Portal:Exam Topics in Biology and Medical Genetics (1. LF UK, GM)

see also current list of exam topics at the website of Institute of Biology and Medical Genetics (http://ublg.lf1.cuni.cz/en/exam-questions-biology--genetics-general-medicine)

Current list of exam questions - valid from 2014/2015 academic year

1. Fundamental laws of genetics
2. Dihybridism
3. Additive model of polygenic inheritance
4. Interaction of non-allelic genes
5. Genetic linkage
6. Genotype variation, mutations and recombination
7. Gene-environment interactions
8. Inheritance of multifactorial traits and diseases in man
9. Heritability, methods and importance of its assessment in medicine
10. Multifactorial diseases, disorders, and traits in man
11. Genealogical method
12. Autosomal dominant inheritance in pedigree and experiment, examples of traits in man
13. Autosomal recessive inheritance in pedigree and experiment, examples of traits in man
14. Gonosomal inheritance in pedigree and experiment, examples of traits in man
15. Twins and twin studies in genetics
16. Genetic methods of linkage analysis
17. Genetic methods of association analysis
18. Genetic analysis methods in experimental and human genetics
19. Genetic mapping in man
20. Genetic maps and their importance
21. Structure and function of eukaryotic cell
22. The cell cycle, its regulation and disturbances
23. Cell signaling
24. Mitosis, its regulation and disturbances
25. Meiosis, its regulation and disturbances
26. Crossing-over, its mechanism and importance
27. Gametogenesis
28. Extranuclear inheritance
29. Non-Mendelian inheritance
30. Structure and types of the eukaryotic chromosomes
31. Methods of chromosomal examination
32. Molecular cytogenetics
33. Human karyotype, methods of its examination
34. Abnormalities in chromosome number, their causes and clinical presentation in man
35. Abnormalities in chromosome structure, their causes and clinical presentation in man
36. Germ cell and somatic cell chromosome mutations
37. Etiology of chromosomal aberrations
38. Autosomal aneuploidy syndromes in man
39. Gonosomal aneuploidy syndromes in man
40. Indications for chromosome analysis in clinical genetics
41. DNA - structure and function
42. RNA - types, structure and function
43. DNA replication
44. Transcription, post-transcriptional processing of RNA in eukaryotes
45. Translation, post-translational processing of proteins in eukaryotes
46. The genetic code
47. Structure and function of a gene
48. Protein coding and non-coding sequences of DNA
49. Regulation of transcription in eukaryotes
50. Translation of membrane and secretory proteins (protein sorting, targeting)
51. Regulation of gene expression in eukaryotes
52. Epigenetics, genetic imprinting
53. Polymorphisms of nucleic acids
54. Methods of nucleic acid analysis
55. Recombinant DNA and genetic engineering
56. Gene mutations, types and manifestation
57. Mutagens and mutagenesis, mutagenicity testing
58. Reparation mechanisms of the cell and their genetic control
59. Reparation mechanisms of nucleic acids
60. Molecular basis of genetic diseases

61. Proteins and their function, genetic polymorphism of proteins
62. Genetics of human hemoglobins
63. Hemoglobinopathies
64. Inborn errors of metabolism
65. Genetic information of mitochondria, mitochondrial diseases
66. Direct diagnostics of hereditary diseases by nucleic acid analysis
67. Indirect diagnostics of hereditary diseases by nucleic acid analysis
68. Physical mapping of DNA
69. Map of human genome, Human Genome Project, results and significance
70. Gene therapy - principles, current possibilities, perspectives
71. Principles of therapy of heritable diseases
72. Genetics and clinical importance of blood group systems
73. Genetics and clinical importance of Rh system
74. The cells of immune system, immunophenotyping
75. Genetic control of immune response
76. Genetic control of antibody production
77. Immune response (antigen recognition, cell cooperation)
78. Genetics of immunoglobulins, B-cell and T-cell receptors
79. Genetics of transplantations, transplantation rules, histocompatibility systems
80. Major histocompatibility complex of man
81. Immunotolerance and possibilities of its induction
82. Genetic aspects of immune system function related to cancer
83. Hereditary immunodeficiencies
84. Structure and function of the prokaryotic cell
85. Importance and structure of prokaryotic chromosomes
86. Biology and genetics of bacteria, importance in medicine
87. Regulation of gene expression in prokaryotes
88. Transcription and translation in prokaryotes
89. Conjugation, transformation, transduction
90. Biology and genetics of viruses, importance in medicine
91. Ontogenesis and its genetic control
92. Genetic determination of body plan in development
93. Chromosomal determination of sex
94. Ontogenesis of sex in mammals and its disturbances
95. Apoptosis, clinical outcomes of its dysregulation
96. Apoptosis, genetic control and importance in development
97. Genetic aspects of aging and death
98. Teratogenesis, teratogens
99. Environmental mutagens and teratogens
100. Inborn errors of development in human, examples, classification
101. Genetic aspects of populations, Hardy-Weinberg equilibrium
102. Selection, its types
103. Inbreeding, consanguineous marriages and their risks
104. Population polymorphisms and their causes
105. Mutations in population genetics, frequency of mutations
106. Migration, gene flow
107. Structure of populations, genetic drift, importance for evolution
108. Characteristics of cancer cells
109. Characteristics of tumor growth
110. Causes of tumors, carcinogenesis, carcinogens
111. Proto-oncogenes, oncogenes
112. Tumor suppressor genes
113. Mutator genes, genome stability
114. Chromosomal aberrations in cancer cells
115. Hereditary cancer, cancer in families
116. Genetics in presymptomatic diagnostics and prevention of cancer
117. Gene therapy of cancer
118. Genetic mechanisms of evolution
119. Species and speciation
120. Evolution of genes and genomes
121. Origin and evolution of species
122. Evolution of Homo sapiens
123. Aims of medical genetics
124. Ethical and legal aspects of medical genetics
125. Genetic consultation and it importance
126. Postnatal screening of heritable diseases
127. Prenatal screening of inborn errors of development
128. Prenatal diagnostics of heritable diseases, possibilities of prevention
129. Prenatal diagnostics of chromosomal aberrations, possibilities of prevention
130. Prenatal diagnostics of inborn errors of development, possibilities of prevention
131. Pre-conception prevention of heritable and inborn diseases
132. Postnatal prevention and therapy of heritable and inborn diseases
133. Ecology, ecogenetics
134. Pharmacogenetics, nutrigenetics