



REVISION NOTES · CLASS 11 AND 12

NEET Biology High-Yield Notes

NEET biology rewards exact NCERT facts. These notes collect the numbers, names and ratios that turn up again and again, chapter by chapter, so you can revise the whole syllabus in an evening.

NEET

CBSE 12

01 The cell

Cell theory – Schleiden and Schwann; Virchow added that new cells come from existing cells (omnis cellula e cellula)

Ribosomes – prokaryotes 70S (50S + 30S); eukaryotes 80S (60S + 40S)

Semi-autonomous organelles – mitochondria and chloroplasts have their own circular DNA and 70S ribosomes

Membrane model – fluid mosaic model, Singer and Nicolson (1972)

Centrioles and cilia – centriole 9 + 0 triplets; cilia and flagella 9 + 2 axoneme

Lysosomes – hydrolytic enzymes, active at acidic pH

02 Cell cycle and division

Interphase – G₁, S (DNA replicates), G₂

Mitosis – metaphase is the best stage to study chromosome morphology

Prophase I of meiosis – synapsis in zygotene; crossing over in pachytene; chiasmata seen in diplotene; terminalisation in diakinesis

Meiosis I – reductional division; meiosis II is equational

03 Molecular biology

DNA structure – Watson and Crick (1953); B-DNA has about 10 bp per turn and a pitch of 3.4 nm

Base pairing – A = T (2 hydrogen bonds); G ≡ C (3 hydrogen bonds); Chargaff's rule A + G = T + C

Replication – semi-conservative (Meselson and Stahl, using ¹⁵N); Okazaki fragments form on the lagging strand

Genetic code – triplet, degenerate, nearly universal; start codon AUG; stop codons UAA, UAG, UGA

Lac operon – Jacob and Monod; lactose (allolactose) is the inducer

Human genome (NCERT figures) – 3164.7 million bp; about 30,000 genes; under 2 per cent codes for proteins

04 Genetics

Mendelian ratios – monohybrid F₂ 3:1 (genotype 1:2:1); dihybrid 9:3:3:1; test cross 1:1

Incomplete dominance – snapdragon flower colour, F₂ 1:2:1

Co-dominance – ABO blood groups (I^A, I^B, i)

Sex determination – humans XX-XY; grasshopper XX-XO; birds ZW female, ZZ male

X-linked recessive – haemophilia, colour blindness

Sickle-cell anaemia – glutamic acid replaced by valine at position 6 of β-globin

Chromosomal disorders – Down syndrome trisomy 21; Klinefelter 47,XXY; Turner 45,XO

05 Human physiology

Muscle contraction – sliding filament theory; Ca²⁺ binds troponin, exposing actin's binding sites to myosin heads; ATP powers the cross-bridges

Nerve impulse – the Na⁺/K⁺ pump moves 3 Na⁺ out for every 2 K⁺ in; chemical synapses pass the signal with neurotransmitters such as acetylcholine

Breathing – tidal volume about 500 mL; vital capacity = IRV + TV + ERV

Gas transport – O₂ about 97% as oxyhaemoglobin; CO₂ about 70% as bicarbonate, 20–25% as carbaminohaemoglobin, 7% dissolved

Heart – SA node is the pacemaker (70–75 beats/min); cardiac output ≈ 70 mL × 72 ≈ 5 L/min; normal BP 120/80 mm Hg

ECG – P wave atrial depolarisation; QRS ventricular depolarisation; T wave ventricular repolarisation

Kidney – GFR about 125 mL/min (180 L/day); PCT reabsorbs 70–80% of water and electrolytes; ADH acts on DCT and collecting duct

Hormones – insulin (β cells) lowers blood glucose, glucagon (α cells) raises it; ADH and oxytocin are made in the hypothalamus and released by the posterior pituitary

06 Plant physiology

Photosystems – PS I reaction centre P700; PS II P680; water splits at PS II

C₃ and C₄ – Calvin cycle's first stable product is 3-PGA; Hatch-Slack (C₄) first product is OAA, with Kranz anatomy (maize, sugarcane)

RuBisCO – the most abundant enzyme on Earth; its oxygenase activity causes photorespiration in C₃ plants

Respiration – glycolysis gives a net 2 ATP; Krebs cycle in the matrix; ETS on the inner membrane; NCERT net gain 38 ATP per glucose

Respiratory quotient – carbohydrates 1; fats about 0.7; proteins about 0.9

Plant hormones – auxin (apical dominance, rooting); gibberellins (bolting, malting); cytokinins (cell division, delay ageing); ethylene (ripening); ABA (stress, stomatal closure, dormancy)

07 Reproduction

Flowering plants – double fertilisation, syngamy plus triple fusion (triploid endosperm)

Menstrual cycle – about 28 days; ovulation about day 14 after the LH surge; corpus luteum secretes progesterone

Testes – Sertoli cells nourish developing sperm; Leydig cells secrete testosterone

Pregnancy – implantation at the blastocyst stage; hCG maintains the corpus luteum

08 Ecology

Energy flow – Lindeman's 10 per cent law; the pyramid of energy is always upright

Inverted pyramids – biomass in the sea; numbers in a single tree

Species–area relationship – $\log S = \log C + Z \log A$, Z usually 0.1 to 0.2

Biodiversity – 34 hotspots worldwide; India has the Western Ghats–Sri Lanka, Indo–Burma and Himalaya

Rivet popper hypothesis – Paul Ehrlich

Causes of loss (the Evil Quartet) – habitat loss and fragmentation, over-exploitation, alien species invasions, co-extinctions

Conservation – in situ (biosphere reserves, national parks, sanctuaries, sacred groves); ex situ (zoos, botanical gardens, seed banks, cryopreservation)

09 Biotechnology and health

Restriction enzyme – EcoRI cuts at GAATTC

PCR – denaturation, annealing, extension with Taq polymerase (*Thermus aquaticus*)

Vector pBR322 – ori, ampicillin and tetracycline resistance genes

Bt crops – cry genes from *Bacillus thuringiensis*; cryI_{Ac} and cryII_{Ab} for cotton, cryI_{Ab} for corn

RNA interference – protects tobacco from the nematode *Meloidogyne incognita*

Firsts – gene therapy for ADA deficiency (1990); Rosie, the transgenic cow whose milk carried human α -lactalbumin (1997)

Diseases – malaria, *Plasmodium* via female Anopheles; typhoid, *Salmonella typhi* (Widal test); dengue and chikungunya via Aedes; filariasis, *Wuchereria* via Culex

AIDS – caused by HIV, a retrovirus that destroys helper T cells; ELISA detects infection

How to use these notes

- 1 Read the matching NCERT paragraph after each section: NEET often lifts the exact sentence.
- 2 Make your own list of examples (organisms, diseases, hormones); they are easy marks.
- 3 Revise diagrams with labels: they carry both one-mark and assertion–reason questions.

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