PIPADOR REVISION

MRCOG Part 1 Revision Notes

Lymphatic System

PHYSIOLOGY • LECTURE 155

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG PART 1 REVISION NOTES | PHYSIOLOGY

155 Lymphatic System

Lymph formation, lymphoid organs, immunity, immunology of pregnancy and pelvic lymphatic drainage

≈ 2–4 L/day	Thoracic duct	IgG only	16–32 wk
Lymph returned to circulation	Drains ≈ ¾ of body → left venous angle	Antibody crossing placenta (FcRn)	Pertussis vaccine window (UK)

■ KEY FACTS: Learning objectives

- Describe the structure and functions of the lymphatic system, lymph nodes, spleen and thymus.
- Outline innate and adaptive immunity and the immunoglobulin classes.
- Describe maternal–fetal immune tolerance and passive transfer of immunity.
- Describe lymphatic drainage of the pelvic organs and clinical applications (cancer staging, lymphoedema, cystic hygroma).

155.1 The lymphatic system

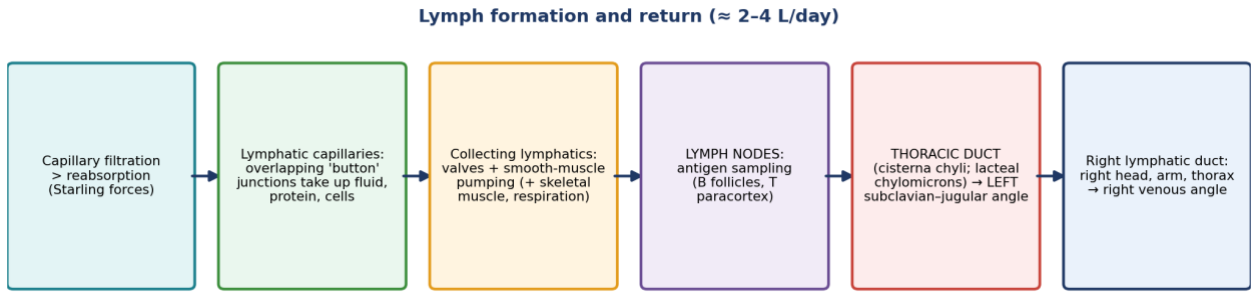


Figure 155.1 — Formation and return of lymph

Fluid balance	Fat absorption	Immunity
Returns filtered fluid and protein	Lacteals carry chylomicrons	Antigen transport to nodes; lymphocyte recirculation

Organ	Structure	Function / clinical
Lymph node	Capsule; cortex (B-cell follicles, germinal centres), paracortex (T cells, HEVs), medulla (plasma cells, macrophages)	Filter lymph, antigen presentation, clonal expansion; enlargement in infection/malignancy
Spleen	White pulp (lymphoid — PALS T cells, follicles B cells); red pulp (sinusoids, cords)	Removes old/abnormal RBCs, encapsulated bacteria (opsonised), platelet pool (≈ ⅓). Asplenia → vaccinate (pneumococcus, meningococcus, Hib), antibiotic prophylaxis; splenic artery aneurysm rupture in pregnancy
Thymus	Cortex and medulla; involutes after puberty	T-cell maturation (positive and negative selection); DiGeorge (22q11) — thymic aplasia
MALT	Tonsils, Peyer's patches, bronchial	Mucosal IgA

155.2 Immunity overview

	Innate	Adaptive
Speed / specificity	Immediate; pattern recognition (TLRs)	Days; highly specific; memory
Cells	Neutrophils, macrophages, NK cells, dendritic cells, mast cells	B cells (antibodies), T cells (CD4 helper — Th1/Th2/Th17/Treg; CD8 cytotoxic)
Molecules	Complement, cytokines, acute-phase proteins, defensins	Immunoglobulins, T-cell receptors (MHC-restricted)

Ig class	Key features
IgG	Most abundant; only class crossing the placenta (FcRn); secondary response; subclasses IgG1–4 (IgG1 crosses best)
IgM	Pentamer; first response; does not cross placenta — raised IgM in a neonate = fetal infection; ABO isoagglutinins
IgA	Dimer in secretions; breast milk/colostrum (passive gut immunity)
IgE	Allergy, parasites (mast cell degranulation)
IgD	B-cell receptor

155.3 Immunology of pregnancy

Mechanism of maternal tolerance	Detail
Trophoblast HLA expression	Villous syncytiotrophoblast lacks classical HLA; extravillous trophoblast expresses HLA-C, HLA-E, HLA-G (not HLA-A/B) → inhibits NK and T-cell attack
Uterine NK cells	Dominant decidual leucocyte; promote spiral artery remodelling (KIR–HLA-C)
Regulatory T cells	Expand in pregnancy; fetal antigen-specific tolerance
Cytokine milieu	Shift towards Th2 / anti-inflammatory (↑ IL-4, IL-10) — Th1-mediated disease (RA, MS) often improves; SLE may flare
Local factors	IDO (tryptophan depletion), complement regulators (CD46, CD55, CD59), Fas ligand, progesterone-induced blocking factor
Consequences	↑ Susceptibility/severity: influenza, varicella, COVID-19, listeria, malaria, hepatitis E

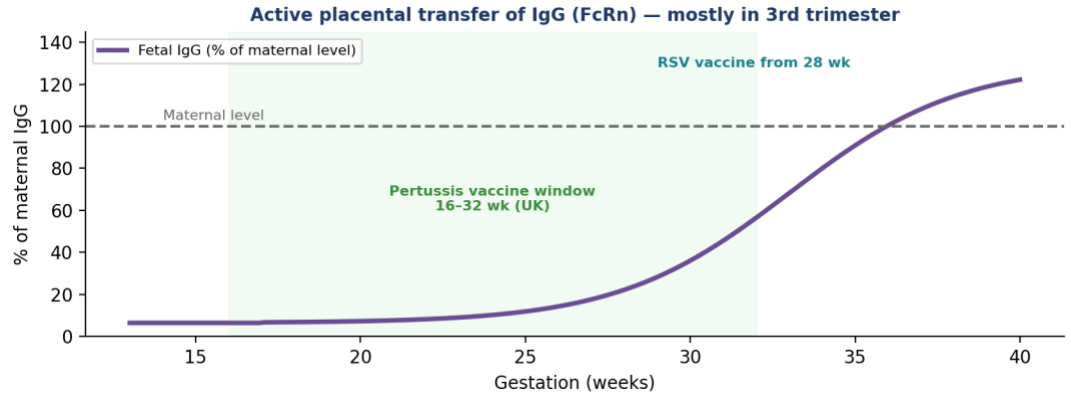


Figure 155.2 — Placental IgG transfer and the timing of maternal vaccination

Vaccines in pregnancy (UK): pertussis (16–32 weeks), influenza (any trimester), **RSV (from 28 weeks)**, COVID-19 — all inactivated/subunit. **Live vaccines** (MMR, varicella, BCG, yellow fever) are avoided in pregnancy; MMR given postpartum if rubella non-immune. Preterm infants receive less maternal IgG.

155.4 Lymphatic drainage of the pelvic organs

Organ	Primary nodes	Clinical relevance
Vulva	Superficial → deep inguinofemoral (node of Cloquet) → external iliac; midline lesions drain bilaterally	Sentinel node biopsy (unifocal < 4 cm); groin node dissection → lymphoedema, wound breakdown
Lower ⅓ vagina	Inguinal	—
Upper vagina / cervix	Parametrial → obturator, internal & external iliac → common iliac → para-aortic	FIGO stage IIIC (pelvic/para-aortic nodes); radical hysterectomy + pelvic lymphadenectomy / sentinel node
Uterine body	Iliac nodes; fundus via ovarian vessels → para-aortic; along round ligament → inguinal	Endometrial cancer staging (sentinel node mapping)
Ovary / tube	Along ovarian vessels → para-aortic (L1–L2) nodes	Para-aortic dissection in ovarian cancer staging

155.5 Clinical correlations

Condition	Physiology
Lymphoedema	Lymphatic obstruction/removal (lymphadenectomy, radiotherapy, filariasis) → protein-rich oedema, fibrosis, cellulitis risk
Chylothorax / chylous ascites	Thoracic duct injury → triglyceride-rich milky fluid; fetal chylothorax → hydrops
Cystic hygroma	Failure of jugular lymphatic sacs to join venous system → posterior neck septated cysts; Turner (45,X), trisomies, Noonan; ↑ nuchal translucency shares this mechanism
Non-immune hydrops	Lymphatic dysplasia is one cause (also cardiac, anaemia, infection, aneuploidy)
Sentinel lymph node	First node(s) draining a tumour; blue dye/technetium/ICG — staging with less morbidity

155.6 Must-know summary

■ **EXAM TIP**

- Lymph ≈ 2–4 L/day; thoracic duct → **left** subclavian–jugular junction; lacteals absorb fat.
- Spleen: clears encapsulated bacteria — asplenia needs vaccination.
- **IgG is the only antibody crossing the placenta** (FcRn; mostly 3rd trimester); IgM in a neonate = congenital infection; IgA in breast milk.
- Tolerance: trophoblast expresses **HLA-C, -E, -G** (not A/B); uNK cells; Tregs; Th2 shift.
- Cervix → **obturator/iliac** nodes; ovary → **para-aortic**; vulva → **inguinofemoral**; round ligament → inguinal.

■ **MNEMONIC / MEMORY AID**

Antibodies — 'GAMED': IgG (Goes across), IgA (Away in secretions), IgM (Made first), IgE (allErgy), IgD. **'G for Gestation'** — only IgG crosses the placenta.