PIPADOR REVISION

MRCOG Part 1 Revision Notes

Pituitary Hormones

ENDOCRINOLOGY • LECTURE 169

VISUAL EXAMINATION REVISION NOTES

2026 Edition

169

MRCOG PART 1 REVISION NOTES | ENDOCRINOLOGY

Pituitary Hormones

FSH, LH, TSH, ACTH, GH, prolactin, oxytocin and ADH — physiology, pregnancy changes and pituitary disorders

α-subunit	≈ 10-fold	3–5 min	Sheehan's
Shared by FSH, LH, TSH (and hCG)	Prolactin rise by term	Oxytocin half-life	Postpartum pituitary infarction

■ KEY FACTS: Learning objectives

- Describe the embryology and cell types of the anterior and posterior pituitary.
- Describe the structure, regulation and actions of FSH, LH, TSH, ACTH, GH, prolactin, oxytocin and ADH.
- Describe pituitary changes in pregnancy and lactation.
- Describe hypopituitarism, Sheehan's syndrome, prolactinoma, acromegaly and diabetes insipidus in obstetric practice.

169.1 The pituitary gland

Anterior	Posterior	Sella turcica
Rathke's pouch (oral ectoderm); portal blood supply	Neural ectoderm (diencephalon); axon terminals	Optic chiasm above → bitemporal hemianopia

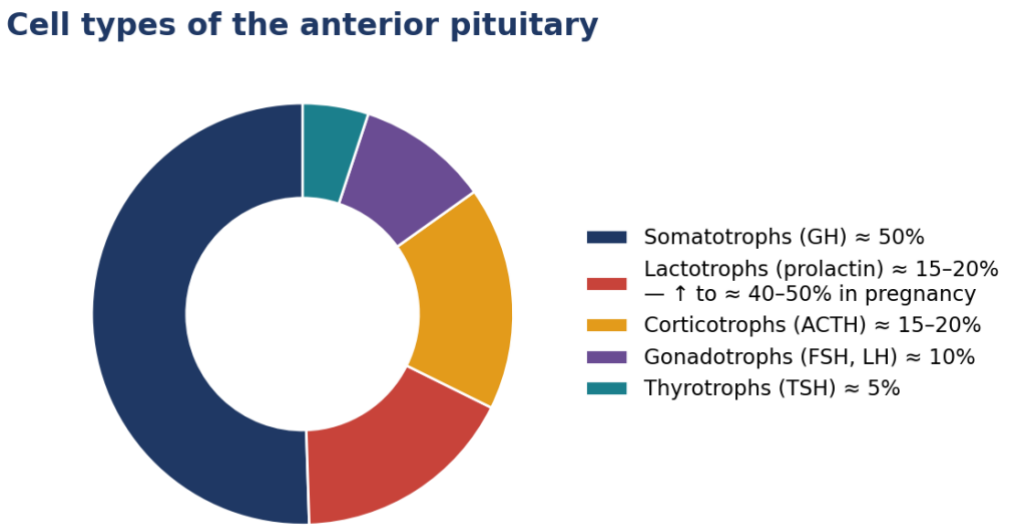


Figure 169.1 — Anterior pituitary cell types

169.2 Anterior pituitary hormones

Hormone	Structure / receptor	Main actions	Control
FSH	Glycoprotein (α + β); Gs	Granulosa: follicle growth, aromatase, inhibin; Sertoli: spermatogenesis	GnRH (slow pulses) +; inhibin B, E2 −

Hormone	Structure / receptor	Main actions	Control
LH	Glycoprotein; Gs (shares receptor with hCG)	Theca androgens; ovulation, luteinisation, CL; Leydig testosterone	GnRH (fast pulses) +; E2/P/T −; E2 + (surge)
TSH	Glycoprotein; Gs	Thyroid hormone synthesis, thyroid growth	TRH +; T_3/T_4, somatostatin, dopamine −. ↓ in 1st trimester (hCG)
ACTH	39 aa from POMC (also MSH, β-endorphin); MC2R	Cortisol (and adrenal androgens); pigmentation at high levels (Addison's, Nelson's)	CRH, ADH +; cortisol −; circadian
GH	191 aa; JAK–STAT	Growth via IGF-1; anti-insulin, lipolysis	GHRH, ghrelin +; somatostatin, IGF-1 −; pulsatile (sleep)
Prolactin	199 aa; JAK–STAT	Milk synthesis; ↓ GnRH (lactational amenorrhoea)	Dopamine − (dominant); TRH, oestrogen, suckling, stress, sleep +

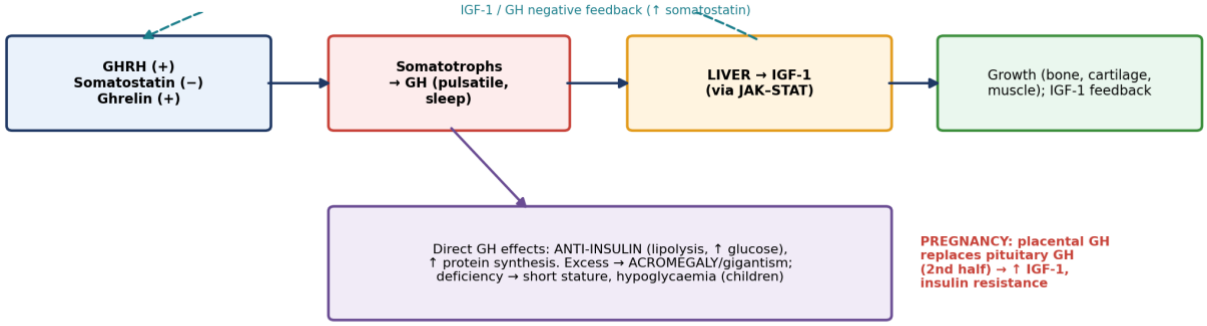


Figure 169.2 — The GH–IGF-1 axis

169.3 Posterior pituitary hormones

	Oxytocin	ADH (vasopressin)
Origin	Paraventricular > supraoptic nuclei; 9 aa	Supraoptic > paraventricular; 9 aa (differs by 2 aa)
Stimulus	Suckling (milk ejection), cervical/vaginal stretch (Ferguson reflex), orgasm; conditioned (baby's cry); inhibited by stress	↑ Plasma osmolality (osmoreceptors, ≈ 1–2% change), ↓ blood volume/BP (≥ 10%), nausea, pain, opioids
Receptors / actions	OT receptor (Gq) — myometrial contraction (receptors ↑ ≈ 100-fold near term), myoepithelial contraction; bonding	V_2 (Gs): aquaporin-2 → water reabsorption; V_1 (Gq): vasoconstriction; ACTH release
Clinical	Syntocinon (IOL, PPH) — water intoxication at high doses (ADH-like); carbetocin (long-acting); atosiban (antagonist)	Diabetes insipidus (cranial, nephrogenic, gestational — placental vasopressinase; treat with desmopressin); SIADH

169.4 The pituitary in pregnancy and lactation

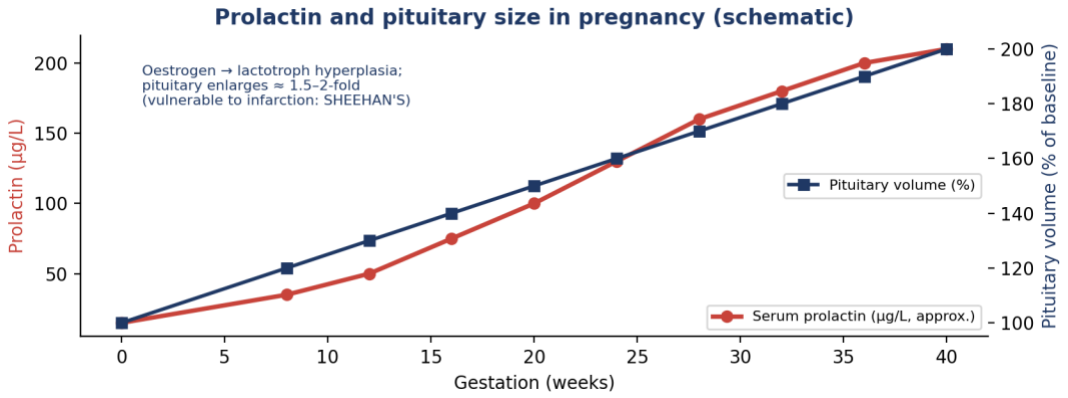


Figure 169.3 — Prolactin and pituitary volume in pregnancy

Hormone	Change in pregnancy
Prolactin	↑ ≈ 10-fold by term (oestrogen-driven lactotroph hyperplasia); milk secretion inhibited by progesterone until birth (Lecture 148)
FSH, LH	Suppressed (high E2, P, inhibin)
GH	Pituitary GH ↓ in 2nd half — replaced by placental GH (↑ IGF-1)
TSH	↓ in 1st trimester (hCG thyrotropic effect); trimester-specific ranges
ACTH, cortisol	↑ (placental CRH; ↑ CBG) — free cortisol ↑
Pituitary size	Enlarges ≈ 1.5–2-fold (mostly lactotrophs) — returns postpartum; MRI interpretation

169.5 Clinical disorders

Disorder	Key points
Sheehan's syndrome	Ischaemic necrosis of the enlarged pituitary after massive PPH/hypotension. Failure of lactation (first sign) and of menses resumption, fatigue, hypothyroidism, adrenal insufficiency (may present acutely), loss of pubic/axillary hair. Treat: hydrocortisone before thyroxine, then HRT
Hypopituitarism	Typical order of loss: GH → FSH/LH → TSH → ACTH → prolactin (prolactin often ↑ with stalk lesions). Causes: adenomas, surgery/radiotherapy, apoplexy, lymphocytic hypophysitis (late pregnancy/postpartum; autoimmune)
Prolactinoma	Commonest functioning adenoma; amenorrhoea, galactorrhoea, infertility. Cabergoline (or bromocriptine) — usually stopped once pregnant. Symptomatic growth: microadenoma ≈ 2–3%, macroadenoma ≈ 20–30% → visual field monitoring; restart dopamine agonist if growth. Breastfeeding usually permitted
Acromegaly	GH excess → ↑ IGF-1; diagnose by failure of GH suppression in OGTT; pregnancy rare (↑ GDM, hypertension)
Cushing's disease	ACTH-secreting adenoma; rare in pregnancy (anovulation); ↑ pre-eclampsia, GDM, fetal loss — diagnosis confounded by physiological ↑ cortisol
Pituitary apoplexy	Haemorrhage/infarction of adenoma — sudden headache, visual loss, ophthalmoplegia, hypopituitarism; emergency steroids
Diabetes insipidus	Polyuria/polydipsia, dilute urine; gestational DI with AFLP, twins (vasopressinase) — desmopressin (resistant to vasopressinase)

169.6 Must-know summary

■ **EXAM TIP**

- FSH, LH, TSH, hCG: glycoproteins sharing an **α-subunit**; GH and prolactin: **JAK–STAT**; ACTH from **POMC**.
- Prolactin is under **dopamine inhibition**; rises ≈ 10-fold in pregnancy (lactotroph hyperplasia).
- Oxytocin: milk ejection and uterine contraction (Ferguson reflex); ADH: **V_2 aquaporin-2**, V_1 vasoconstriction.
- **Sheehan's**: failure to lactate after PPH; give **hydrocortisone before thyroxine**.
- Prolactinoma: stop cabergoline in pregnancy; macroadenomas need visual field monitoring.

■ **MNEMONIC / MEMORY AID**

Hypopituitarism order — 'Go Look For The Adenoma Please': GH, LH, FSH, TSH, ACTH, Prolactin. **Anterior hormones — 'FLAT PiG'**: FSH, LH, ACTH, TSH, Prolactin, (i), GH.