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Female Reproductive System: Hormones, Cycle, Anatomy & Oogenesis

Study Guide — Reproductive System

High school / pre-med / IB practice on female reproductive anatomy, ovarian + uterine cycles, endocrine feedback (GnRH-LH/FSH-ovary), oogenesis/meiosis timing (n, chromatids/DNA molecules), ovulation, fertilization, implantation, and key pregnancy/lactation hormones.

100 items — Study Guide with Answers

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1 Which structure is the primary site of oocyte maturation and ovarian hormone production (estrogen/progesterone)?

- A Uterus
- B Ovary ✓
- C Cervix
- D Vagina
- E Fallopian tube (oviduct)

► **Explanation:** The ovary produces oocytes (oogenesis) and secretes estrogen and progesterone (via follicles/corpus luteum). The uterus is mainly for implantation and fetal development; the oviduct is mainly for transport and fertilization.



2 In a typical menstrual cycle, fertilization most commonly occurs in the:

- A Cervix
- B Uterine cavity
- C Ampulla of the fallopian tube ✓
- D Vagina
- E Ovary itself (inside the follicle)

► **Explanation:** Fertilization most often happens in the ampulla of the oviduct. Implantation occurs later in the uterus. The ovary releases the oocyte; fertilization usually does not occur inside the follicle.



3 The endometrium is best described as the:

- A Muscular outer layer of the uterus responsible for contractions





- B Inner lining of the uterus that thickens and is shed during menstruation ✓**
- C Inner lining of the vagina
- D Outer capsule of the ovary
- E Tube that carries the oocyte to the ovary

► **Explanation:** The endometrium is the uterine lining that proliferates under estrogen and becomes secretory under progesterone; it is shed during menstruation if no pregnancy occurs. The myometrium is the muscular uterine layer.

4 Which uterine layer is primarily responsible for labor contractions?



- A Endometrium
- B Myometrium ✓**
- C Perimetrium
- D Zona pellucida
- E Corpus luteum

► **Explanation:** The myometrium is the smooth muscle layer of the uterus and generates strong contractions during labor. Endometrium is the lining; corpus luteum is in the ovary.

5 The cervix is best described as the:



- A Upper part of the fallopian tube
- B Narrow lower part of the uterus that opens into the vagina ✓**
- C Part of the ovary that forms the corpus luteum
- D Site of oocyte meiosis I completion
- E Muscle that expels the oocyte during ovulation





► **Explanation:** The cervix is the lower uterine region connecting to the vagina; it produces cervical mucus that changes across the cycle. Ovulation occurs at the ovary, not the cervix.

6 During ovulation, the oocyte is released from the ovary and is captured most directly by the:



- A Uterine myometrium
- B Fimbriae of the fallopian tube ✓**
- C Cervix
- D Placenta
- E Seminal vesicles

► **Explanation:** Fimbriae are finger-like projections at the end of the fallopian tube that help sweep the released oocyte into the tube. The placenta forms only after implantation and pregnancy begins.

7 Which hormone is secreted by the hypothalamus to stimulate release of LH and FSH from the anterior pituitary?



- A Estrogen
- B Progesterone
- C GnRH ✓**
- D hCG
- E Inhibin

► **Explanation:** GnRH (gonadotropin-releasing hormone) from the hypothalamus stimulates the anterior pituitary to release LH and FSH. Estrogen/progesterone are ovarian hormones; hCG is from early pregnancy.





8 Which anterior pituitary hormone primarily triggers ovulation when it surges mid-cycle?



- A FSH
- B LH ✓
- C Prolactin
- D Oxytocin
- E TSH

► **Explanation:** The LH surge is the key trigger for ovulation and for luteinization (formation of the corpus luteum). FSH rises too, but LH surge is the classic ovulation trigger.

9 During most of the cycle (outside the pre-ovulatory surge), estrogen usually provides which type of feedback on GnRH/LH/FSH?



- A Positive feedback (increases GnRH/LH/FSH)
- B Negative feedback (decreases GnRH/LH/FSH) ✓
- C No feedback; estrogen does not affect the brain/pituitary
- D Only increases FSH while decreasing LH
- E Only increases GnRH while decreasing both LH and FSH

► **Explanation:** At low-to-moderate levels, estrogen generally suppresses GnRH and gonadotropins (negative feedback). A key exception is sustained high estrogen late follicular phase, which flips to positive feedback and helps cause the LH surge.

10 The LH surge is best explained by:



- A A sudden drop in estrogen causing the pituitary to release LH





B Sustained high estrogen from the dominant follicle causing positive feedback on the hypothalamus/pituitary ✓

- C** High progesterone early in the follicular phase stimulating LH release
- D** Inhibin from the corpus luteum stimulating LH release
- E** hCG from the placenta stimulating ovulation in non-pregnant cycles

► **Explanation:** The classic trigger is sustained high estrogen late in the follicular phase, which switches from negative to positive feedback and triggers the LH surge. Progesterone is mainly high after ovulation, and hCG is relevant to pregnancy, not normal ovulatory triggering.

11 After ovulation, the ruptured follicle becomes the corpus luteum, which mainly secretes:



- A Progesterone (and some estrogen) ✓**
- B** GnRH
- C** FSH
- D** hCG
- E** Oxytocin

► **Explanation:** The corpus luteum secretes progesterone (dominant) and also estrogen, maintaining the endometrium and suppressing further LH/FSH. GnRH is hypothalamic; hCG is embryonic/placental.

12 If fertilization does NOT occur, what happens to the corpus luteum and what is the result for the uterine lining?



- A** Corpus luteum persists; progesterone remains high; endometrium continues secretory phase indefinitely
- B Corpus luteum degenerates; progesterone/estrogen fall; menstruation occurs ✓**
- C** Corpus luteum becomes placenta immediately; progesterone rises further; menstruation occurs





- D Corpus luteum degenerates; progesterone rises; ovulation repeats within 24 hours
- E Corpus luteum persists; FSH falls to zero permanently

► **Explanation:** Without pregnancy signals (notably hCG), the corpus luteum regresses, causing progesterone and estrogen to drop. That hormone withdrawal triggers shedding of the endometrium (menstruation).

13 Which hormone produced early in pregnancy 'rescues' the corpus luteum and keeps progesterone high?



- A FSH
- B LH
- C **hCG** ✓
- D Inhibin
- E ADH

► **Explanation:** hCG from the early embryo/placenta supports the corpus luteum, maintaining progesterone and preventing menstruation. LH triggers ovulation but is suppressed during pregnancy.

14 Which statement best distinguishes the ovarian cycle from the uterine cycle?



- A Ovarian cycle describes changes in the endometrium; uterine cycle describes follicle development
- B **Ovarian cycle describes follicle → ovulation → corpus luteum changes; uterine cycle describes endometrium changes** ✓
- C They are identical terms with identical phases
- D Ovarian cycle occurs only during pregnancy; uterine cycle occurs only at puberty
- E Uterine cycle happens in the ovary; ovarian cycle happens in the uterus





► **Explanation:** The ovarian cycle is about follicles, ovulation, and corpus luteum. The uterine cycle is about the endometrium (menstrual/proliferative/secretory changes). Many students confuse the location and names.

15 Which uterine phase is most strongly driven by estrogen and is characterized by rebuilding/thickening of the endometrium?



- A Menstrual phase
- B Proliferative phase ✓
- C Secretory phase
- D Fertilization phase
- E Implantation phase

► **Explanation:** Estrogen from growing follicles stimulates the proliferative phase, rebuilding the endometrium after menstruation. The secretory phase is mainly progesterone-driven after ovulation.

16 Which uterine phase is most strongly driven by progesterone and prepares the endometrium for possible implantation?



- A Menstrual phase
- B Proliferative phase
- C Secretory phase ✓
- D Ovulatory phase
- E Germinal phase

► **Explanation:** Progesterone from the corpus luteum makes the endometrium secretory: thicker, more glandular, and nutrient-rich, supporting implantation. Menstrual and proliferative phases occur before this.





17 Cervical mucus becomes most watery/elastic ('spinnbarkeit') around ovulation mainly due to:



- A High progesterone
- B High estrogen ✓
- C High hCG
- D High prolactin
- E High oxytocin

► **Explanation:** Estrogen makes cervical mucus thinner and more sperm-friendly near ovulation. Progesterone thickens mucus in the luteal phase, which is a common confusion trap.

18 After ovulation, cervical mucus typically becomes thicker mainly due to:



- A Progesterone from the corpus luteum ✓
- B FSH from the pituitary
- C hCG from the placenta
- D A sudden rise in GnRH
- E A sudden loss of ovarian hormones

► **Explanation:** Progesterone in the luteal phase thickens cervical mucus, making it less permeable to sperm. Estrogen tends to thin mucus pre-ovulation.

19 Basal body temperature often rises slightly AFTER ovulation because:



- A Estrogen peaks and directly raises temperature





- B Progesterone has a thermogenic effect during the luteal phase ✓**
- C FSH surge increases metabolism permanently
- D hCG is released in every cycle regardless of pregnancy
- E The endometrium releases heat when it sheds

► **Explanation:** Progesterone produced after ovulation raises basal body temperature slightly, which is why temperature tracking can help estimate ovulation timing. Estrogen peaks before ovulation, not after.

20 A key difference between oogenesis and spermatogenesis is that oogenesis usually results in:



- A Four equal-sized functional gametes from each primary oocyte
- B One large ovum and polar bodies due to unequal cytokinesis ✓**
- C Two functional gametes from each primary oocyte with equal cytoplasm
- D No meiosis because females are born with haploid eggs
- E Only mitosis; meiosis does not occur in females

► **Explanation:** Oogenesis produces one large cell optimized for early development, while polar bodies discard extra chromosomes. Spermatogenesis produces four smaller functional sperm. The unequal division is the key conceptual trap.

21 Primary oocytes in humans are formed before birth and are typically arrested in which stage until puberty?



- A Metaphase II
- B Prophase I ✓**
- C Anaphase I





- D Telophase II
- E G1 of mitosis

► **Explanation:** Primary oocytes are arrested in prophase I (often described as dictyotene) from fetal life until puberty. Metaphase II arrest happens later, after ovulation.

22 A secondary oocyte is typically arrested in which stage, and completes meiosis only if fertilization occurs?



- A Prophase I
- B Metaphase II ✓**
- C Anaphase II
- D Telophase I
- E G2 phase

► **Explanation:** After completing meiosis I, the oocyte becomes a secondary oocyte and arrests in metaphase II. It completes meiosis II only after fertilization. Many students swap the two arrest points.

23 A human primary oocyte just AFTER S phase (before meiosis I) has which combination of chromosomes and DNA molecules (chromatids)?



- A 46 chromosomes and 46 DNA molecules
- B 46 chromosomes and 92 DNA molecules ✓**
- C 23 chromosomes and 46 DNA molecules
- D 23 chromosomes and 23 DNA molecules
- E 92 chromosomes and 92 DNA molecules





► **Explanation:** DNA replication doubles DNA molecules but not chromosome count: still 46 chromosomes, now each has two sister chromatids → 92 DNA molecules. The common trap is to double chromosome number, which is wrong.

24 A human secondary oocyte at metaphase II has which combination of chromosomes and DNA molecules?



- A 46 chromosomes and 92 DNA molecules
- B 46 chromosomes and 46 DNA molecules
- C 23 chromosomes and 46 DNA molecules ✓**
- D 23 chromosomes and 23 DNA molecules
- E 92 chromosomes and 46 DNA molecules

► **Explanation:** After meiosis I, the cell is haploid (23 chromosomes) but each chromosome still has two chromatids, so 46 DNA molecules. Meiosis II hasn't separated sister chromatids yet in metaphase II.

25 An ovum (after completion of meiosis II) has which combination of chromosomes and DNA molecules?



- A 46 chromosomes and 46 DNA molecules
- B 46 chromosomes and 92 DNA molecules
- C 23 chromosomes and 46 DNA molecules
- D 23 chromosomes and 23 DNA molecules ✓**
- E 92 chromosomes and 92 DNA molecules

► **Explanation:** Completion of meiosis II separates sister chromatids, leaving a haploid cell with 23 chromosomes, each as one DNA molecule: 23 DNA molecules. A frequent confusion is keeping 46 DNA molecules, which applies to metaphase II before chromatid separation.





26 Crossing over (genetic recombination) occurs during oogenesis primarily in:



- A Prophase I ✓
- B Metaphase II
- C Anaphase II
- D Telophase II
- E The secretory phase of the uterus

► **Explanation:** Crossing over is a meiosis I event (prophase I) when homologous chromosomes pair. It does not occur in uterine phases, and it's not anaphase/telophase events.

27 Independent assortment in oogenesis is most directly due to:



- A Random alignment of homologous pairs at metaphase I ✓
- B Random separation of sister chromatids in anaphase I
- C Random fertilization by sperm
- D Random mutation caused by progesterone
- E Random thickening of cervical mucus

► **Explanation:** Independent assortment comes from random orientation of each homologous chromosome pair at metaphase I. Sister chromatids separate in meiosis II, and random fertilization is a different source of variation.

28 A major reason meiosis produces genetically varied gametes is that it includes:





- A Crossing over and independent assortment ✓**
- B Only mitosis with no genetic change
- C Only DNA replication without chromosome separation
- D Only fertilization
- E Only progesterone secretion

► **Explanation:** Crossing over reshuffles alleles within chromosomes, and independent assortment mixes maternal/paternal homologs between gametes. These are meiosis-specific sources of variation; fertilization adds further variation but is not meiosis itself.

29 Which statement best describes the timing of oocyte production in humans?



- A New primary oocytes are produced continuously throughout adult life
- B Most primary oocytes are formed before birth and decline over time; a subset resumes meiosis after puberty ✓**
- C Primary oocytes form only at menopause
- D Oocytes are produced in the uterus during menstruation
- E Oocytes are formed in the pituitary and travel to the ovary

► **Explanation:** Humans are typically taught to form the primary oocyte pool before birth, then lose many over time. Each cycle after puberty, some resume meiosis; usually one is ovulated. The uterus and pituitary do not produce oocytes.

30 Which hormone is most directly responsible for maintaining the endometrium and preventing menstruation early in pregnancy?



- A Progesterone ✓**
- B FSH





- C LH
- D Inhibin
- E TSH

► **Explanation:** Progesterone stabilizes the endometrium. Early in pregnancy, hCG helps keep progesterone high by maintaining the corpus luteum. FSH/LH are suppressed during pregnancy.

31 In the classic 'two-cell, two-gonadotropin' model of estrogen production, which pairing is most accurate?



- A LH stimulates granulosa cells to make androgens; FSH stimulates theca cells to aromatize androgens
- B LH stimulates theca cells to make androgens; FSH stimulates granulosa cells to aromatize androgens to estrogens ✓
- C FSH stimulates theca cells to make progesterone; LH stimulates granulosa cells to make GnRH
- D Only LH is needed; FSH has no role
- E Only FSH is needed; LH has no role

► **Explanation:** LH acts on theca cells to produce androgens; FSH acts on granulosa cells to increase aromatase and convert androgens to estrogens. The distractors swap cell types or remove a key hormone.

32 Which ovarian structure is primarily responsible for the high progesterone of the luteal phase?



- A Primordial follicle
- B Corpus luteum ✓
- C Fimbriae
- D Endometrium





- E Placenta (in all cycles)

► **Explanation:** After ovulation, the follicle transforms into the corpus luteum, which secretes progesterone. The placenta becomes a major source later in pregnancy, not in non-pregnant cycles.

33 Ovulation is an event in the ovarian cycle. Which uterine phase is occurring around ovulation in a typical 28-day cycle?



- A Menstrual phase
- B **Late proliferative phase ✓**
- C Late secretory phase
- D Implantation phase (always at ovulation)
- E No uterine changes occur during ovulation

► **Explanation:** Ovulation occurs near the end of the proliferative phase, when estrogen has built up the endometrium. The secretory phase follows ovulation due to progesterone.

34 Which hormone pattern best fits the late luteal phase just BEFORE menstruation (no pregnancy)?



- A High progesterone and high estrogen
- B **Falling progesterone and falling estrogen ✓**
- C High LH surge
- D High hCG
- E Rising FSH with rising progesterone

► **Explanation:** If no hCG is present, the corpus luteum regresses, so progesterone and estrogen fall. That withdrawal triggers menstruation. LH surge is earlier at ovulation.





35 Which change is the best immediate explanation for menstrual bleeding at the start of the cycle?



- A Sudden increase in progesterone
- B Withdrawal (drop) of progesterone and estrogen due to corpus luteum regression** ✓
- C LH surge causing rupture of the uterine lining
- D High hCG destroying the endometrium
- E FSH directly shedding the endometrium

► **Explanation:** Menstruation follows a fall in progesterone/estrogen when the corpus luteum degenerates. LH surge triggers ovulation (ovary), not uterine shedding.

36 Which statement about LH during the menstrual cycle is correct?



- A LH is highest during menstruation because the uterus needs it
- B LH shows a sharp surge mid-cycle that triggers ovulation** ✓
- C LH is produced by the ovary and acts on the hypothalamus
- D LH is the main hormone that thickens the endometrium directly
- E LH is only present during pregnancy

► **Explanation:** LH is secreted by the anterior pituitary and surges mid-cycle, triggering ovulation and corpus luteum formation. Endometrial thickening is mainly driven by estrogen and progesterone.

37 A student claims: 'The follicular phase is the same length in everyone; the luteal phase varies a lot.' Which is most accurate?





- A Correct: follicular is fixed (~14 days) and luteal varies widely
- B **Incorrect: luteal phase is relatively constant (~14 days) while follicular phase varies more** ✓
- C Both phases are always exactly 14 days in everyone
- D Both phases vary equally and unpredictably in all individuals
- E Follicular phase occurs after ovulation; luteal occurs before ovulation

► **Explanation:** The luteal phase is often relatively stable (around ~14 days) because it depends on corpus luteum lifespan. Cycle length variation is commonly due to variable follicular phase length (timing of ovulation).

38 Which event marks the transition from follicular phase to luteal phase in the ovarian cycle?



- A Menstruation begins
- B **Ovulation occurs** ✓
- C Implantation occurs
- D hCG appears in urine
- E Cervical mucus thickens

► **Explanation:** Ovulation is the key switch: the dominant follicle ruptures and becomes the corpus luteum, starting the luteal phase. Menstruation is the start of a new cycle, not the follicular-to-luteal transition.

39 Which hormone is the main driver of the proliferative phase of the endometrium?



- A **Estrogen** ✓
- B Progesterone





- C hCG
- D Oxytocin
- E Prolactin

► **Explanation:** Estrogen stimulates proliferation (growth) of the endometrium. Progesterone converts it into a secretory, implantation-ready lining after ovulation.

40 Which hormone best supports the secretory transformation of the endometrium?



- A Progesterone ✓
- B FSH
- C GnRH
- D LH (direct action on uterus)
- E TSH

► **Explanation:** Progesterone from the corpus luteum makes the endometrium secretory and stable. FSH/LH mainly act on ovaries; LH does not directly drive endometrial secretory changes as its primary role.

41 Inhibin in females is mainly produced by:



- A Granulosa cells of ovarian follicles (and later corpus luteum) ✓
- B Theca cells only
- C The endometrium
- D The hypothalamus
- E The vagina





► **Explanation:** Inhibin is secreted mainly by granulosa cells (and corpus luteum later) and provides negative feedback primarily on FSH. Theca cells mainly produce androgens under LH stimulation.

42 Inhibin's main endocrine effect is to:



- A Increase FSH release
- B Decrease FSH release ✓
- C Increase LH release
- D Trigger the LH surge
- E Cause implantation

► **Explanation:** Inhibin selectively suppresses FSH secretion from the anterior pituitary. LH is more strongly regulated by estrogen/progesterone feedback, not inhibin alone.

43 Which hormone is most closely associated with development and maintenance of the corpus luteum?



- A LH ✓
- B FSH
- C GnRH
- D Prolactin
- E ADH

► **Explanation:** LH triggers ovulation and luteinization, supporting corpus luteum formation. FSH mainly supports follicle growth and granulosa activity.





44 If a person has an anovulatory cycle (no ovulation), which hormone is most likely to be LOW in the second half of that cycle?

- A Progesterone** ✓
- B Estrogen (always zero)
- C GnRH (always zero)
- D TSH
- E Insulin

► **Explanation:** Progesterone is mainly produced by the corpus luteum, which forms after ovulation. Without ovulation, there is no corpus luteum, so luteal progesterone is low. Estrogen may still be present from follicles.



45 Which clinical-style observation most strongly suggests ovulation has occurred (basic physiology)?

- A A rise in basal body temperature after mid-cycle** ✓
- B A sudden drop in progesterone at mid-cycle
- C hCG appearing immediately after ovulation
- D Menstruation starting the next day
- E FSH disappearing completely for life

► **Explanation:** Progesterone rises after ovulation and slightly increases basal temperature. hCG appears only if pregnancy begins, and progesterone drops at the end of the cycle if no pregnancy.



46 A high, sustained estrogen level just before ovulation results in:

- A** Suppression of LH (more negative feedback than usual)





- B Positive feedback leading to an LH surge ✓**
- C Immediate onset of menstruation
- D Immediate release of hCG
- E Instant conversion of the endometrium to secretory phase without ovulation

► **Explanation:** Sustained high estrogen can flip the feedback loop from negative to positive, triggering the LH surge and ovulation. Menstruation is triggered by hormone withdrawal later, not by high estrogen.

47 Which hormone level pattern is most typical of the luteal phase in a non-pregnant cycle?



- A High progesterone with relatively low LH and FSH ✓**
- B High LH surge with low progesterone
- C High FSH surge with no progesterone
- D High hCG with high LH
- E No steroid hormones present at all

► **Explanation:** In the luteal phase, corpus luteum progesterone is high and suppresses LH/FSH through negative feedback. LH surge is mid-cycle, not luteal.

48 Which event occurs immediately after the LH surge in a typical cycle?



- A Menstruation begins
- B Ovulation occurs and the follicle begins luteinization ✓**
- C The placenta replaces the corpus luteum
- D hCG peaks in blood
- E The endometrium is shed





► **Explanation:** The LH surge triggers ovulation and transformation of the follicle into the corpus luteum. Placental takeover and hCG are pregnancy-related events, not immediate in normal cycles.

49 Which statement about follicle development is most accurate at high-school/pre-med level?



- A All follicles ovulate in each cycle
- B Usually one dominant follicle ovulates; others undergo atresia ✓**
- C Follicles form only after puberty and do not exist before birth
- D Follicles are located in the uterus
- E Follicles are the same as the corpus luteum

► **Explanation:** Many follicles begin to develop, but typically one becomes dominant and ovulates; the rest regress (atresia). Follicles are in the ovary and exist long before puberty.

50 What is the most accurate description of what is ovulated in humans?



- A A primary oocyte arrested in prophase I
- B A secondary oocyte arrested in metaphase II ✓**
- C A fertilized zygote
- D A fully formed ovum after meiosis II completion
- E A polar body

► **Explanation:** At ovulation, the cell released is typically a secondary oocyte arrested in metaphase II. It completes meiosis II only if fertilization occurs. Many students mistakenly say 'ovum is ovulated,' but the ovum is formed after fertilization-triggered completion of meiosis II.





51 What is the most direct trigger that allows the secondary oocyte to complete meiosis II?



- A LH surge
- B Fertilization (sperm entry/activation) ✓**
- C Menstruation
- D High progesterone in the luteal phase
- E Cervical mucus thinning

► **Explanation:** The secondary oocyte is arrested in metaphase II and completes meiosis II upon fertilization. LH triggers ovulation and meiosis I completion, not completion of meiosis II.

52 Which event best represents Mendel's law of segregation in female meiosis?



- A Crossing over during prophase I
- B Separation of homologous chromosomes during anaphase I ✓**
- C Separation of sister chromatids during anaphase I
- D Thickening of endometrium during secretory phase
- E Release of estrogen from granulosa cells

► **Explanation:** Alleles on homologous chromosomes segregate when homologs separate in meiosis I (anaphase I). Crossing over creates recombination but is not the segregation step itself.

53 In a typical menstrual cycle, the day labeled 'Day 1' is defined as:



- A The day of ovulation
- B The first day of menstrual bleeding ✓**





- C The day the LH surge peaks
- D The day implantation occurs
- E The day the corpus luteum forms

► **Explanation:** Cycle day counting typically starts with the first day of menstruation. Ovulation occurs later (often around mid-cycle), and implantation is later still if pregnancy occurs.

54 A 28-day cycle with ovulation on day 14 would most likely have implantation (if fertilization occurs) around which time?



- A Day 1–2
- B Day 6–7
- C Around day 20–22 ✓
- D Exactly day 14
- E After day 40 in the same cycle

► **Explanation:** Implantation typically occurs about 6–7 days after fertilization; if fertilization happens near ovulation (~day 14), implantation is often around day 20–21. The distractors confuse cycle day counting and timing.

55 Which hormone is most directly responsible for maintaining the uterine lining during the luteal phase?



- A Progesterone ✓
- B FSH
- C LH (directly on endometrium)
- D GnRH
- E Insulin





► **Explanation:** Progesterone from the corpus luteum maintains the secretory endometrium and prevents shedding. FSH/LH regulate the ovary and are suppressed in the luteal phase.

56 Which statement best explains why combined oral contraceptive pills prevent ovulation?



- A They cause a large estrogen spike that triggers an LH surge
- B They maintain negative feedback on GnRH/LH/FSH, preventing the LH surge ✓**
- C They directly destroy the oocyte in the ovary each cycle
- D They increase FSH to stimulate multiple ovulations at once
- E They replace the uterus with scar tissue

► **Explanation:** Combined pills provide estrogen + progestin that keep gonadotropins suppressed (negative feedback), preventing the mid-cycle LH surge and ovulation. They don't 'destroy eggs' or cause LH surges.

57 Progesterone-only contraception can reduce pregnancy risk partly by:



- A Thickening cervical mucus and making sperm passage more difficult ✓**
- B Triggering an LH surge to increase ovulation
- C Increasing endometrial proliferation to trap sperm
- D Increasing GnRH pulses sharply
- E Turning progesterone into testosterone

► **Explanation:** Progestin thickens cervical mucus and can also suppress ovulation in many cases and alter endometrial receptivity. The wrong options describe opposite endocrine effects or unrelated conversions.





58 Which method best matches the mechanism: 'local inflammatory environment that is toxic to sperm and can prevent fertilization'?

- A Copper IUD ✓
- B Combined oral contraceptive pill
- C Condom
- D Fertility-awareness temperature tracking
- E Vasectomy

► **Explanation:** Copper IUDs mainly act locally by creating an environment unfavorable to sperm and fertilization. Hormonal pills act via endocrine feedback; condoms are physical barriers; vasectomy is a male procedure.



59 Which structure is NOT an accessory gland in the female reproductive system (i.e., it is a primary organ for gamete/hormone production)?

- A Ovary ✓
- B Uterus
- C Cervix
- D Vagina
- E Fallopian tube

► **Explanation:** The ovary is the gonad: it produces gametes and major sex steroids. Uterus/cervix/vagina/tubes are parts of the reproductive tract that support transport, fertilization, and development.



60 Menopause is best explained biologically by:





- A Complete loss of pituitary gland function
- B Depletion of functional ovarian follicles over time ✓**
- C The uterus no longer being able to contract
- D Ovulation happening twice a day
- E GnRH being replaced by hCG permanently

► **Explanation:** Menopause occurs when follicles decline to the point that cyclic ovarian hormone production and ovulation cease. Pituitary hormones often rise (FSH/LH) due to reduced negative feedback—another common trap.

61 In menopause, which hormonal pattern is most expected?



- A High estrogen and high progesterone with low FSH
- B Low estrogen with high FSH (loss of negative feedback) ✓**
- C High hCG with low LH
- D Low estrogen with low FSH and low LH always
- E High progesterone with high LH surge every day

► **Explanation:** With fewer follicles, estrogen/progesterone fall, reducing negative feedback, so FSH (and LH) tend to rise. hCG is pregnancy-related, not menopause.

62 A common misconception: 'Ovulation causes menstruation.' The best correction is:



- A True—ovulation directly tears the endometrium
- B False—menstruation is mainly caused by hormone withdrawal (progesterone/estrogen fall) when the corpus luteum regresses ✓**
- C True—LH surge directly sheds the uterine lining





- D False—menstruation is triggered by high hCG
- E False—menstruation is triggered by high FSH

► **Explanation:** Menstruation is a withdrawal bleed after progesterone (and estrogen) drop due to corpus luteum degeneration. Ovulation happens earlier and is not the direct cause of bleeding.

63 Which statement best explains how pregnancy prevents a new ovulation from occurring soon after implantation?



- A hCG replaces GnRH and forces new LH surges
- B High progesterone/estrogen maintain negative feedback on GnRH/LH/FSH, suppressing follicle development and LH surge ✓**
- C The ovaries disappear during pregnancy
- D Cervical mucus becomes watery, triggering a second ovulation
- E FSH increases massively during pregnancy

► **Explanation:** Pregnancy maintains high progesterone and estrogen (initially via corpus luteum supported by hCG, later placenta), which suppress GnRH/LH/FSH and prevent a new ovulatory cycle.

64 Which hormone is most directly involved in milk production (synthesis) after birth?



- A Oxytocin
- B Prolactin ✓**
- C LH
- D FSH
- E hCG





► **Explanation:** Prolactin stimulates milk production. Oxytocin triggers milk ejection (let-down). LH/FSH regulate ovaries, and hCG supports early pregnancy.

65 Which hormone is most directly responsible for milk ejection (let-down reflex)?



- A Prolactin
- B Oxytocin ✓
- C Progesterone
- D FSH
- E Estrogen

► **Explanation:** Oxytocin causes contraction of myoepithelial cells in the breast, ejecting milk. Prolactin makes the milk; students often mix these up.

66 Why do high estrogen and progesterone levels during pregnancy generally prevent milk secretion despite breast development?



- A They stimulate prolactin so strongly that milk is used up immediately
- B They inhibit the full milk-secreting action of prolactin until after birth when they drop ✓
- C They destroy mammary glands
- D They convert prolactin into oxytocin
- E They are unrelated; milk always secretes at full levels during pregnancy

► **Explanation:** High estrogen/progesterone support breast growth but inhibit full lactation. After delivery, their levels drop, allowing prolactin to drive milk production; oxytocin supports ejection.





67 Which structure forms after implantation and can act as an endocrine organ later in pregnancy?



- A Corpus albicans
- B Placenta ✓**
- C Zona pellucida
- D Fimbriae
- E Oviduct ampulla

► **Explanation:** The placenta forms after implantation and eventually produces hormones (including progesterone and estrogens) that maintain pregnancy. Zona pellucida is around the early embryo/oocyte, not an endocrine organ.

68 Which is the best description of the 'fertile window' concept?



- A Only the day of menstruation is fertile
- B It is centered around ovulation because sperm can survive for days and the oocyte is viable for a limited time after ovulation ✓**
- C Fertility is identical on all cycle days
- D Only the luteal phase is fertile because progesterone is high
- E Only the follicular phase is infertile because estrogen blocks sperm

► **Explanation:** Fertility peaks near ovulation: sperm can live several days in the female tract, and the oocyte remains viable for a short time after ovulation. Hormone-driven mucus changes near ovulation also favor sperm transport.

69 Which outcome best illustrates why the follicular phase variability affects cycle length?





- A** If ovulation occurs later, menstruation is delayed because the luteal phase tends to last about ~2 weeks after ovulation ✓
- B** If ovulation occurs later, luteal phase doubles in length so menstruation happens earlier
- C** If ovulation occurs later, menstruation always occurs on day 14 anyway
- D** Ovulation timing never affects menstruation timing
- E** Menstruation causes ovulation, so ovulation cannot shift

► **Explanation:** Luteal phase length is often relatively stable, so later ovulation shifts the entire cycle later, delaying menstruation. This is a key reasoning step students often miss.

70 Which structure is shed during menstruation?



- A** The entire uterus
- B** A functional layer of the endometrium ✓
- C** The ovaries
- D** The myometrium
- E** The placenta

► **Explanation:** Menstruation is shedding mainly of the functional layer of the endometrium (the lining built for potential implantation). The myometrium remains; the placenta exists only in pregnancy.

71 Which hormone is most directly responsible for maintaining the corpus luteum early in pregnancy?



- A** hCG ✓
- B** FSH
- C** Oxytocin
- D** Prolactin





E TSH

► **Explanation:** hCG acts like LH in early pregnancy and supports the corpus luteum, keeping progesterone high until the placenta can take over. FSH is suppressed, not increased.

72 A pregnancy test detects hCG. Why is hCG a good marker of early pregnancy?



- A hCG is secreted by the pituitary in every menstrual cycle
- B hCG is produced by early embryonic/placental tissue after implantation ✓**
- C hCG is produced by the endometrium only during menstruation
- D hCG is produced by sperm cells in semen
- E hCG is the same hormone as GnRH

► **Explanation:** After implantation, embryonic/placental tissues begin releasing hCG, which enters blood and urine. That makes it a useful early pregnancy marker; it is not a normal-cycle pituitary hormone.

73 Which event most directly prevents polyspermy (entry of multiple sperm) after the first sperm fuses with the oocyte?



- A LH surge
- B Cortical reaction that modifies the zona pellucida ✓**
- C Menstruation
- D FSH secretion
- E Thickening of cervical mucus by progesterone

► **Explanation:** After sperm fusion, the cortical reaction changes the zona pellucida so additional sperm cannot bind/penetrate. The endocrine events (LH/FSH) occur earlier and don't directly block polyspermy.





74 The acrosome reaction is functionally important because it allows the sperm to:



- A Release enzymes to penetrate the zona pellucida ✓
- B Complete meiosis II
- C Trigger the LH surge
- D Produce progesterone
- E Shed the endometrium

► **Explanation:** The acrosome contains enzymes that help sperm penetrate the egg's protective layers (including zona pellucida). It is not an endocrine event and does not involve meiosis completion (that occurs in the oocyte).

75 Which structure surrounds the oocyte/early embryo and is involved in sperm binding and protection before implantation?



- A Endometrium
- B Zona pellucida ✓
- C Myometrium
- D Corpus luteum
- E Cervical canal

► **Explanation:** The zona pellucida is a glycoprotein layer around the oocyte/early embryo, important for sperm binding and prevention of polyspermy. The endometrium is the uterine lining for implantation.





76 Which event directly links to implantation being possible in the uterus?



- A High progesterone making the endometrium secretory and receptive ✓
- B High FSH causing endometrial shedding
- C LH surge directly thickening the endometrium
- D High estrogen always preventing implantation
- E Cervical mucus becoming thick at ovulation

► **Explanation:** Progesterone transforms the endometrium into a secretory, implantation-ready lining. FSH does not cause shedding, and thick mucus typically occurs after ovulation, not at ovulation.

77 Which statement about ectopic pregnancy is most accurate conceptually?



- A It means the embryo implants in the endometrium, which is normal
- B It means implantation occurs outside the uterus (often in the oviduct), which cannot support normal development ✓
- C It means ovulation did not occur
- D It means the placenta forms before fertilization
- E It means the embryo implants in the cervix on purpose to start labor

► **Explanation:** Ectopic pregnancy is implantation outside the uterine cavity, commonly in the fallopian tube. This location cannot properly support pregnancy and can be dangerous. It is not 'normal implantation.'

78 Which hormone combination in a non-pregnant cycle is most associated with suppression of FSH to prevent many follicles from maturing at once?



- A High estrogen + inhibin from the developing dominant follicle ✓





- B High hCG + high progesterone
- C Low estrogen + low inhibin
- D High LH + low estrogen
- E High prolactin + high oxytocin

► **Explanation:** As the dominant follicle grows, estrogen and inhibin rise and suppress FSH, reducing stimulation to other follicles (which then undergo atresia). hCG is pregnancy-related.

79 Which statement best captures why progesterone is called the 'pro-gestation' hormone (at this level)?



- A It causes the LH surge to start ovulation
- B It stabilizes and maintains an implantation-ready endometrium and reduces uterine contractions ✓
- C It directly produces oocytes by mitosis
- D It triggers menstruation by rising sharply
- E It is secreted by the hypothalamus to stimulate FSH

► **Explanation:** Progesterone maintains the uterine lining and supports conditions favorable for pregnancy. The LH surge is estrogen-driven positive feedback; menstruation occurs after progesterone drops.

80 Which graph-like description best matches estrogen across a typical cycle?



- A Very high and flat constant level throughout the entire cycle
- B Rises during follicular phase, peaks just before ovulation, then falls and has a smaller rise in luteal phase ✓
- C Peaks only at menstruation and is zero at ovulation
- D Peaks only after menstruation ends and stays at zero later





- E** Is highest in late luteal phase right before bleeding due to corpus luteum growth

► **Explanation:** Estrogen rises as follicles grow, peaks pre-ovulation, then dips. A smaller luteal estrogen rise can occur because the corpus luteum secretes some estrogen. Right before menstruation, estrogen typically falls due to corpus luteum regression.

81 Which graph-like description best matches progesterone across a typical non-pregnant cycle?



- A** High in follicular phase, low in luteal phase

B Low before ovulation, rises after ovulation (luteal phase), then falls before menstruation ✓

- C** Peaks sharply before ovulation to trigger LH surge

- D** Peaks only at menstruation

- E** Is absent in all females because it is a male hormone

► **Explanation:** Progesterone is mainly produced by the corpus luteum, which forms after ovulation, so progesterone is low pre-ovulation and high in the luteal phase, then falls if no pregnancy occurs.

82 Which hormone changes best explains why FSH rises slightly at the start of a new cycle?



- A** A rise in progesterone increases FSH release

B A fall in estrogen and progesterone removes negative feedback, allowing FSH to rise ✓

- C** hCG peaks at menstruation to stimulate FSH

- D** LH surge causes FSH to rise at the beginning of the cycle

- E** Inhibin increases sharply at menstruation and stimulates FSH





► **Explanation:** When the corpus luteum regresses, estrogen and progesterone drop, releasing the pituitary from negative feedback. That allows FSH to rise and recruit follicles. Inhibin suppresses FSH, not stimulates it.

83 Which hormone is most directly responsible for follicle recruitment and early follicular growth?



- A FSH** ✓
- B hCG
- C Oxytocin
- D Prolactin
- E ADH

► **Explanation:** FSH stimulates granulosa cells and follicle development early in the cycle. hCG is pregnancy-related, and oxytocin/prolactin are lactation/labor related.

84 Which is the best explanation for why only one follicle typically becomes dominant?



- A FSH rises continuously throughout the cycle, stimulating all follicles equally
- B The dominant follicle becomes more sensitive and produces estrogen/inhibin that suppress FSH, causing other follicles to undergo atresia** ✓
- C LH destroys all but one follicle by apoptosis at menstruation
- D Progesterone is highest in early follicular phase and blocks all follicles except one
- E hCG is released mid-cycle to select the dominant follicle

► **Explanation:** A key concept is selection by feedback: estrogen/inhibin from the leading follicle reduces FSH, and only the most advanced/sensitive follicle keeps growing. Others regress (atresia).





85 Which event in oogenesis creates the first polar body?



- A Completion of meiosis I (unequal cytokinesis) ✓
- B Completion of meiosis II (unequal cytokinesis)
- C Mitosis of oogonia
- D Ovulation (release) itself
- E Implantation

► **Explanation:** The first polar body is formed when the primary oocyte completes meiosis I, creating a secondary oocyte + first polar body by unequal division. The second polar body forms after meiosis II upon fertilization.

86 Which event in oogenesis creates the second polar body?



- A Completion of meiosis I
- B Completion of meiosis II (usually after fertilization) ✓
- C LH surge before ovulation
- D Menstruation
- E Aromatase converting androgens to estrogen

► **Explanation:** The secondary oocyte completes meiosis II only after fertilization, producing the ovum and a second polar body. LH triggers ovulation and meiosis I completion, not meiosis II completion.

87 Which statement best describes why polar bodies form in oogenesis?



- A To increase the number of functional eggs produced per meiosis





B To discard extra chromosomes while keeping most cytoplasm in one cell for early development ✓

- C** To provide mitochondria to sperm
- D** To reduce hormone feedback on the pituitary
- E** To prevent crossing over

► **Explanation:** Polar bodies allow chromosome reduction with minimal cytoplasm loss from the egg, ensuring a large, resource-rich ovum. They do not increase egg number (opposite) and are not about sperm mitochondria or feedback loops.

88 Which statement about mitochondria inheritance is most accurate in humans?



- A** Mitochondria are inherited equally from sperm and egg
- B Mitochondria are typically inherited maternally because the egg contributes most cytoplasm/organelles ✓**
- C** Mitochondria are inherited only from the father
- D** Mitochondria come from the placenta
- E** Mitochondria are created from scratch after fertilization

► **Explanation:** The egg supplies most cytoplasm and organelles, so mitochondrial DNA is typically maternal. Sperm contributes mainly nuclear DNA, and its mitochondria are usually not transmitted.

89 Which event is most directly responsible for the formation of a zygote?



- A** Ovulation
- B Fusion of haploid nuclei from sperm and ovum (fertilization) ✓**
- C** Menstruation
- D** LH surge





- E Formation of the corpus luteum

► **Explanation:** A zygote forms when sperm and egg nuclei fuse, restoring diploid chromosome number. Ovulation and LH surge occur earlier and do not create a zygote by themselves.

90 A human zygote has:



- A 23 chromosomes total
- B **46 chromosomes total ✓**
- C 92 chromosomes total
- D 46 chromosomes but only 23 DNA molecules
- E No DNA until implantation

► **Explanation:** Fertilization restores diploidy: 23 from sperm + 23 from egg = 46 chromosomes. Chromosome number does not wait for implantation.

91 Which event is most directly associated with the blastocyst stage being ready to implant?



- A Still being surrounded by a thick zona pellucida with no changes
- B **'Hatching' from the zona pellucida and interacting with the endometrium ✓**
- C Remaining in the ovary inside the corpus luteum
- D Triggering an LH surge
- E Undergoing meiosis I

► **Explanation:** Before implantation, the embryo (blastocyst) must hatch from the zona pellucida to attach to the endometrium. It does not trigger ovulation hormones or undergo meiosis.





92 Which structure in the ovary contains the developing oocyte and granulosa/theca cells, and secretes estrogen as it grows?



- A Corpus albicans
- B Ovarian follicle ✓
- C Endometrium
- D Myometrium
- E Cervical canal

► **Explanation:** The ovarian follicle is the key functional unit containing the oocyte and supporting cells. The endometrium is in the uterus, and corpus albicans is the degenerated corpus luteum.

93 If progesterone remains high (e.g., due to pregnancy), what happens to menstruation?



- A Menstruation occurs as normal because progesterone triggers bleeding
- B Menstruation is suppressed because the endometrium is maintained ✓
- C Menstruation becomes continuous and heavier
- D Ovulation occurs daily
- E FSH rises sharply to start a new cycle

► **Explanation:** Menstruation is mainly triggered by progesterone (and estrogen) withdrawal. If progesterone stays high, the endometrium remains supported and bleeding is prevented.

94 Which of the following is the most accurate reason that breastfeeding can reduce fertility (lactational amenorrhea, conceptually)?





- A Oxytocin directly destroys ovarian follicles
- B Elevated prolactin can suppress GnRH pulses, reducing LH/FSH and ovulation ✓**
- C Milk contains estrogen that blocks fertilization
- D Breastfeeding causes the uterus to stop existing
- E hCG is produced continuously during breastfeeding

► **Explanation:** High prolactin associated with breastfeeding can suppress GnRH, lowering LH/FSH and reducing ovulation. It's an endocrine feedback effect, not follicle destruction or hCG production.

95 A student says: 'Progesterone peaks right before ovulation to cause the LH surge.' The best correction is:



- A Correct—progesterone is the main trigger for LH surge
- B Incorrect—estrogen peaks before ovulation and drives the LH surge; progesterone rises mainly after ovulation ✓**
- C Incorrect—FSH peaks before ovulation and drives LH surge; estrogen is irrelevant
- D Correct—hCG triggers the LH surge
- E Incorrect—LH surge happens during menstruation

► **Explanation:** The LH surge is triggered by sustained high estrogen (positive feedback) late in the follicular phase. Progesterone is mainly high in the luteal phase after ovulation (from corpus luteum).

96 Which hormone most directly causes the uterus to become more 'secretory' (glands secreting nutrients) for a potential embryo?



- A Progesterone ✓**
- B Estrogen
- C FSH





- D LH
- E GnRH

► **Explanation:** Progesterone converts the endometrium into a secretory, nutrient-supporting lining. Estrogen mainly drives proliferative growth earlier.

97 Which hormone primarily promotes endometrial proliferation earlier in the cycle?



- A Estrogen ✓
- B Progesterone
- C hCG
- D Prolactin
- E Oxytocin

► **Explanation:** Estrogen drives the proliferative phase (rebuilding the lining). Progesterone dominates after ovulation, creating the secretory phase.

98 Which event is the MOST direct cause of the progesterone rise after ovulation?



- A Formation of the corpus luteum from the ruptured follicle ✓
- B Menstruation stimulating progesterone secretion
- C hCG from the embryo in every cycle
- D FSH directly converting estrogen into progesterone
- E Cervical mucus thinning

► **Explanation:** After ovulation, the follicle luteinizes into a progesterone-secreting corpus luteum. hCG maintains it only if pregnancy occurs.





99 Which is the best high-school-level definition of ovulation?



- A Shedding of the endometrium
- B Release of a secondary oocyte from the ovary ✓**
- C Fusion of sperm and egg nuclei
- D Formation of milk in the breast
- E Implantation of the blastocyst into the uterus

► **Explanation:** Ovulation is the ovarian event of oocyte release. Menstruation is uterine shedding; fertilization is gamete fusion; implantation is embryo embedding.

100 Which of the following best defines menstruation?



- A Release of an oocyte from the ovary
- B Shedding of the functional layer of the endometrium when pregnancy does not occur ✓**
- C Fertilization of the egg
- D Formation of the corpus luteum
- E Milk ejection from the breast

► **Explanation:** Menstruation is uterine lining shedding due to hormone withdrawal (progesterone/estrogen fall). Ovulation and fertilization are separate events in the ovary/tube.

