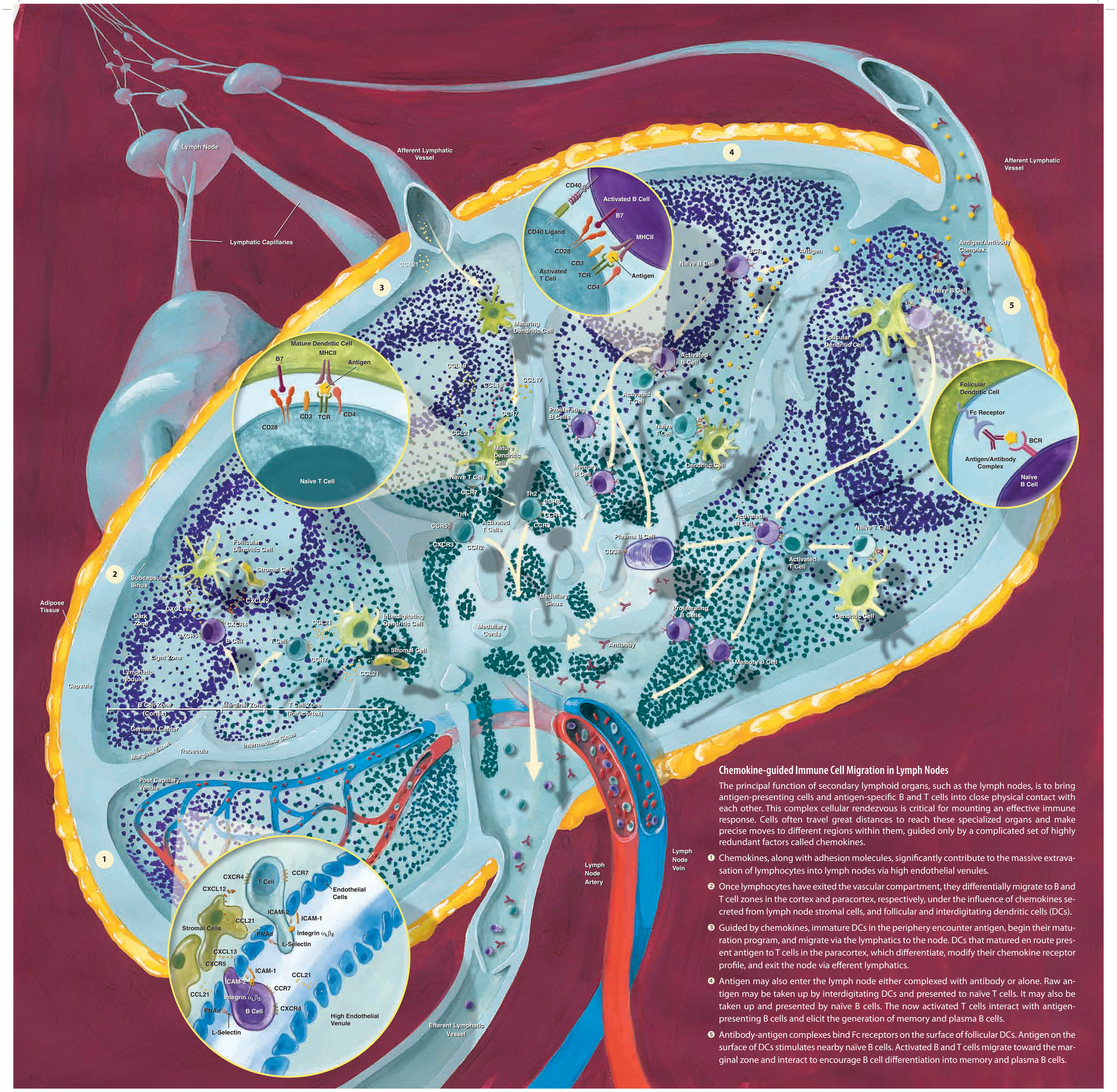

Chemokine-guided Immune Cell Migration in Lymph Nodes

The principal function of secondary lymphoid organs, such as the lymph nodes, is to bring antigen-presenting cells and antigen-specific B and T cells into close physical contact with each other. This complex cellular rendezvous is critical for mounting an effective immune response. Cells often travel great distances to reach these specialized organs and make precise moves to different regions within them, guided only by a complicated set of highly redundant factors called chemokines.

1. Chemokines, along with adhesion molecules, significantly contribute to the massive extravasation of lymphocytes into lymph nodes via high endothelial venules.
2. Once lymphocytes have exited the vascular compartment, they differentially migrate to B and T cell zones in the cortex and paracortex, respectively, under the influence of chemokines secreted from lymph node stromal cells, and follicular and interdigitating dendritic cells (DCs).
3. Guided by chemokines, immature DCs in the periphery encounter antigen, begin their maturation program, and migrate via the lymphatics to the node. DCs that matured en route present antigen to T cells in the paracortex, which differentiate, modify their chemokine receptor profile, and exit the node via efferent lymphatics.
4. Antigen may also enter the lymph node either complexed with antibody or alone. Raw antigen may be taken up by interdigitating DCs and presented to naïve T cells. It may also be taken up and presented by naïve B cells. The now activated T cells interact with antigen-presenting B cells and elicit the generation of memory and plasma B cells.
5. Antibody-antigen complexes bind Fc receptors on the surface of follicular DCs. Antigen on the surface of DCs stimulates nearby naïve B cells. Activated B and T cells migrate toward the marginal zone and interact to encourage B cell differentiation into memory and plasma B cells.

The Human Chemokine System

SYSTEMATIC NAME	COMMON NAME	CHROMOSOME LOCATION	MATURE LENGTH	MOLECULAR WEIGHT	RECEPTORS
CC Chemokines					
CCL1	I-309	17q11	73 aa	8.5 kDa	CCR8
CCL2	MCP-1	17q11	76 aa	8.7 kDa	CCR1, 2
CCL3	MIP-1α	17q11	69 aa	7.7 kDa	CCR1, 4, 5
CCL4	MIP-1β	17q11	69 aa	7.8 kDa	CCR1, 5, 8
CCL5	RANTES	17q11	68 aa	7.9 kDa	CCR1, 3, 4, 5
CCL7	MCP-3	17q11	76 aa	9.0 kDa	CCR1, 2, 3, 5
CCL8	MCP-2	17q11	76 aa	8.9 kDa	CCR1, 2, 3, 5
CCL11	Eotaxin	17q21	74 aa	8.4 kDa	CCR2, 3, 5
CCL13	MCP-4	17q11	75 aa	8.6 kDa	CCR1, 2, 3, 5
CCL14	HCC-1	17q11	74 aa	8.7 kDa	CCR1, 5
CCL15	MIP-1δ	17q11	92 aa	10.2 kDa	CCR1, 3
CCL16	HCC-4	17q11	97 aa	11.2 kDa	CCR1, 2, 5
CCL17	TARC	16q13	71 aa	8.1 kDa	CCR4, 8
CCL18	PARC	17q11	69 aa	7.9 kDa	CCR3
CCL19	MIP-3β	9p13	77 aa	8.8 kDa	CCR7
CCL20	MIP-3α	2q33	70 aa	8.0 kDa	CCR6
CCL21	6Ckine	9p13	111 aa	12.3 kDa	CCR7
CCL22	MDC	16q13	69 aa	8.1 kDa	CCR4
CCL23	MPIF-1	17q11	99 aa	11.4 kDa	CCR1
CCL24	Eotaxin-2	7q11	93 aa	10.5 kDa	CCR3
CCL25	TECK	9p13	127 aa	14.2 kDa	CCR9
CCL26	Eotaxin-3	7q11	71 aa	8.4 kDa	CCR2, 3, 10
CCL27	CTACK	9p13	88 aa	10.2 kDa	CCR10
CCL28		5p12	108 aa	12.4 kDa	CCR3, 10

SYSTEMATIC NAME	COMMON NAME	CHROMOSOME LOCATION	MATURE LENGTH	MOLECULAR WEIGHT	RECEPTORS
CXC Chemokines					
CXCL1	GROα	4q21	73 aa	7.9 kDa	CXCR2
CXCL2	GROβ	4q21	73 aa	7.9 kDa	CXCR2
CXCL3	GROγ	4q21	73 aa	7.9 kDa	CXCR2
CXCL4	PF4	4q12	70 aa	7.8 kDa	CXCR3
CXCL5	ENA-78	4q13	78 aa	8.4 kDa	CXCR1, 2
CXCL6	GCP-2	4q21	77 aa	8.3 kDa	CXCR1, 2
CXCL7	NAP-2	4q12	70 aa	7.6 kDa	CXCR2
CXCL8	IL-8	4q12	72, 77 aa	8.4, 8.9 kDa	CXCR1, 2
CXCL9	MIG	4q21	103 aa	11.7 kDa	CXCR3
CXCL10	IP-10	4q21	77 aa	8.6 kDa	CXCR3
CXCL11	I-TAC	4q21	73 aa	8.3 kDa	CXCR3
CXCL12	SDF-1	10q11	68, 72 aa	8.0, 8.5 kDa	CXCR4
CXCL13	BCA-1	4q21	87 aa	10.3 kDa	CXCR5
CXCL14	BRAK	5q31	77 aa	9.4 kDa	
CXCL16		17p13	89 aa*	10.2 kDa*	CXCR6
XC Chemokines					
XCL1	Lymphotactin	1q23	93 aa	10.3 kDa	XCR1
XCL2	SCM-1β	1q23	93 aa	10.3 kDa	XCR1
CX_3C Chemokines					
CX_3CL1	Fractalkine	16q13	76 aa*	8.6 kDa*	CX_3CR1

* Chemokine domain only

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