PIPADOR REVISION

MRCOG Part 1 Revision Notes

Endocrinology of Lactation and Breastfeeding

ENDOCRINOLOGY • LECTURE 186

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG PART 1 REVISION NOTES | ENDOCRINOLOGY

186 Endocrinology of Lactation and Breastfeeding

Mammogenesis, lactogenesis, prolactin and oxytocin reflexes, milk synthesis, lactational amenorrhoea, drugs and disorders

Prolactin	Oxytocin	30–72 h	98%
Milk synthesis (anterior pituitary)	Milk ejection (posterior pituitary)	Lactogenesis II (milk 'comes in')	LAM efficacy (criteria met)

■ KEY FACTS: Learning objectives

- Describe the hormonal control of breast development (mammogenesis).
- Describe the endocrine control of lactogenesis I, II and III and the suckling reflexes.
- Describe the cellular synthesis of milk and its autocrine regulation.
- Describe lactational amenorrhoea, hormonal contraception in lactation, drugs and causes of lactation failure and galactorrhoea.

186.1 Mammogenesis

Stage	Hormones	Effect
Puberty	Oestrogen, GH/IGF-1, cortisol; progesterone (luteal)	Ductal elongation and branching; terminal end buds; stroma and fat
Each cycle	Oestrogen, progesterone	Cyclical lobular changes (premenstrual swelling)
Pregnancy	Oestrogen (ducts), progesterone (lobuloalveolar), prolactin, hPL, insulin, cortisol, thyroid hormones	Alveolar proliferation and secretory differentiation; breast enlarges; lactogenesis I from ≈ 16 weeks
Post-weaning	Withdrawal of suckling/prolactin; milk stasis	Involution — apoptosis of alveolar epithelium

186.2 Lactogenesis

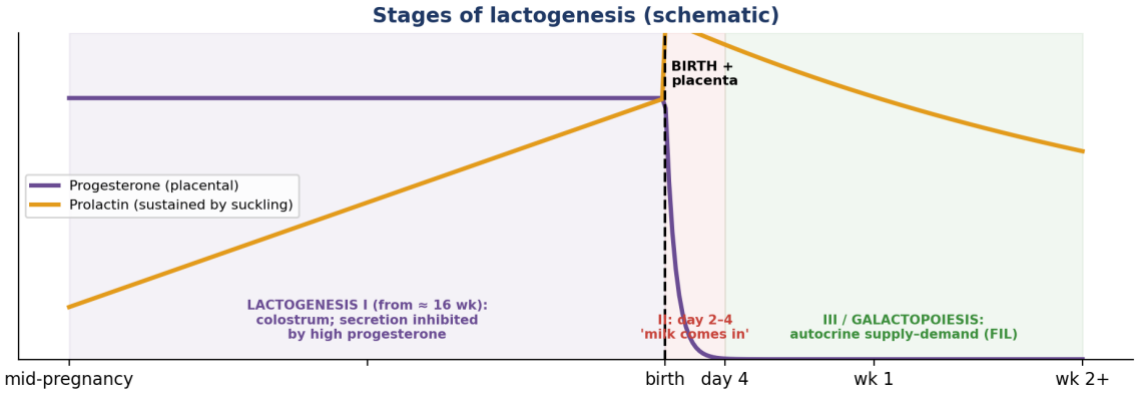


Figure 186.1 — Stages of lactogenesis

Stage	Endocrine control	Notes
Lactogenesis I	Prolactin + hPL drive differentiation; high progesterone blocks copious secretion (↓ PRL receptor signalling, ↓ α-lactalbumin)	Colostrum from mid-pregnancy

Stage	Endocrine control	Notes
Lactogenesis II	Progesterone withdrawal after placental delivery with high prolactin, plus cortisol and insulin (permissive); tight junctions close	Day 2–4; delayed by retained placenta, diabetes, obesity, CS, stress, PPH/Sheehan's
Lactogenesis III (galactopoiesis)	Autocrine control — milk removal removes feedback inhibitor of lactation (FIL) and maintains PRL receptor density; prolactin permissive	Supply = demand; each breast regulated independently

186.3 The neuroendocrine reflexes

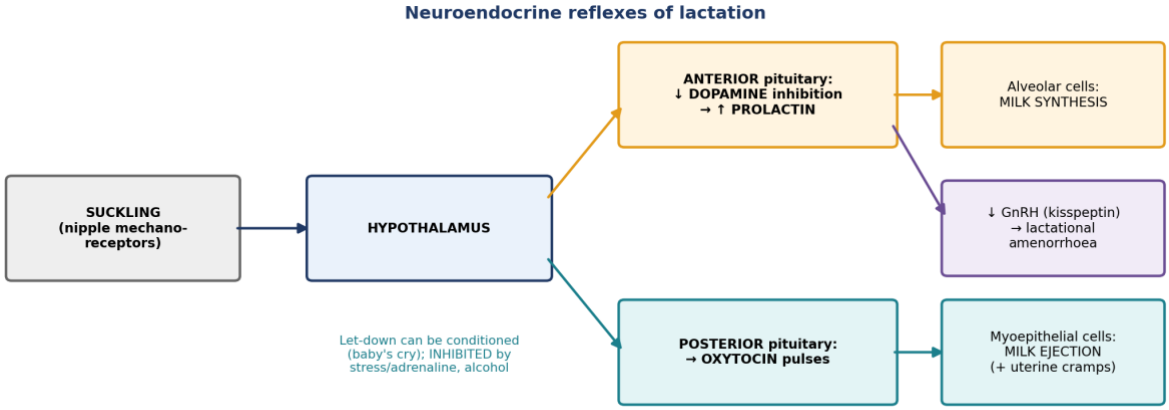


Figure 186.2 — Suckling, prolactin and oxytocin

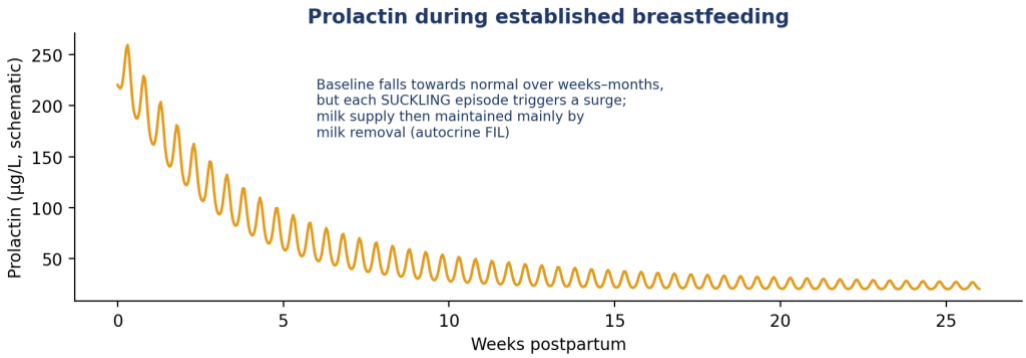


Figure 186.3 — Prolactin during established breastfeeding

- **Prolactin reflex**: suckling → hypothalamic inhibition of **dopamine** (and ↑ prolactin-releasing factors) → prolactin surge (peaks ≈ 30–45 min) → synthesis for the **next** feed; higher at night.
- **Milk ejection (let-down) reflex**: suckling, or conditioned cues (baby's cry) → **oxytocin** pulses → **myoepithelial contraction**; **inhibited by pain, anxiety, adrenaline, alcohol**. Also causes **uterine cramps** (aids involution) and promotes bonding.
- **Milk synthesis**: prolactin ↑ **α-lactalbumin** (part of lactose synthase: glucose + UDP-galactose → **lactose**, the main osmotic determinant of volume), caseins and lipid synthesis; IgA transcytosis via the polymeric Ig receptor.

186.4 Lactational amenorrhoea and contraception

- Frequent suckling → prolactin (and neural signals) **suppress kisspeptin/GnRH pulsatility** → ↓ LH pulses, follicular development without ovulation.
- **LAM** is ≈ **98% effective** if: **< 6 months** postpartum, **amenorrhoeic**, and **fully/nearly fully breastfeeding** (no long intervals between feeds).
- Contraception in breastfeeding (UKMEC): **progestogen-only methods** and IUDs from early postpartum; **combined hormonal contraception UKMEC 4 < 6 weeks** (and may ↓ milk supply; UKMEC 2 from 6 weeks to 6 months).

186.5 Drugs and disorders

Topic	Key points
Lactation suppression	Cabergoline (dopamine agonist) — e.g. after stillbirth/neonatal death; avoid in hypertension/pre-eclampsia; bromocriptine (stroke/MI reports)
Galactagogues	Dopamine antagonists domperidone (QT — cardiac caution), metoclopramide; first optimise feeding technique and frequency
Failure of lactation	Sheehan's syndrome (first sign), retained placental fragments, breast hypoplasia/insufficient glandular tissue, breast surgery, severe PPH, maternal diabetes/obesity, prolactin deficiency
Galactorrhoea / hyperprolactinaemia	Prolactinoma, dopamine antagonists (antipsychotics), hypothyroidism (TRH), renal failure, chest wall stimulation; macroprolactin artefact
Medicines in breastfeeding	Most compatible (check LactMed/UKDILAS); avoid cytotoxics, radioisotopes, high-dose iodine, amiodarone; caution lithium, codeine (ultra-rapid CYP2D6 metabolisers)

186.6 Must-know summary

■ **EXAM TIP**

- Oestrogen → ducts; progesterone → lobuloalveoli; prolactin + hPL → secretory differentiation.
- Lactogenesis II is triggered by **progesterone withdrawal** (placenta out) with high prolactin; delayed by retained placenta, diabetes, obesity, CS.
- **Prolactin = synthesis** (dopamine-inhibited); **oxytocin = ejection** (stress-inhibited).
- Established supply is **autocrine (FIL)**: supply matches demand.
- LAM 98% (< 6 months, amenorrhoeic, full breastfeeding); CHC UKMEC 4 < 6 weeks if breastfeeding.

■ **MNEMONIC / MEMORY AID**

'Prolactin Produces, Oxytocin Outputs'. **LAM criteria — 'Baby < 6 months, Bleeding absent, Breastfeeding fully'.**