

Unit 7.1. MCQs Set 1

Results



#1. Q1. Which concept laid the foundation for the “Principles of Inheritance and Variation” historically?

- (A). The cell theory
- (B). Mendel’s Laws of segregation and independent assortment
- (C). Hippocratic medicine
- (D). None

Gregor Mendel’s pea plant experiments revealed how traits are inherited, forming the basis for classical genetics.

#2. Q2. Mendel’s “Law of Independent Assortment” states that

- (A). Two alleles of a gene separate from each other during gamete formation
- (B). Genes for different traits assort independently if they are on different chromosomes
- (C). No crossing over occurs
- (D). None

Different gene pairs segregate independently when unlinked, giving novel phenotypic combinations in the offspring.

#3. Q3. Historical perspectives: The modern synthesis integrated genetics with

- (A). None
- (B). Darwin’s theory of evolution, explaining how gene frequencies change in populations
- (C). Hippocratic medicine
- (D). Infectious illusions

The “modern synthesis” merged Mendelian genetics with natural selection, forming the basis of population genetics.

#4. Q4. The human genome's approximate size is

- (A). 3 million base pairs
- (B). 3 billion base pairs
- (C). 30,000 base pairs
- (D). 300 trillion base pairs

The haploid human genome has around 3×10^9 nucleotides.

#5. Q5. The “Human Genome Project” concluded around 2003, revealing that

- (A). Humans have $\sim 100,000$ genes
- (B). Humans have $\sim 20,000\text{--}25,000$ protein-coding genes
- (C). None
- (D). Genes are mostly large introns

Surprisingly, the human gene count was found to be around 20-25,000 protein-coding genes.

#6. Q6. Human genome evolution suggests

- (A). No trace of homology to other organisms
- (B). Shared genes with other primates, numerous evolutionary conserved elements
- (C). RBC doping
- (D). None

Humans share a high degree of genetic similarity with other primates, indicating common ancestry.

#7. Q7. Genotype-phenotype correlation tries to

- (A). Increase metabolism
- (B). Link specific genetic variations to observable traits, bridging molecular basis and outward expression
- (C). RBC doping
- (D). Infectious illusions

Understanding how certain genes or polymorphisms cause or influence phenotypic outcomes is key to modern genomics.

#8. Q8. Multi-OMIC approach includes

- (A). None
- (B). Integrating genomics, transcriptomics, proteomics, and metabolomics data for holistic correlation

- (C). RBC doping
- (D). Infectious illusions

By examining multiple molecular layers, we obtain a more comprehensive view of how genotype affects phenotype.

#9. Q9. Ayurveda's concept of doṣa-prakṛti might be correlated with

-
- (A). None
-
- (B). Genetic and epigenetic profiles that predispose an individual's metabolic and physiologic tendencies
-
- (C). RBC doping
-
- (D). Infectious illusions

Research suggests that traditional prakṛti classifications may reflect underlying genetic or metabolic predispositions.

#10. Q10. Using medicinal plants in correlation with doṣa-prakṛti might imply

-
- (A). None
-
- (B). Personalized herbal selection based on genetic/phenotypic constitution
-
- (C). RBC doping
-
- (D). Infectious illusions

Personalizing herbal therapy based on an individual's prakṛti and genetic profile is part of the emerging field of "Ayurgenomics."

#11. Q11. Basics of human genomics includes

-
- (A). Only RBC doping
-
- (B). Structure of chromosomes, gene organization (exons/introns), regulatory sequences, and polymorphisms
-
- (C). None
-
- (D). Infectious illusions

Human genomics encompasses the study of chromosomal structures, gene organization, regulation, and variation.

#12. Q12. Regulatory mechanisms of genetic variation might involve

-
- (A). Epigenetic modifications, promoter/enhancer usage, splicing variants
-
- (B). None
-
- (C). RBC doping
-
- (D). Infectious illusions

Gene regulation is influenced by epigenetic modifications, alternative promoter usage, and splicing variants.

#13. Q13. Genetic variation's role in drug response ties into

- (A). None
- (B). Pharmacogenomics—some polymorphisms (e.g., CYP450) affect drug metabolism
- (C). Infectious illusions
- (D). RBC doping

Pharmacogenomics studies how individual genetic variations affect drug metabolism and response.

#14. Q14. Population genomics studies

- (A). None
- (B). The distribution of gene variants across populations and their evolution under selection, drift, and migration
- (C). RBC doping
- (D). Infectious illusions

This field examines how different gene frequencies arise and evolve in various populations.

#15. Q15. Disease genomics focuses on

- (A). None
- (B). Identifying genetic variants that predispose to or cause specific diseases, enabling targeted prevention or therapy
- (C). RBC doping
- (D). Infectious illusions

Disease genomics aims to pinpoint the genetic factors that influence disease risk and therapeutic responses.

#16. Q16. Pharmaco-genomics (pharmacogenetics) attempts to

- (A). None
- (B). Tailor drug choice and dose based on an individual's genetic makeup for optimal safety and efficacy
- (C). RBC doping
- (D). Infectious illusions

Personalized therapy in pharmacogenomics seeks to optimize drug treatments based on genetic profiles.

#17. Q17. Nutrigenomics means

- (A). None
- (B). Studying how diet interacts with the genome, influencing metabolism and disease risk
- (C). RBC doping
- (D). Infectious illusions

Nutrigenomics explores the interplay between dietary factors and genetic predispositions.

#18. Q18. Scientific approaches for biomarker discovery might include

- (A). None
- (B). Using multi-omics data analysis and machine learning on big datasets to identify gene/protein/metabolite markers
- (C). RBC doping
- (D). Infectious illusions

Advanced analytical and computational techniques are essential for identifying robust biomarkers.

#19. Q19. “P4 medicine” stands for

- (A). None
- (B). Predictive, Preventive, Personalized, Participatory
- (C). Panchakarma-based protocols
- (D). RBC doping

P4 medicine is defined by the four pillars: Predictive, Preventive, Personalized, and Participatory approaches.

#20. Q20. “P5 medicine” extends P4 by adding

- (A). None
- (B). Promotive—actively enhancing overall health, not just preventing disease
- (C). RBC doping
- (D). Infectious illusions

P5 medicine adds a focus on health promotion to the P4 framework.

#21. Q21. Approach to integrative “Ayurgenomics” might be

- (A). None
- (B). Mapping dosha-prakrti with genetic expression patterns to refine personalized prevention or therapy
- (C). RBC doping
- (D). Infectious illusions

Integrating traditional prakrti classification with genomic data is key to Ayurgenomics.

#22. Q22. Limitation in bridging Ayurveda & genomics is

- (A). None
- (B). The complexity of polygenic traits and the limited standardization of prakrti classification, requiring large-scale studies

- (C). RBC doping
- (D). Infectious illusions

A major challenge is standardizing prakṛti assessment and managing the complexity of polygenic traits.

#23. Q23. Challenges in “delivery” of P4/P5 medicine in Ayurveda might be

-
- (A). None
-
- (B). Limited infrastructure for genetic testing, big data analytics, and standardized doṣa assessments
-
- (C). RBC doping
-
- (D). Infectious illusions

Improved infrastructure and standardization are necessary to deliver personalized and predictive medicine effectively.

#24. Q24. Development of a biomarker for “pittaja prakṛti” might

-
- (A). None
-
- (B). Involve multi-omics to identify consistent transcript or metabolite signatures associated with pitta-dominant physiology
-
- (C). RBC doping
-
- (D). Infectious illusions

A multi-omics approach may reveal distinct molecular signatures linked to the pitta constitution.

#25. Q25. Historically, genetic inheritance was widely recognized with Mendel, but in Ayurveda

-
- (A). None
-
- (B). The bija (seed) concept indicates an early awareness of hereditary factors
-
- (C). RBC doping
-
- (D). Infectious illusions

Ayurveda's bija concept reflects early insights into hereditary transmission.

#26. Q26. “Variation” in genetics is explained by

-
- (A). None
-
- (B). Mutation, recombination, independent assortment, and crossing over
-
- (C). RBC doping
-
- (D). Infectious illusions

These mechanisms generate genetic diversity, which is fundamental to evolution.

#27. Q27. Population genomics in an Ayurvedic sense might explore

- (A). None
- (B). The distribution of prakṛti-based gene variants across different ethnic/regional groups
- (C). RBC doping
- (D). Infectious illusions

This approach investigates how genetic variants related to prakṛti vary across populations.

#28. Q28. Disease genomics, e.g., in diabetes, attempts

- (A). None
- (B). To identify risk alleles (such as TCF7L2) that predispose individuals to type 2 diabetes
- (C). RBC doping
- (D). Infectious illusions

Genome-wide association studies have identified risk alleles for complex diseases like type 2 diabetes.

#29. Q29. Pharmacogenomics can yield

- (A). None
- (B). Personalized drug dosing recommendations based on genetic variants (e.g., CYP450 polymorphisms)
- (C). RBC doping
- (D). Infectious illusions

Pharmacogenomic data can guide individualized drug dosing to minimize adverse reactions.

#30. Q30. Nutrigenomics might find that

- (A). None
- (B). Certain genotypes respond better to specific diets (e.g., low-carb versus low-fat), influencing weight loss and disease outcomes
- (C). RBC doping
- (D). Infectious illusions

Nutrigenomics investigates how genetic variation affects dietary response and health outcomes.

#31. Q31. Discovery of biomarkers requires

- (A). None
- (B). Advanced analytical platforms (e.g., microarrays, next-gen sequencing, proteomics) and rigorous validation in clinical populations
- (C). RBC doping

(D). Infectious illusions

Robust discovery and validation methods are essential for identifying clinically useful biomarkers.

#32. Q32. Approaches to P4/P5 medicine in Ayurveda are limited by

(A). None

(B). Inadequate large-scale genomic data on prakṛti, challenges in standardizing assessment, and the high cost of genetic profiling

(C). RBC doping

(D). Infectious illusions

Significant financial and methodological challenges exist in integrating genomics with Ayurvedic principles.

#33. Q33. Challenges in “development & delivery” of P5 medicinal aspects might include

(A). None

(B). Regulatory issues regarding genomic data privacy and the need for extensive clinical trials correlating dosha assessment with molecular biomarkers

(C). RBC doping

(D). Infectious illusions

Bridging traditional Ayurveda with modern genomics requires resolving regulatory and methodological challenges.

#34. Q34. The principle of “Predictive medicine” is to

(A). None

(B). Identify genetic or other risk markers early, preventing disease onset or mitigating severity

(C). RBC doping

(D). Infectious illusions

Early identification of risk markers allows for timely intervention and disease prevention.

#35. Q35. “Preventive medicine” complements predictive by

(A). None

(B). Implementing lifestyle and dietary interventions based on identified risk factors

(C). RBC doping

(D). Infectious illusions

Once high-risk individuals are identified, preventive measures such as diet and lifestyle modifications can be employed.

#36. Q36. “Personalized medicine” indicates

-
- (A). None
-
- (B). Tailoring therapy based on an individual’s genetic, phenotypic, and clinical data for optimal outcomes
-
- (C). RBC doping
-
- (D). Infectious illusions

Personalized medicine optimizes treatment by considering each individual’s unique profile.

#37. Q37. “Participatory medicine” suggests

-
- (A). None
-
- (B). Patients actively engaged in their health decisions through digital tools and shared decision-making
-
- (C). RBC doping
-
- (D). Infectious illusions

Patients’ active involvement in their treatment is a key component of participatory medicine.

#38. Q38. “Promotive medicine” in a P5 context means

-
- (A). None
-
- (B). Actively enhancing overall well-being, going beyond prevention
-
- (C). RBC doping
-
- (D). Infectious illusions

Promotive medicine seeks not only to prevent disease but also to enhance overall health and vitality.

#39. Q39. The approach of “Ayurgenomics” might unify

-
- (A). None
-
- (B). Ancient dosha-based classification with modern multi-omic and big data analytics to refine personalized therapies
-
- (C). RBC doping
-
- (D). Infectious illusions

Ayurgenomics merges classical Ayurvedic principles with advanced genomic methodologies for personalized care.

#40. Q40. Historical perspective in genetics includes

-
- (A). None
-
- (B). Contributions by Darwin, Mendel, Watson & Crick, culminating in the Human Genome Project
-
- (C). RBC doping
-
- (D). Infectious illusions

The evolution of genetics from Darwin and Mendel to modern molecular biology and the Human Genome Project is well documented.

#41. Q41. Regulatory mechanisms of genetic variation might involve

- (A). None
- (B). Epistasis, enhancer/repressor activity, methylation, histone modification, splicing variants, and microRNAs
- (C). RBC doping
- (D). Infectious illusions

Multiple layers of regulation, including epigenetic and post-transcriptional mechanisms, control genetic variation and expression.

#42. Q42. Role of these variations in health includes

- (A). None
- (B). Certain polymorphisms can confer susceptibility or resistance to diseases and affect drug metabolism
- (C). RBC doping
- (D). Infectious illusions

Genetic variations can determine individual disease risk and influence treatment outcomes.

#43. Q43. Population genomics in disease might show

- (A). None
- (B). Variation in allele frequency for risk genes among ethnic groups, which can guide public health strategies
- (C). RBC doping
- (D). Infectious illusions

Population genomics studies can reveal how gene frequencies differ among populations, impacting disease risk.

#44. Q44. Exploratory genotype-phenotype correlation helps

- (A). None
- (B). Link doṣa-based phenotypes or disease states with specific SNP haplotypes
- (C). RBC doping
- (D). Infectious illusions

Correlating traditional Ayurvedic phenotypes with modern SNP data can help validate and refine prakṛti classification.

#45. Q45. The biggest challenge in practical “Ayurgenomics” is

- (A). None

- (B). Standardizing dosha assessment, collecting large multi-omic datasets, and achieving robust statistical power
- (C). RBC doping
- (D). Infectious illusions

Challenges include variability in clinical assessment and the high costs associated with omics technologies.

#46. Q46. P4 & P5 medicine aim to reduce chronic disease burden by

- (A). None
- (B). Predicting high-risk individuals, preventing disease onset, personalizing therapy, involving patients, and promoting health
- (C). RBC doping
- (D). Infectious illusions

These integrated approaches encompass the entire spectrum from prediction to health promotion.

#47. Q47. Genetic approach to identify “biomarkers” for Ayurvedic rasayana response might

- (A). None
- (B). Evaluate changes in transcript or metabolite levels pre- and post-rasayana intervention
- (C). RBC doping
- (D). Infectious illusions

Measuring molecular changes before and after treatment can help in biomarker discovery.

#48. Q48. Limitations of “Ayurgenomics” research can include

- (A). None
- (B). Heterogeneity in classical textual interpretations, subjective prakrti classification, and high omics costs
- (C). RBC doping
- (D). Infectious illusions

Variability in traditional assessments and high research costs are significant hurdles.

#49. Q49. Implementation-wise, “development & delivery” of P4 medicine might require

- (A). None
- (B). Digital health platforms, machine learning integration, standardized dosha questionnaires, and genomic screening programs
- (C). RBC doping
- (D). Infectious illusions

Integrating modern digital tools and genomic screening with classical assessments is essential for practical



implementation.

#50. Q50. Overall, bridging genetics with Ayurvedic practice aims to

- (A). None
- (B). Provide a more holistic, personalized medicine by merging traditional dosha-based wisdom with modern molecular insights
- (C). RBC doping
- (D). Infectious illusions

The goal is to enhance personalized healthcare by integrating Ayurvedic concepts with contemporary genetic research.

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