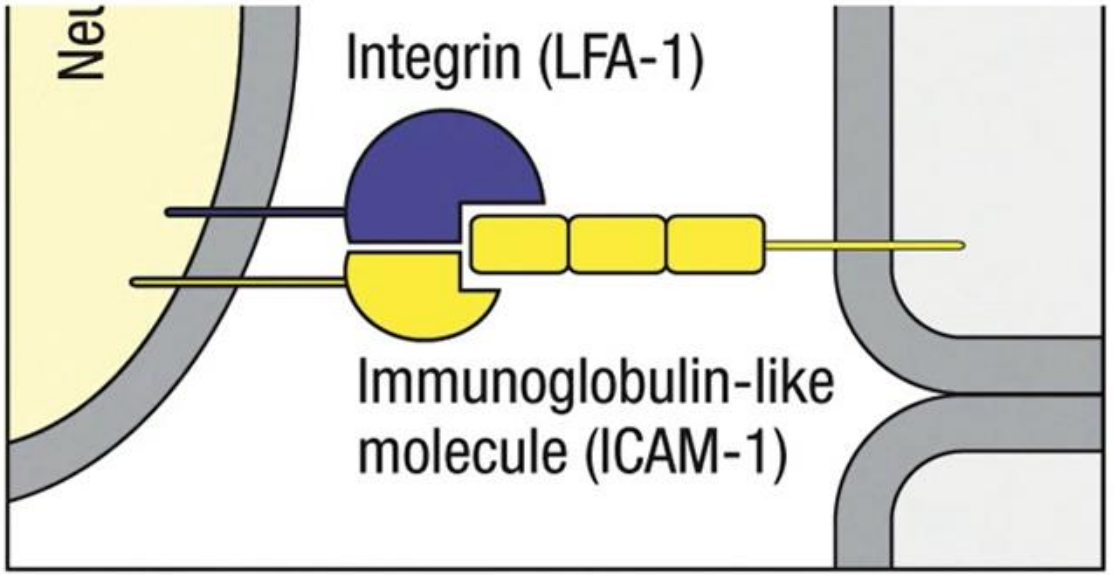
Stages of leukocyte trafficking



Firm arrest/Adhesion is mediated by integrins



Kuby Figure 14-1



Parham Figure 3.23

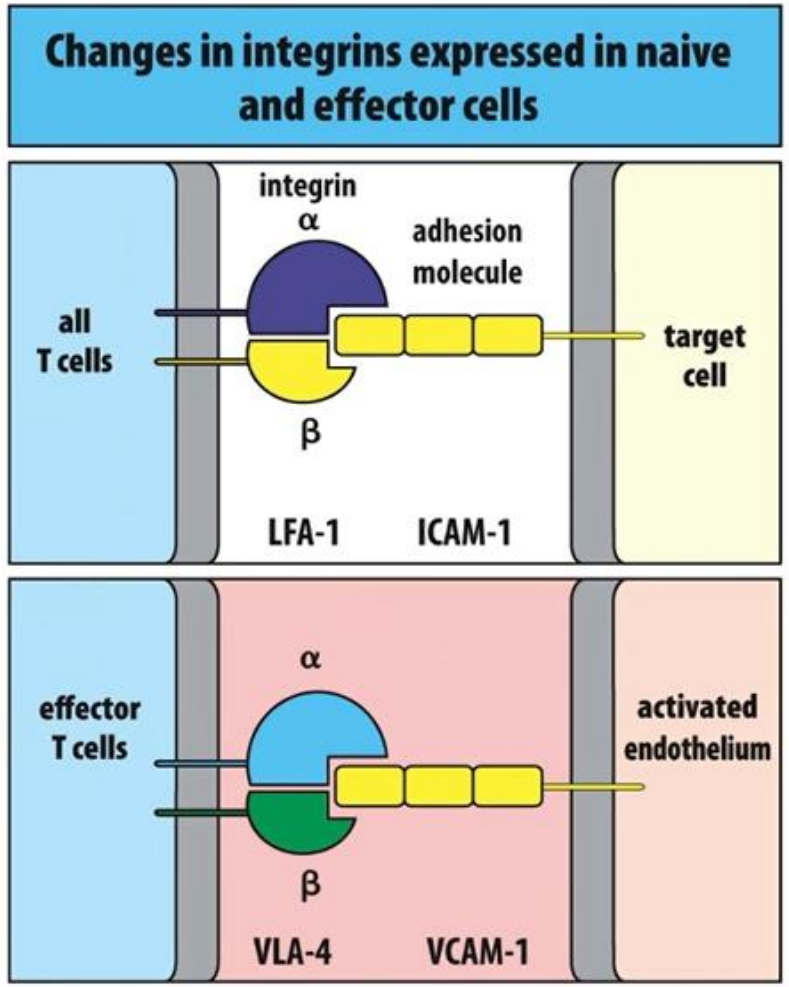
Integrins and Integrin Ligands

Integrins:

- $\alpha_4\beta_1$ (VLA-4, LPAM-2)
- $\alpha_4\beta_7$ (LPAM-1)
- $\alpha_6\beta_1$ (VLA-6)
- $\alpha_L\beta_2$ (LFA-1)
- $\alpha_M\beta_2$ (Mac-1)
- $\alpha_X\beta_2$ (CR4, p150/95)
- $\alpha_E\beta_7$ (CD103)

Ig-superfamily CAMs:

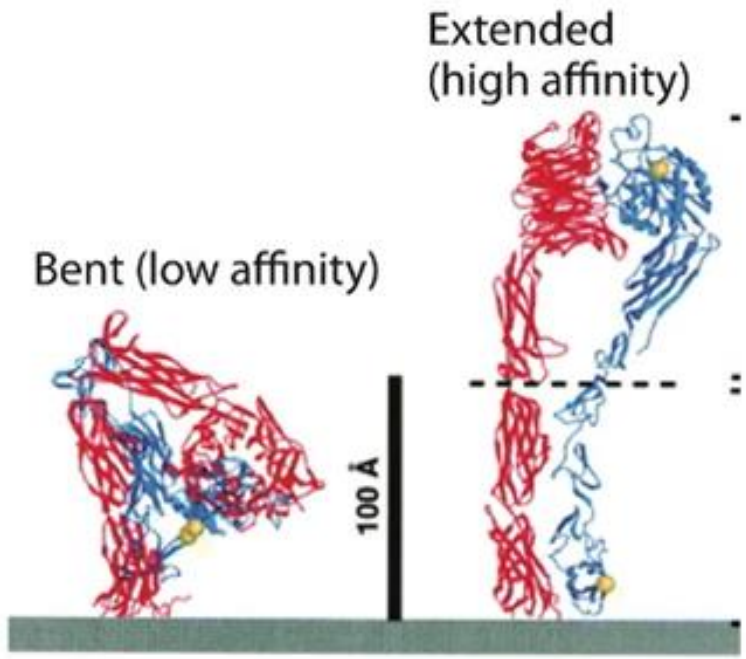
- ICAM-1, -2, -3
- VCAM-1
- LFA-2 (CD2)
- LFA-3 (CD58)
- MAdCAM-1



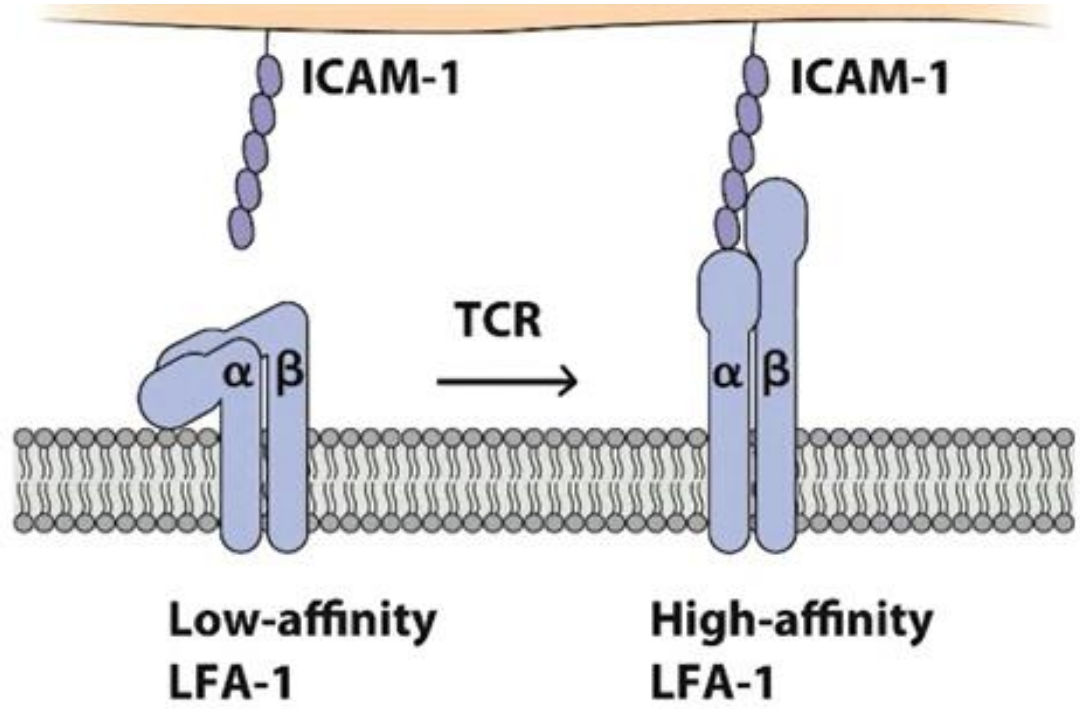
Kuby Figure 14-1

Parham 4th Edition Figure 8.19

Integrin activation

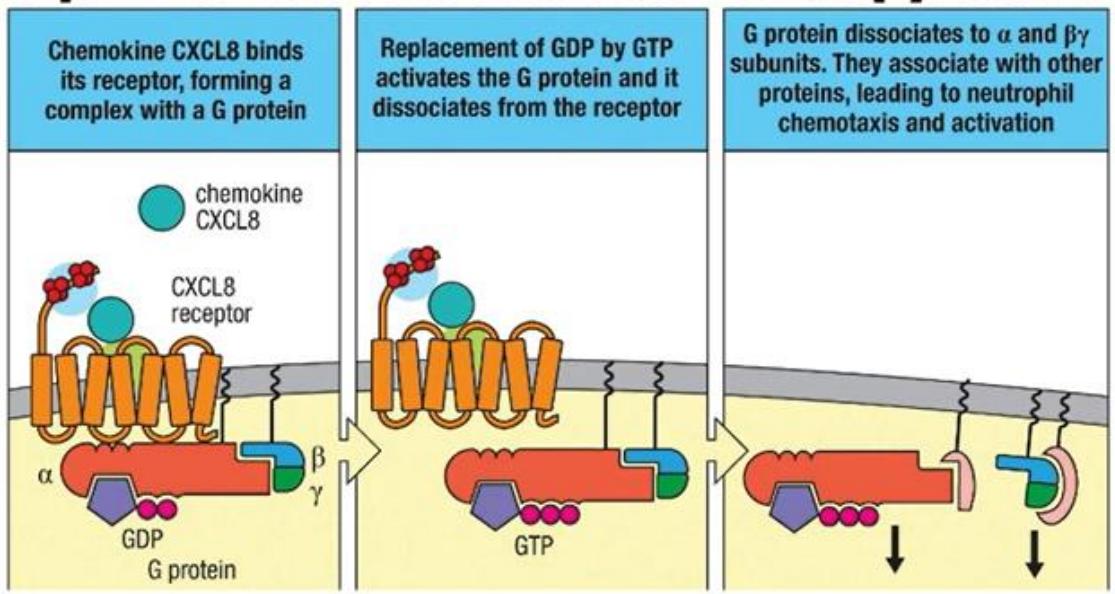


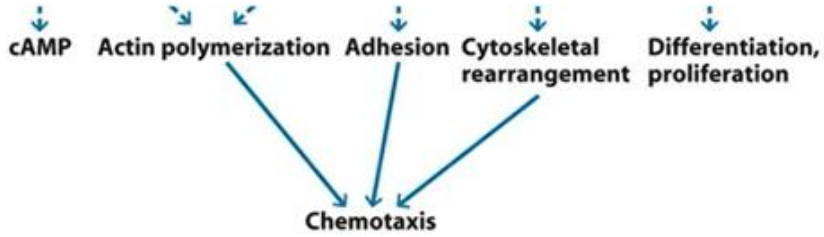
Abbas Figure 3-2



Kuby Figure 12-9

Step 2: Chemokine signaling





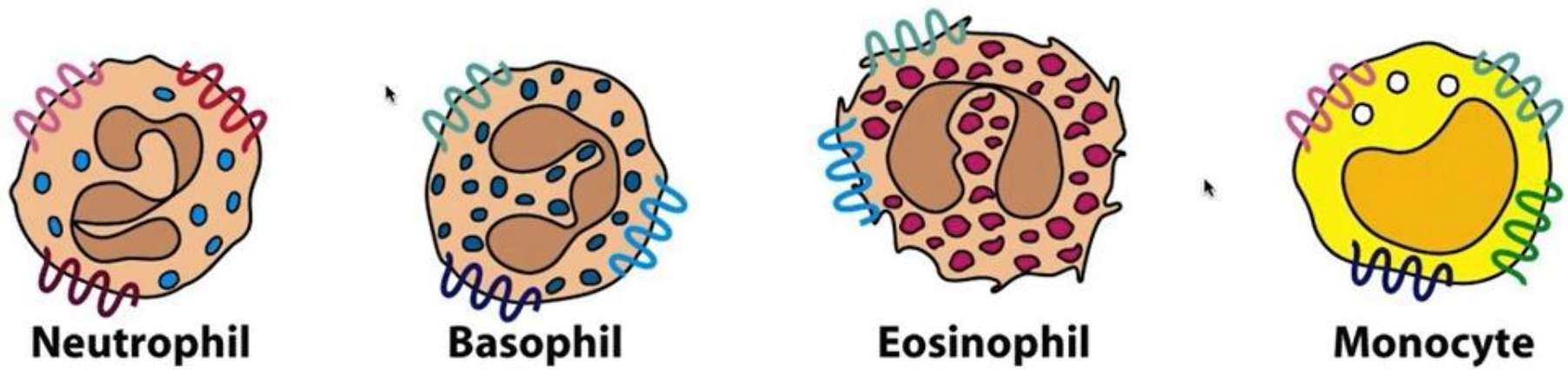
Parham Figure 3.25 Kuby 6th Ed. Figure 13-2

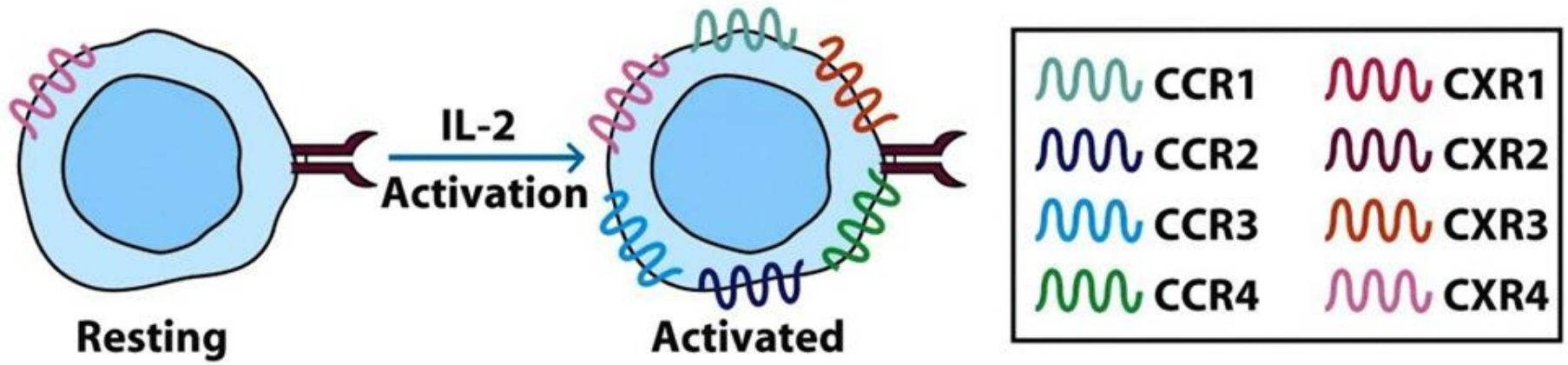
Chemokines

Class	Structural signature	Names	Number (n) in class
CXC	.....CX__C.....C.....C.....	CXCL#	15
CC	.....C___C.....C.....C.....	CCL#	25
XC	.....C.....C	XCL#	2
CX_3C	.....CXXXC.....C.....C.....	CX3CL1	1

Figure 3-23
Kuby Immunology, Eighth Edition

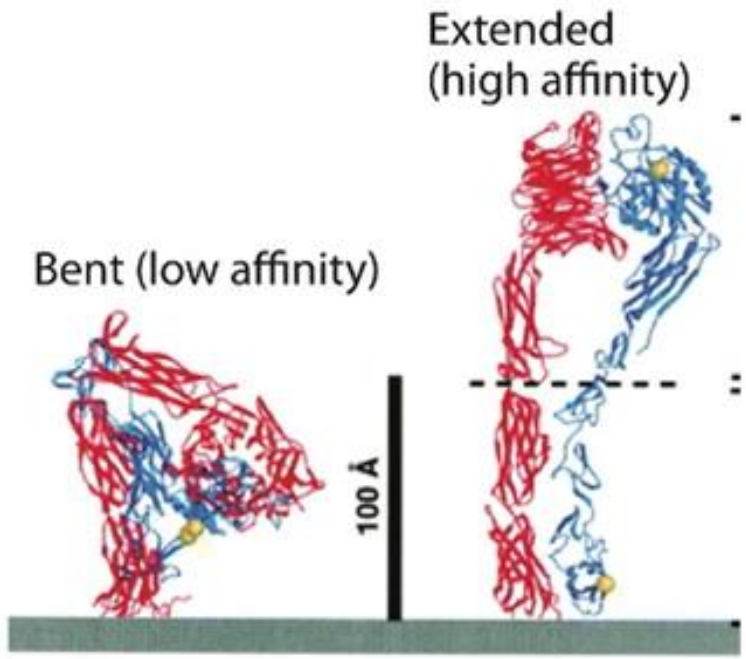
Different chemokine receptors on different leukocytes



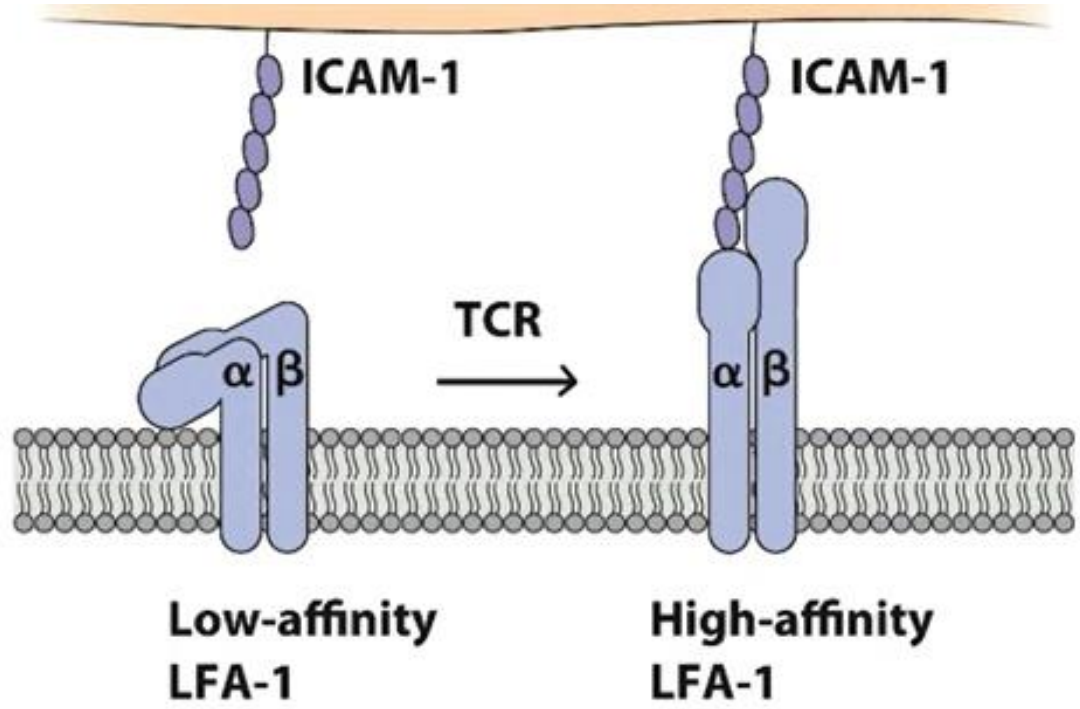


Kuby 6th Ed. Figure 13 **T lymphocyte**

Integrin activation

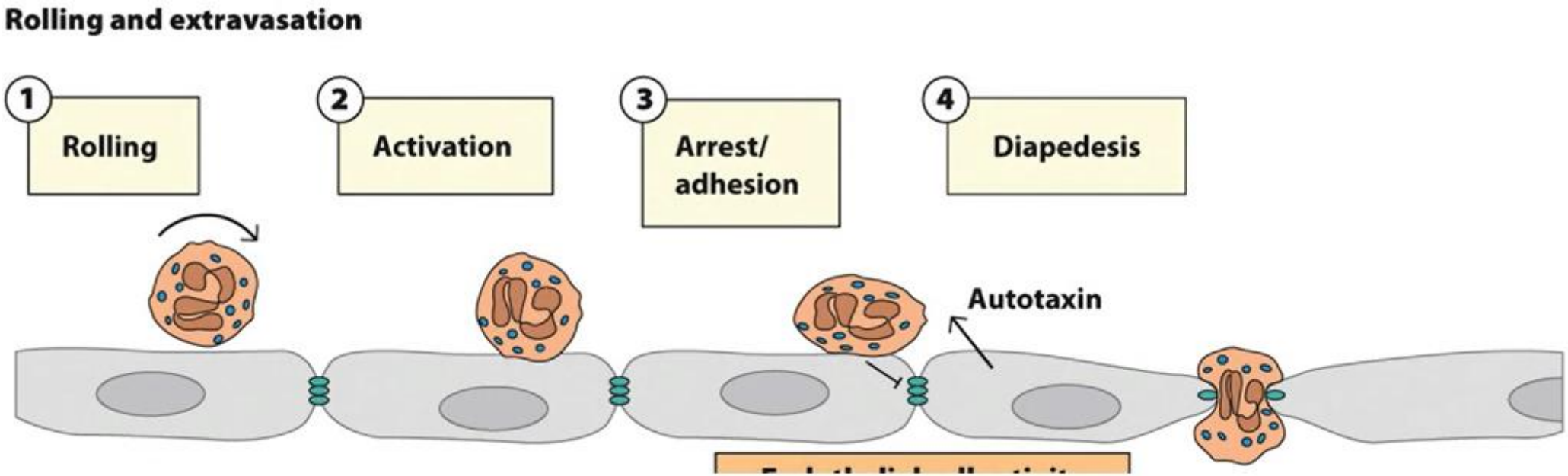


Abbas Figure 3-2

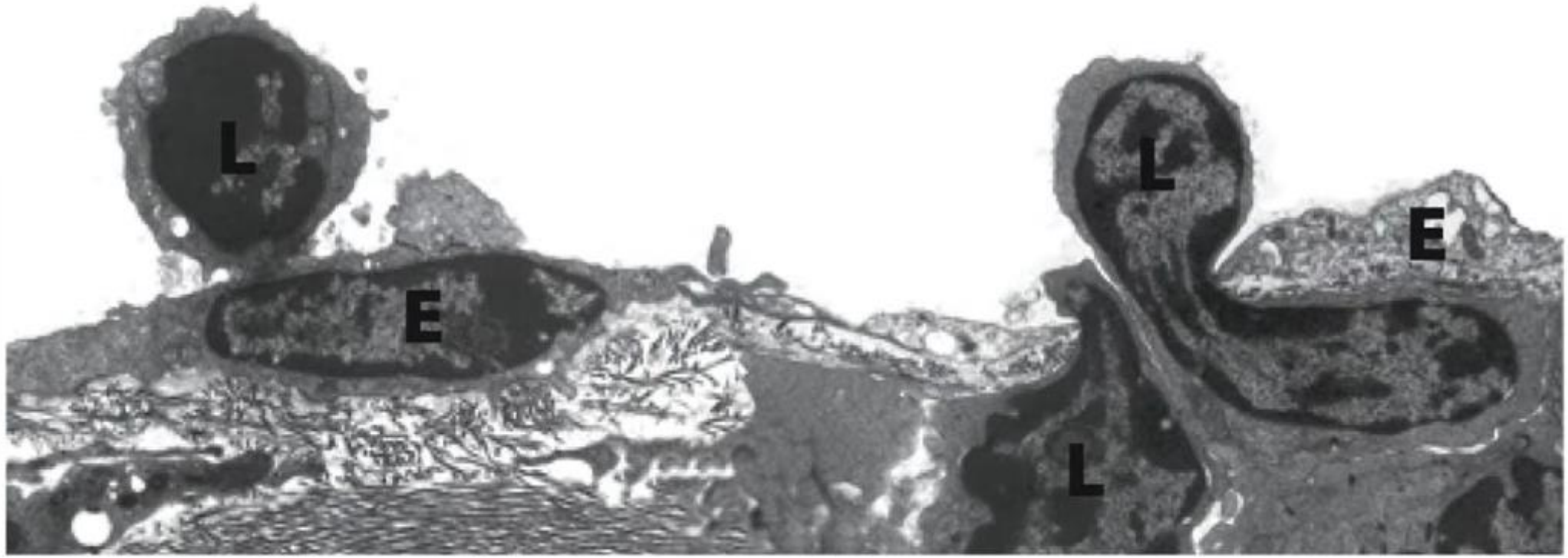


Kuby Figure 12-9

Stages of leukocyte trafficking

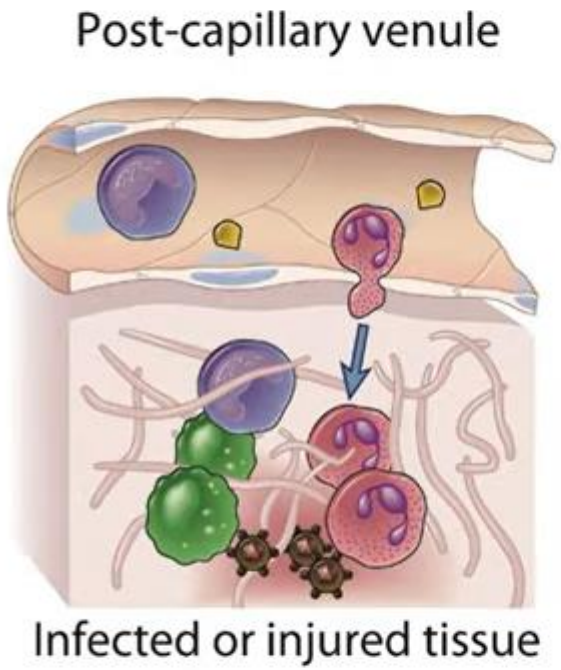


Transendothelial migration/diapedesis/extravasation

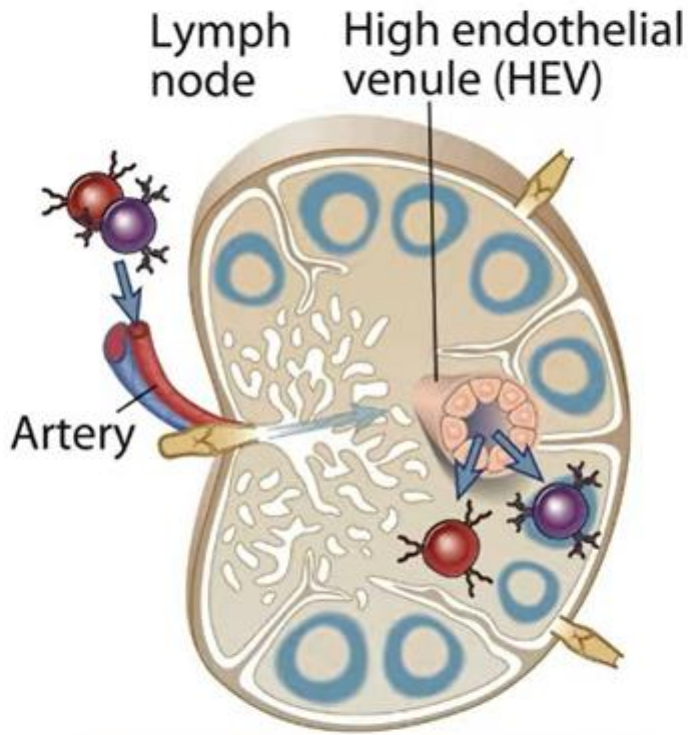


Kuby Figure 14-4

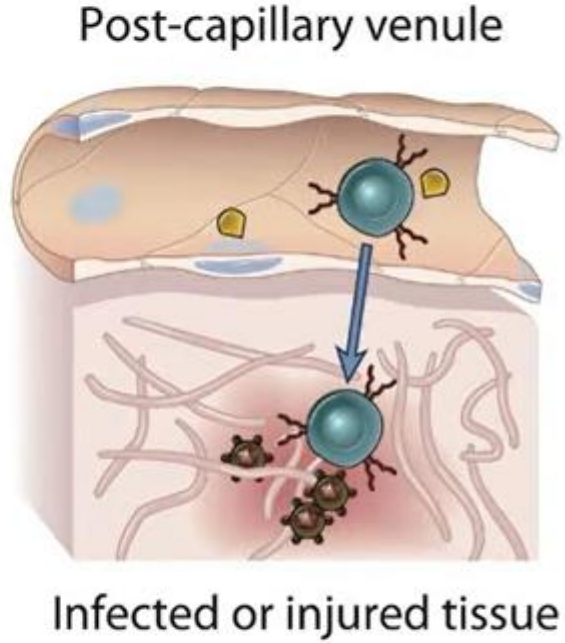
Leukocyte trafficking



Neutrophils and monocytes migrate to sites of infection and tissue injury: inflammation



Naive T and B cells migrate into secondary lymphoid tissues: initiation of adaptive immune responses



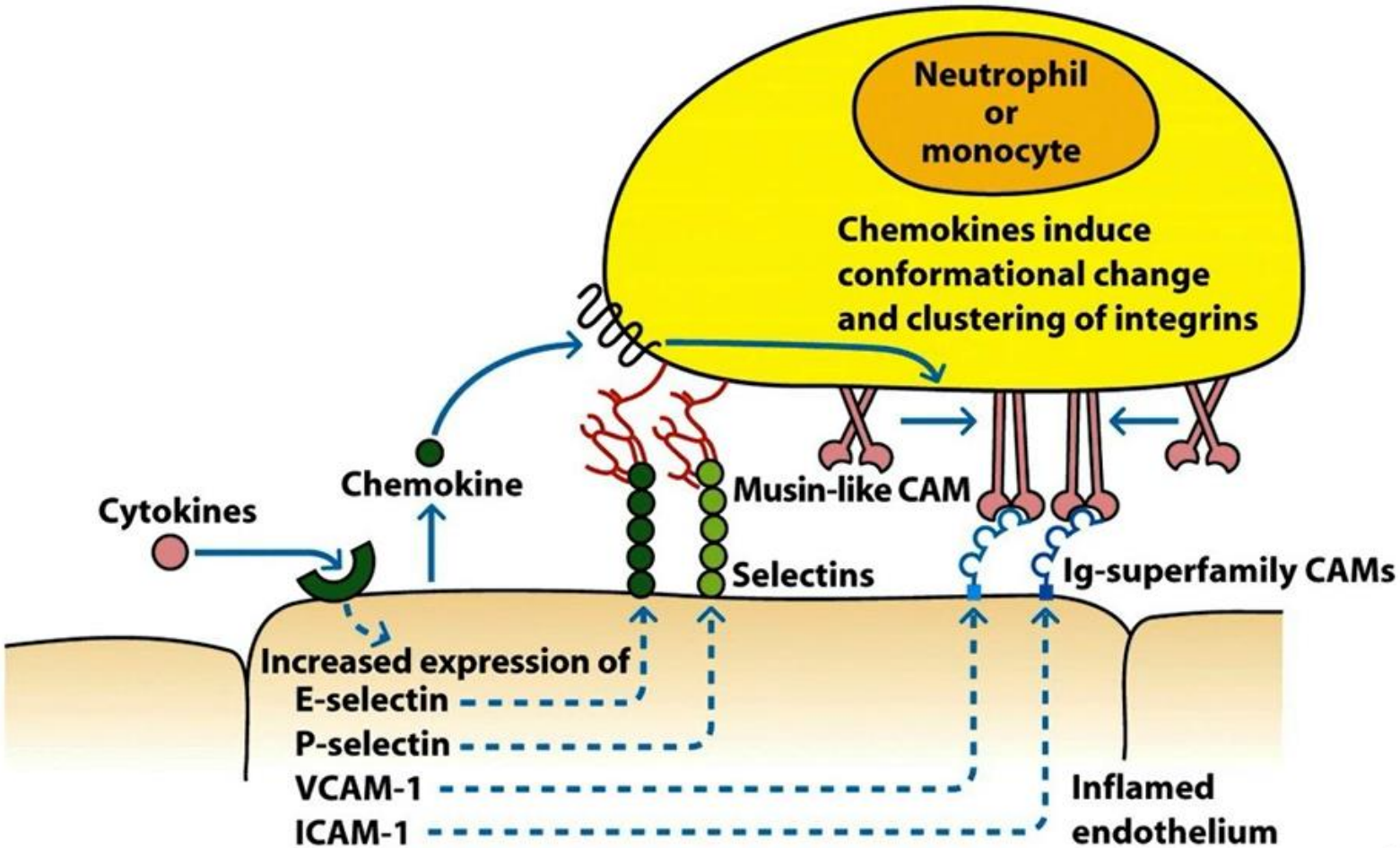
Effector and memory T cells migrate into sites of infection and tissue injury: cell-mediated immunity

Leukocyte trafficking to site of infection

TABLE 1 Molecules involved in extravasation of leukocytes

Leukocyte	Molecules involved in rolling	Chemokines involved in activation	Molecules involved in adhesion	Comments
Neutrophils	PSGL-1	IL-8 and macrophage inflammatory protein 1β (MIP-1β [also called CCL4])	LFA-1 and MAC-1	First to the site of inflammation: responds to C5a, bacterial peptides containing *N*-formyl peptides, and leukotrienes within inflamed tissues

Leukocyte trafficking to site of infection



Kuby 6th Ed. Figure 13-5

Leukocyte trafficking to site of infection

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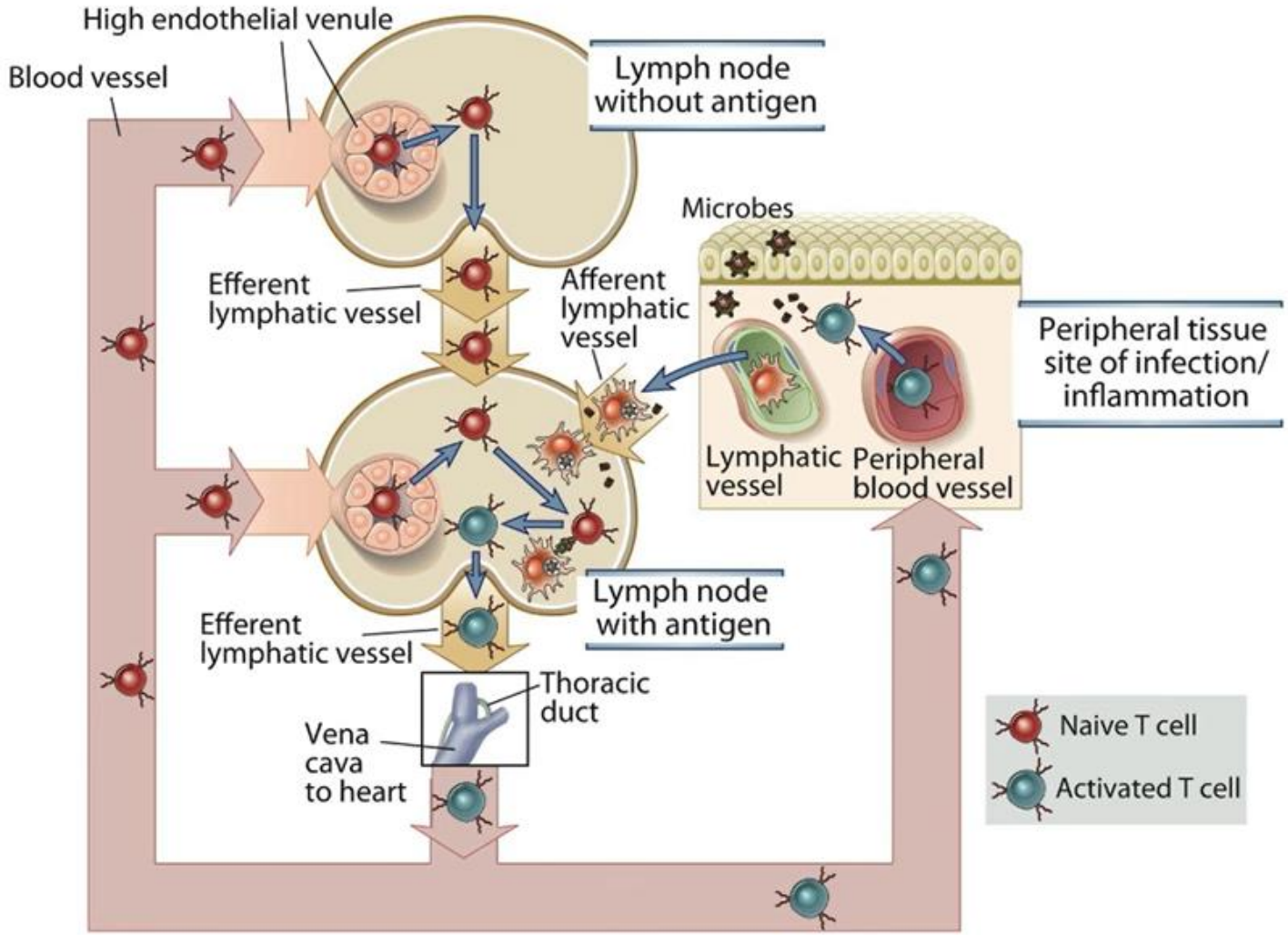
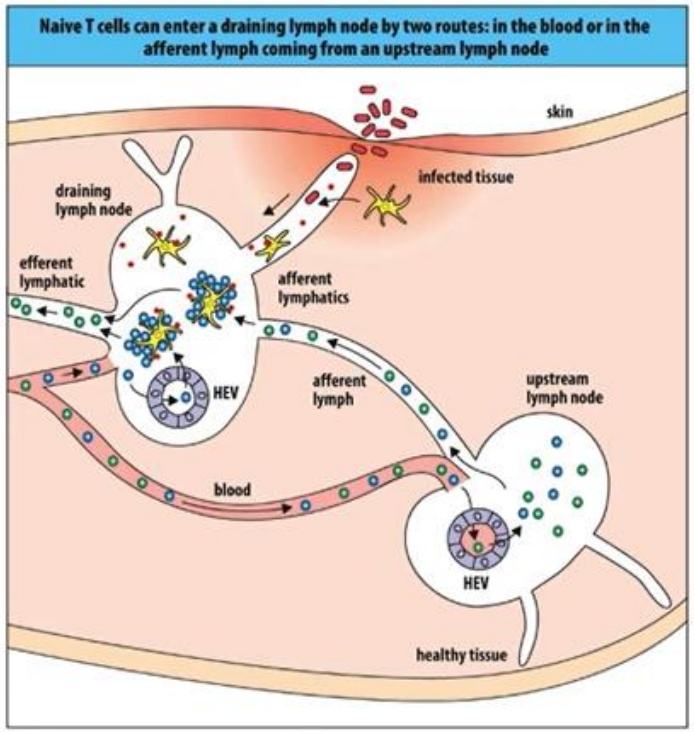
Neutrophils	PSGL-1	IL-8 and macrophage inflammatory protein 1β (MIP-1β [also called CCL4])	LFA-1 and MAC-1	First to the site of inflammation: responds to C5a, bacterial peptides containing *N*-formyl peptides, and leukotrienes within inflamed tissues
Naïve lymphocytes	L-selectin, LFA-1, VLA-4 (in low-affinity forms)	CCL21, CCL19, CXCL12 (T cells), and CXCL13 (B cells)	LFA-1 and VLA-4	Travel across high-endothelial venules to enter the lymph node

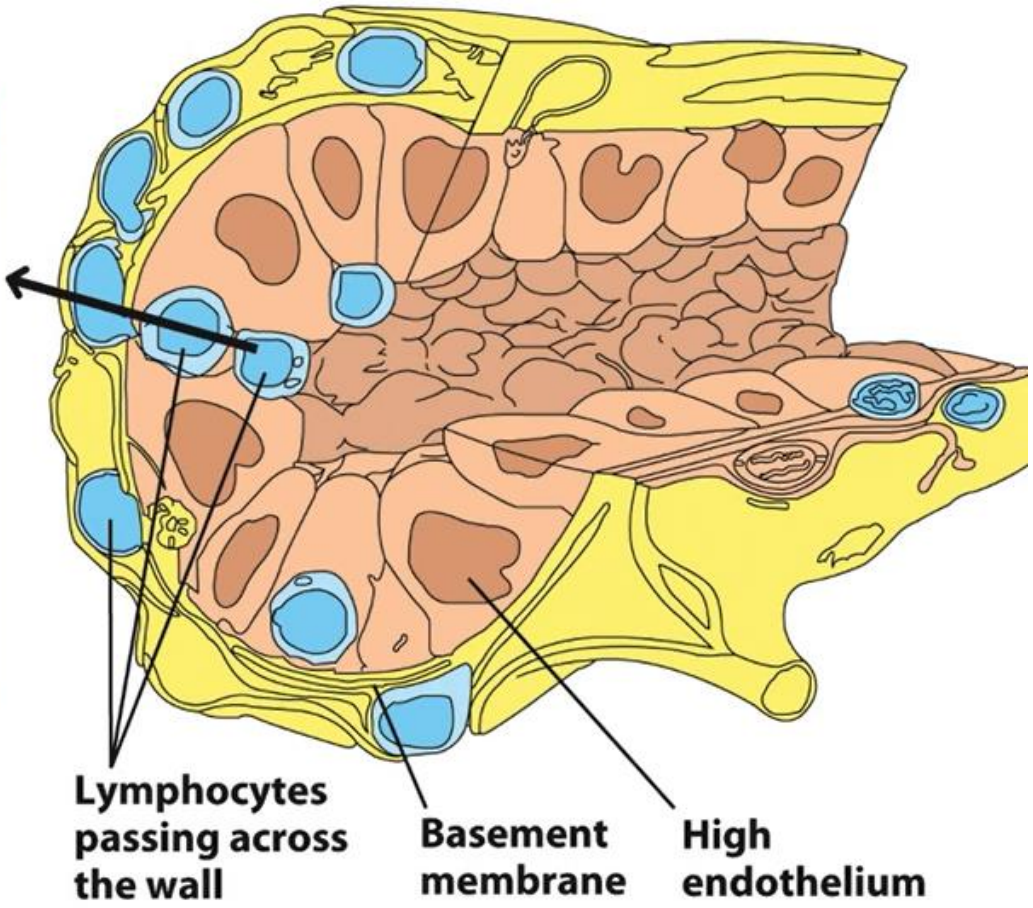
Recirculation of naïve and activated T cells



Abbas Figure 3-4

High endothelial venules

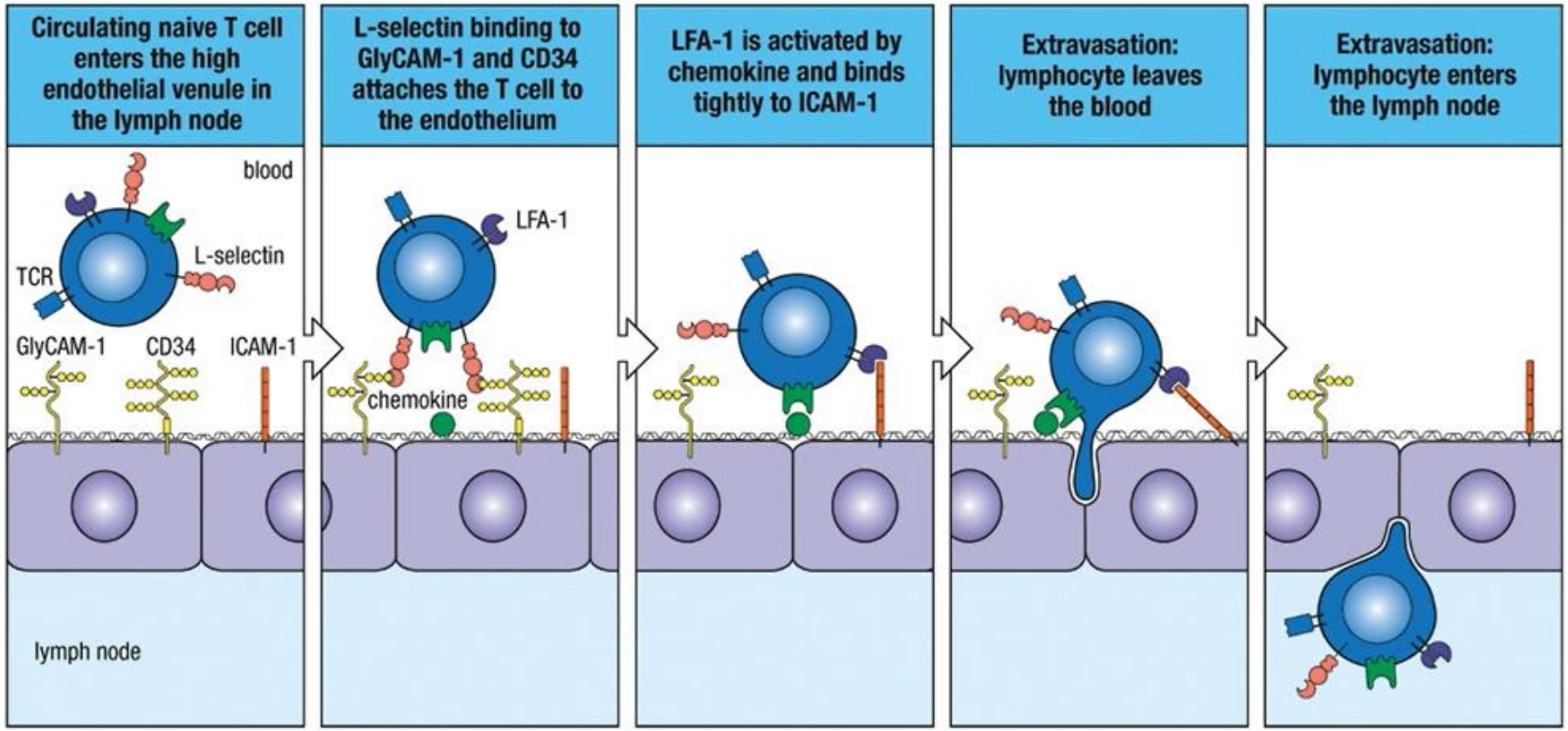




Parham Figure 8.5

Kuby Figure 14-3

Naïve lymphocyte trafficking to lymph nodes

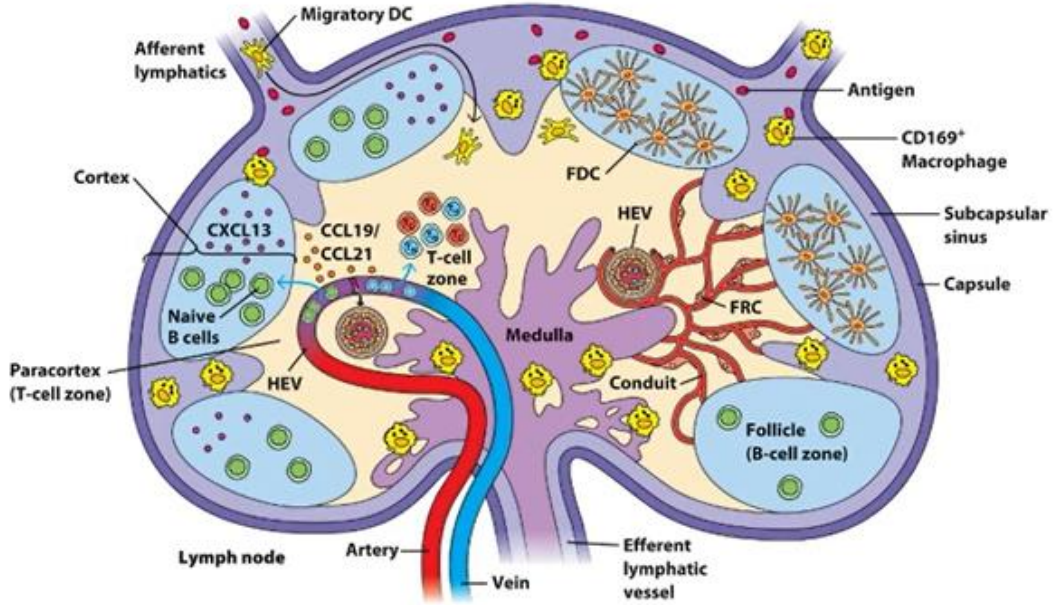


Parham Figure 8.6

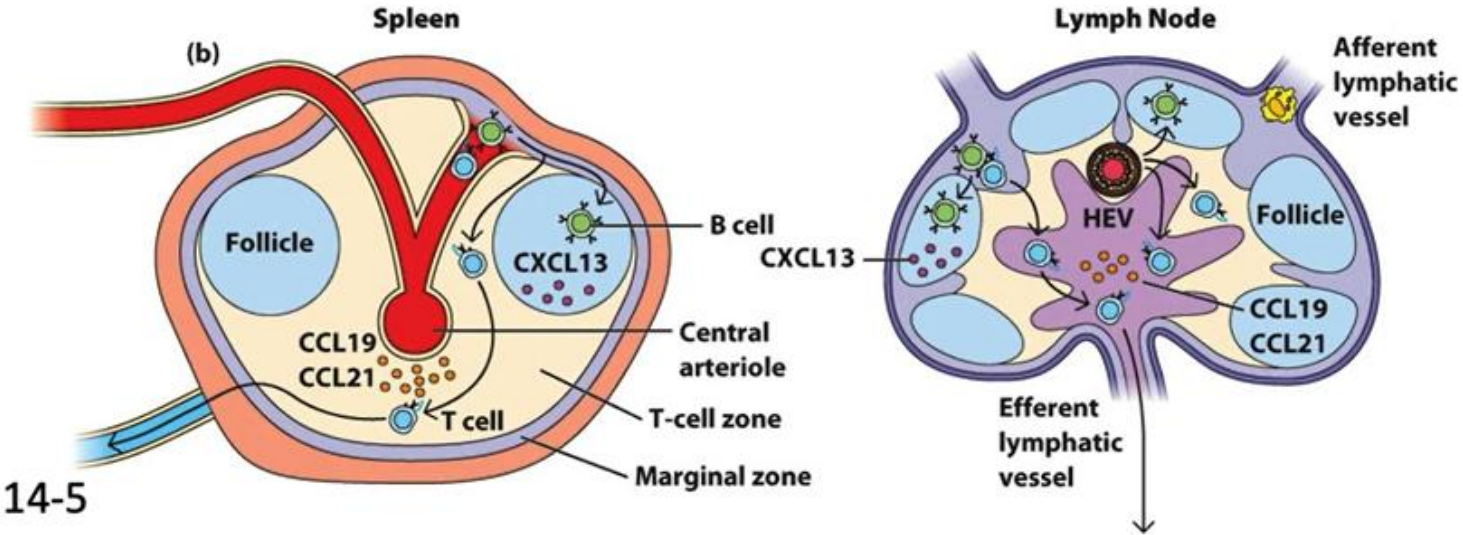
L-selectin, LFA-1, VLA-4 (in low-affinity forms)	**CCL21, CCL19, and CXCL12 (for T cells) CXCL13 (for B cells)**	**LFA-1 and VLA-4**	**Travel across high-endothelial venules to enter the lymph node**

Organization within the Secondary Lymphoid Organ

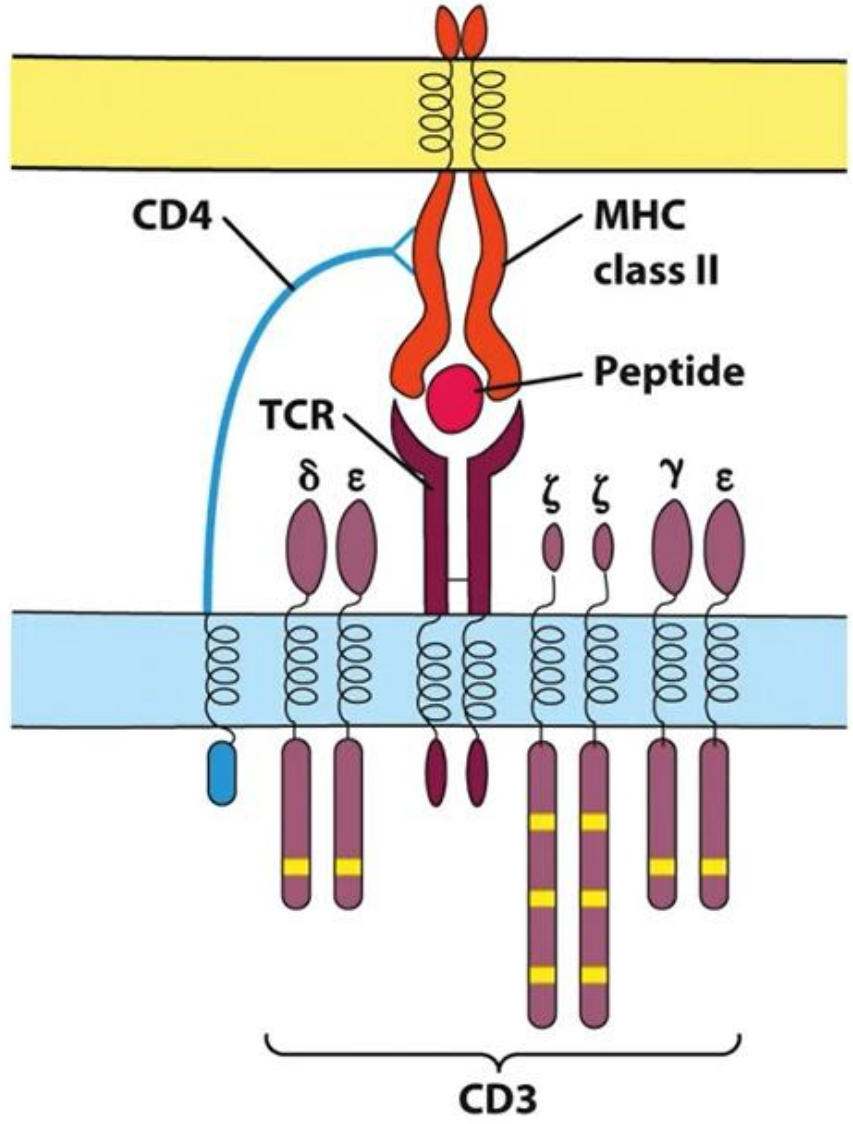
Kuby Figure 14-2



Kuby Figure 14-5



T cell receptor



Kuby Figure 3-17

Adhesion Molecules on T Cells

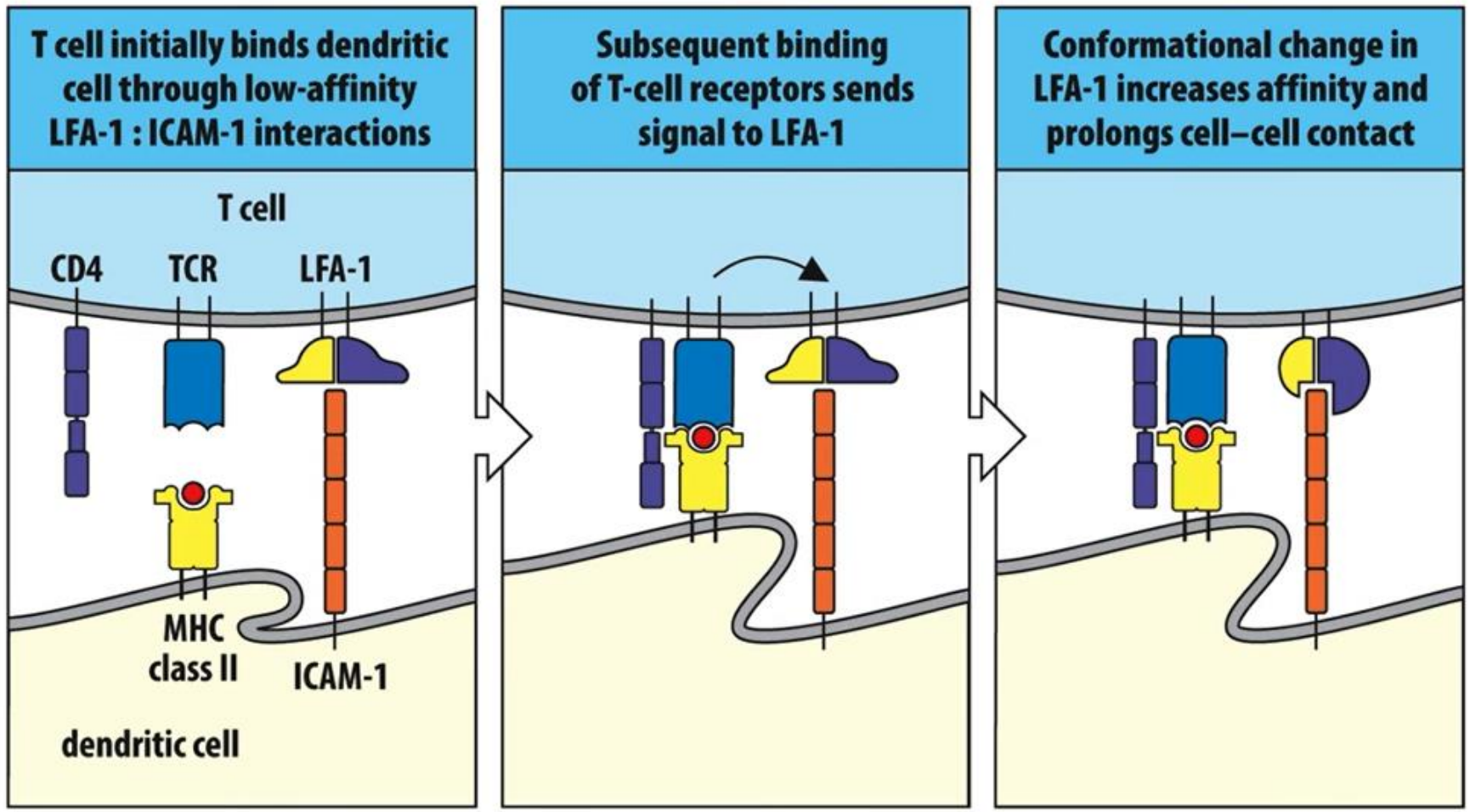
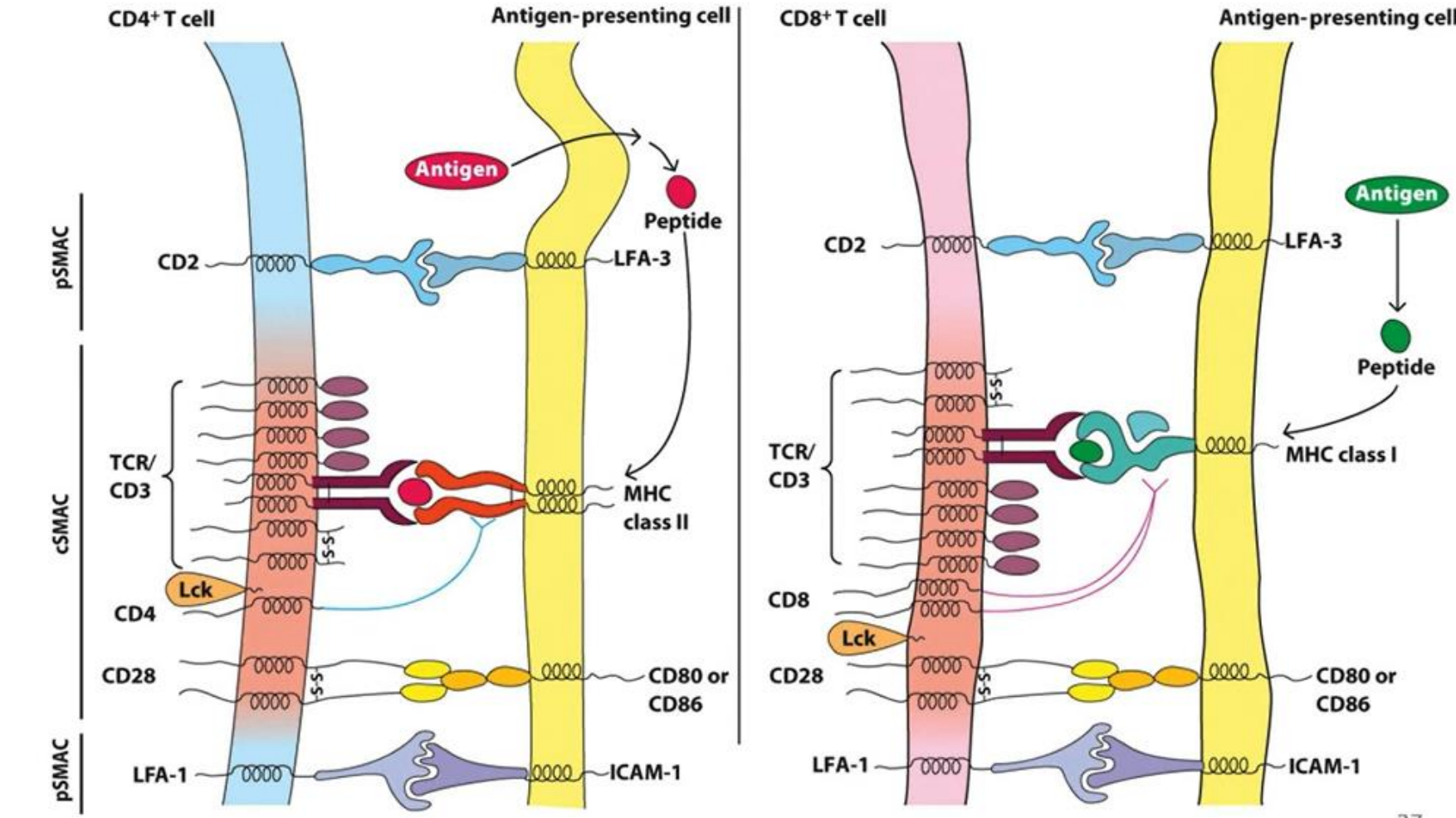


Figure 8.7 The Immune System, 4th ed. (© Garland Science 2015)

Parham Figure 8.7

Proteins on the surface of T cells and APCs



Kuby Figure 10-3

Conclusion

https://www.youtube.com/watch?v=Sv66abGd6xA