PIPADOR REVISION

MRCOG Part 1 Revision Notes

Cellular Adaptation

PATHOLOGY • LECTURE 310

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG PART 1 REVISION NOTES | PATHOLOGY

310 Cellular Adaptation

Hypertrophy, hyperplasia, atrophy, metaplasia and dysplasia with O&G examples

Hypertrophy	Hyperplasia	Atrophy	Metaplasia
↑ Size — pregnant myometrium	↑ Number — endometrium	Menopause	Cervical transformation zone

■ KEY FACTS: Learning objectives

- Define hypertrophy, hyperplasia, atrophy and metaplasia, and distinguish them from dysplasia.
- Describe the mechanisms and stimuli of cellular adaptation.
- Apply adaptations to the uterus, cervix, breast and endometrium.

310.1 Types of adaptation

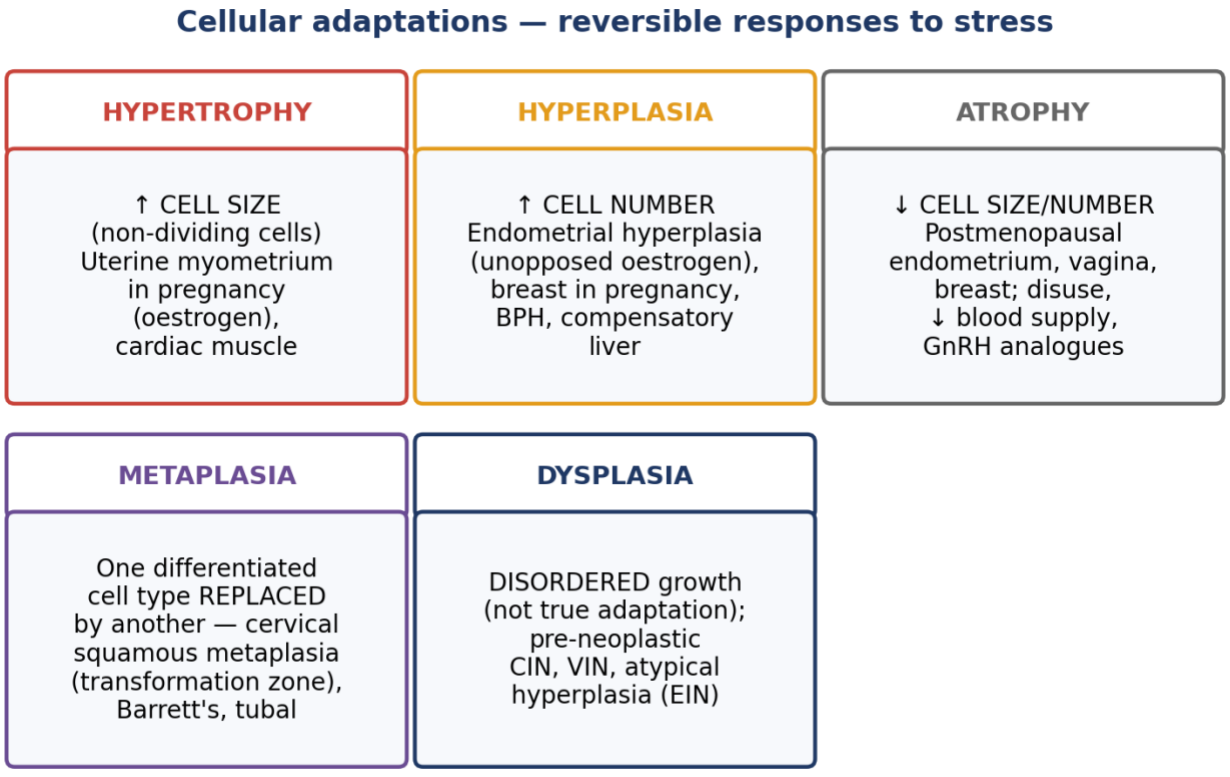


Figure 310.1 — Cellular adaptations

Adaptation	Mechanism	O&G examples
Hypertrophy	↑ Protein synthesis and organelles; in cells with limited division	Uterus in pregnancy (≈ 70 g → 1 kg; oestrogen/stretch — mostly hypertrophy, some hyperplasia)
Hyperplasia — physiological	Hormonal/compensatory proliferation	Breast lobuloalveolar growth in pregnancy, proliferative endometrium

Adaptation	Mechanism	O&G examples
Hyperplasia — pathological	Excess stimulation	Endometrial hyperplasia (unopposed oestrogen), BPH
Atrophy	• ↓ Workload, blood supply, innervation, hormones • Ubiquitin–proteasome, autophagy	Postmenopausal endometrium/vagina (GSM), lactation-induced, GnRH-analogue atrophy
Metaplasia	Reprogramming of stem cells	• **Squamous metaplasia** in the cervical transformation zone (acidic vaginal pH after puberty/pregnancy) • Tubal metaplasia • Barrett's oesophagus

310.2 From adaptation to neoplasia

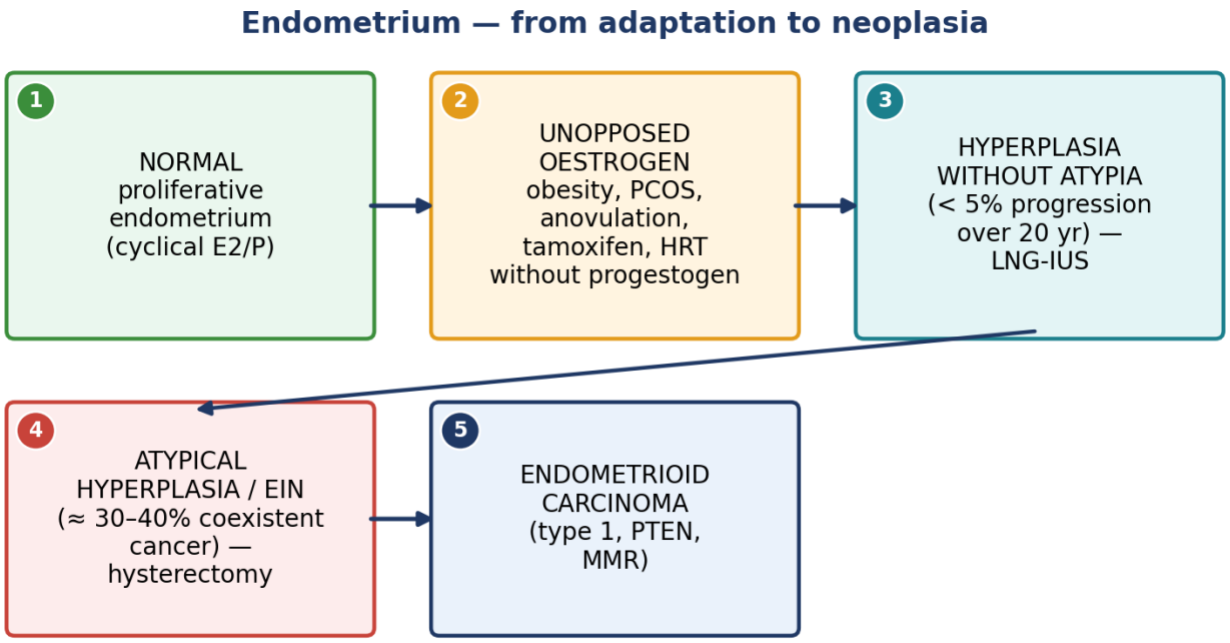


Figure 310.2 — The endometrial continuum

- **Dysplasia** is disordered growth with cytological atypia (↑ N:C ratio, hyperchromasia, abnormal mitoses, loss of polarity) — a pre-neoplastic state, not an adaptation (CIN, VIN, VAIN, AIN).
- Metaplastic epithelium is the field in which dysplasia arises — HPV infects the **immature metaplastic cells** of the transformation zone.
- Hyperplasia without atypia: LNG-IUS (or oral progestogens) and treat the cause; atypical hyperplasia: total hysterectomy (RCOG/BSGE).

310.3 Must-know summary

■ EXAM TIP

- Hypertrophy ↑ size; hyperplasia ↑ number; atrophy ↓; metaplasia = cell-type switch; dysplasia = disordered, pre-malignant.
- Pregnant uterus: hypertrophy (± hyperplasia); endometrial hyperplasia: unopposed oestrogen.
- Cervical squamous metaplasia in the transformation zone → HPV target.
- Atypical hyperplasia → hysterectomy; non-atypical → LNG-IUS.

■ MNEMONIC / MEMORY AID

'Hyper-TROPHY = Trophy (bigger); Hyper-PLASIA = Plenty (more)'.