

ANIMAL GENETICS AND BREEDING

CHAPTER 2.10: LABORATORY ANIMAL BREEDING

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1. Which among the following is the most commonly used laboratory animal species?
 - a) Rat
 - b) Mice**
 - c) Hamster
 - d) Guinea pig
2. Which lab animal species is used for the study of allergies and anaphylactic shock?
 - a) Rat
 - b) Mice
 - c) Hamster
 - d) Guinea pig**
3. Which lab animal species is used for the diagnosis of T.B.?
 - a) Rat
 - b) Mice
 - c) Hamster
 - d) Guinea pig**
4. “Laboratory Animal Bureau” was set up in India in the year
 - a) 1947**
 - b) 1953
 - c) 1972
 - d) 1978
5. “Cruelty to Animals” act was enacted in the year
 - a) 1856
 - b) 1866
 - c) 1876**
 - d) 1886
6. “Cheek pouches” are characteristics of which lab animal?
 - a) Rat
 - b) Mice
 - c) Hamster**
 - d) Guinea pig
7. Which lab animal likes solitary behavior?
 - a) Guinea pig
 - b) Dog
 - c) Gerbil
 - d) Hamster**
8. Which of the following is a non-murine rodent?
 - a) Rat
 - b) Mice

- c) Hamster
 - d) Gerbil**
9. Circadian rhythm is absent in which lab animal?
- a) Rat
 - b) Hamster
 - c) Mice
 - d) Guinea pig**
10. Which of the following is known as “Cinderella of Genetics”?
- a) Garden Pea
 - b) Drosophila**
 - c) Mice
 - d) Guinea pig
11. In mice, MHC-related genes are clustered on which chromosome?
- a) 23
 - b) 20
 - c) 17
 - d) 7
12. Gall bladder is absent in which lab animal?
- a) Rat**
 - b) Mice
 - c) Hamster
 - d) Guinea pig
13. Harderian glands are present in
- a) Rat
 - b) Gerbil
 - c) Both of the above**
 - d) None of the above
14. Whistling is found in which of the following lab animals?
- a) Rat
 - b) Mice
 - c) Hamster
 - d) Guinea pig**
15. Whining is seen in which lab animal?
- a) Rat
 - b) Hamster
 - c) Gerbil
 - d) Rabbit**
16. A strain is established after ____ generations of close breeding.
- a) 1-2
 - b) 2-3
 - c) 3-4
 - d) 4-5**
17. “Flank glands” are present in which lab animal?
- a) Rat
 - b) Gerbil
 - c) Hamster**
 - d) Guinea pig
18. Which rat strain among the following is genetically modified to study obesity and hypertension?
- a) WISTAR
 - b) SPRAGUE-DAWLEY
 - c) ZUCKER**
 - d) LONG-EVANS
19. Which rat strain among the following was the first to be used as a model organism?
- a) WISTAR**
 - b) SPRAGUE-DAWLEY

- c) ZUCKER
 - d) LONG-EVANS
20. What type of rats are used as models to study autoimmune type-1 diabetes?
- a) Gnotobiotic
 - b) Hairless
 - c) **Biobreeding**
 - d) None of the above
21. Which among the following is the most commonly used strain of mice in clinical research?
- a) WISTAR
 - b) **SWISS ALBINO**
 - c) BALB/c
 - d) C57BL/6
22. Vitamin – C was discovered through experiments on which lab animal species?
- a) Rat
 - b) Mice
 - c) **Guinea pig**
 - d) Gerbil
23. Which of the following lab animals is used in the study of cholesterol and lipoprotein metabolism and study of asthma?
- a) Rat
 - b) Mice
 - c) Gerbil
 - d) **Guinea pig**
24. Which lab animal is used in epilepsy and auditory studies?
- a) Hamster
 - b) **Gerbil**
 - c) Rabbits
 - d) Guinea pigs
25. Which lab animal is extensively used in Respiratory Syncytial Virus (RSV) studies?
- a) Rat
 - b) Mice
 - c) **Hamster**
 - d) Gerbil
26. Which strain of hamster is more suitable for smoke inhalation studies?
- a) Syrian
 - b) Golden
 - c) **European**
 - d) Chinese
27. Which hamster strain is more suitable for cytogenesis research?
- a) Syrian
 - b) Golden
 - c) European
 - d) **Chinese**
28. Louis Pasteur used which lab animal to develop the rabies vaccine?
- a) **Rabbit**
 - b) Guinea pig
 - c) Gerbil
 - d) Hamster
29. Which lab animal has a high tolerance to Atropine because of the presence of atropine esterase?
- a) Hamster
 - b) Guinea pig
 - c) **Rabbit**
 - d) Monkey
30. Which is the lab animal of choice for cardiac studies?
- a) Guinea pig

- b) Syrian hamster
 - c) Chinese hamster
 - d) Rabbit**
31. Draize test, associated with the testing of cosmetics on which lab animal?
- a) Rabbit**
 - b) Hamster
 - c) Gerbil
 - d) Monkey
32. Which lab animal is suitable for study on aging?
- a) Cat**
 - b) Dog
 - c) Monkey
 - d) Rabbit
33. Cats are mainly used as models to study
- a) Behavioural studies
 - b) Sensory systems and neuroscience**
 - c) Cardiac diseases
 - d) Pyrogen testing
34. Which of the following is the most commonly used dog breed in research?
- a) Mongrel
 - b) Beagle
 - c) Chihuahua
 - d) Both a & b**
35. Acetylcholine was discovered through a study on which lab animal species?
- a) Drosophila
 - b) Nematodes
 - c) Frog**
 - d) Mice
36. Which of the following is associated with the African clawed frog (*Xenopus laevis*)
- a) Studying embryonic development
 - b) Discovery of magainin antibiotics
 - c) Both a & b**
 - d) None of the above
37. Which of the following is the most common breed of fish used in research?
- a) Silver carp
 - b) Lionfish
 - c) Zebrafish**
 - d) Pufferfish
38. Which of the following is used to model the atrial septal defect condition of humans?
- a) Chick embryos**
 - b) Zebrafish
 - c) Monkey
 - d) Rabbit
39. Which among the following was introduced as a lab animal for its susceptibility to infection with leishmania?
- a) Golden hamster**
 - b) Syrian hamster
 - c) Mice
 - d) Rat
40. "Escapism" is seen in which lab animal?
- a) Rat
 - b) Hamster**
 - c) Mice
 - d) Gerbil
41. Which of the following lab animals can't vomit?

- a) Rat
 - b) Mice
 - c) Hamster
 - d) All of the above**
42. Which of the following lab animals are coprophagic?
- a) Hamster
 - b) Guinea pig
 - c) Rabbit
 - d) All of the above**
43. Which of the following lab animals is not nocturnal?
- a) Rat
 - b) Mice
 - c) Hamster
 - d) Guinea pig**
44. Barbering and molting behaviors are shown by which lab animal?
- a) Rat
 - b) Hamster
 - c) Gerbil**
 - d) Mice
45. "Scent gland" at the belly is present in which lab animal?
- a) Gerbil**
 - b) Hamster
 - c) Rat
 - d) Rabbit
46. Which among the following is an old-world monkey?
- a) Marmosets
 - b) Baboons**
 - c) Spider monkey
 - d) Woolly monkey
47. The first genome to be completely sequenced among the following
- a) Mice**
 - b) Rat
 - c) Rabbit
 - d) Poultry
48. Which of the following is the first transgenic animal?
- a) Dolly
 - b) Tracy**
 - c) Alba
 - d) ANDi
49. Which of the following is a transgenic rabbit?
- a) Dolly
 - b) Astrid
 - c) Alba**
 - d) ANDi
50. Which of the following is a transgenic monkey?
- a) Dolly
 - b) Astrid
 - c) Alba
 - d) ANDi**
51. Which non-primate lab animal has the highest geographical range?
- a) Baboon
 - b) Rhesus monkey**
 - c) Marmoset
 - d) Woolly monkey

52. Which among the following lab animals is commonly used for AIDS research, study on fructose metabolism and malaria?
- a) Rhesus monkey**
 - b) Chimpanzee
 - c) Gorilla
 - d) Baboon
53. The “Fission-Fusion society” type of social group composition is characteristic of
- a) Rhesus monkey
 - b) Chimpanzee**
 - c) Gorilla
 - d) Baboon
54. Which primate species among the following feeds primarily on grass?
- a) Gelada**
 - b) Chimpanzee
 - c) Gorilla
 - d) Orangutans
55. Which among the following is a factor affecting effective population size concerning laboratory animals?
- a) Division into two sexes
 - b) Variation in offspring number
 - c) Inbreeding
 - d) All of the above**
56. Which among the following is a factor affecting effective population size concerning laboratory animals?
- a) Age and stage structure
 - b) Spatial structure
 - c) Genetic structure
 - d) All of the above**
57. A strain is called an inbred strain if it has undergone_____ generations of brother x sister or parent x offspring mating.
- a) 10
 - b) 15
 - c) 20**
 - d) 25
58. After how many generations of inbreeding, the animals are 99.5% similar?
- a) 20
 - b) 30
 - c) 40**
 - d) 50
59. A minimum of how many inbred strains is required when toxicity studies are extrapolated to the human population.
- a) 1
 - b) 2**
 - c) 3
 - d) 4
60. Which among the following is an inbred strain of rat?
- a) C57BL/6
 - b) FVB
 - c) BN**
 - d) 129/SvEv
61. Which among the following is an inbred strain of mice?
- a) ACI
 - b) Black 6**
 - c) BN
 - d) FHH

62. Which among the following is an identification method used in breeding records?
- Pedigree card
 - Cage tag
 - Card file
 - All of the above**
63. Which lab animal is most suitable for studies on atherosclerosis?
- Rabbit**
 - Mice
 - Rat
 - Guinea pig
64. Insulin was first isolated in 1922 from which animal?
- Sheep
 - Dog**
 - Hog
 - None of the above
65. Leprosy vaccine was developed using which animal?
- Racoon
 - Wolverine
 - Armadillo**
 - Gerbil
66. Which lab animal is used commonly for the production of polyclonal antibodies?
- Dog
 - Cat
 - Rabbit**
 - Monkey
67. Which of the following animals have no micro-organisms living in or on it?
- Germfree animals
 - Axenic animals
 - Gnotobiotic animals
 - Both a & b**
68. Animals with one or more known non-pathogenic bacteria are called
- Gnotobiotic animals**
 - SPF animals
 - Germfree animals
 - None of the above
69. Which of the following are also called defined flora animals?
- SPF animals
 - Gnotobiotic animals**
 - Axenic animals
 - Germfree animals
70. Which of the following animals are guaranteed freed from specific pathogens?
- Gnotobiotic animals
 - Pathogen-free animals
 - SPF animals**
 - Germfree animals
71. Animals kept at a conventional level with no monitoring or inspection of pathogenic animals?
- SPF animals
 - Axenic animals
 - Holoxenique animals**
 - None of the above
72. Which is not a part of 3R's
- Replacement
 - Regression**
 - Refinement

- d) Reduction
73. 3R's were introduced by
- Watson & Crick
 - Ian Pavlov
 - Robert Koch
 - Russell & Burch**
74. Which among the following is a knockout mouse model noted for longevity?
- Methuselah**
 - Frantic
 - P53 KO
 - None of the above
75. Which among the following is a knockout mouse useful to study anxiety disorders?
- Methuselah
 - Frantic**
 - P53 KO
 - None of the above
76. Which among the following is a method to produce knockout mice *in vitro*?
- Gene targeting
 - Gene trapping
 - Both a & b**
 - None of the above
77. Which among the following is a limitation in knockout animal models?
- They may be developmentally lethal
 - May serve a different function in adults than in developing embryos
 - May fail to produce an observable change in a mouse
 - All of the above**
78. C57BL and C57BR strains of mice were developed in 1921 by
- Hook
 - Mendel
 - Lathrop
 - Little**
79. How many breeding pairs were in the maximum avoidance mating system (Falconer's model)?
- <25**
 - <30
 - <35
 - <40
80. The size of breeding unit in a random breeding system is
- >25
 - >50
 - >100**
 - >150
81. Which of the following is an outbred strain of rat?
- NMRI
 - WISTAR**
 - NIH
 - Swiss-hiiret
82. Individuals having identical genotypes are called
- Homogenic
 - Isogenic/ Syngenic**
 - Co-isogenic
 - Congenetic
83. Which of the following is an inbred strain of mice?
- BALB/c
 - FVB
 - C57BL

d) All the above

84. Alteration in genes by mutation and strain produced by inbreeding is called
- a) Isogenic
 - b) Co-isogenic**
 - c) Congenic
 - d) Homogenic
85. Alteration in the gene obtained by backcrossing (external alteration) is called
- a) Isogenic
 - b) Co-isogenic
 - c) Congenic**
 - d) Homogenic
86. A minimum of how many generations of backcrossing is required to produce congenic strains?
- a) 5
 - b) 8
 - c) 9
 - d) 10**
87. In the production of GM strains, the animals with both parents having the modified gene are called
- a) Homozygous
 - b) Homologous
 - c) Homotsygous**
 - d) Homogenic
88. The first transgenic animal was produced in which animal model?
- a) Mice**
 - b) Rat
 - c) Drosophila
 - d) Frog
89. Which among the following lab animals is also known as "Sea Pig," "Barbary Rabbit," or "Little Sea Pig"?
- a) Rabbit
 - b) Guinea pig**
 - c) Hamster
 - d) Gerbil
90. Which among the following is a hystricomorph rodent?
- a) Rat
 - b) Rabbit
 - c) Guinea pig**
 - d) Hamster
91. "Barbering" and "Preyer or pinna reflex" are shown by which of the following lab animals?
- a) Hamster
 - b) Rat
 - c) Rabbit
 - d) Guinea pig**
92. Meat of which animal was regarded as "underground mutton"?
- a) Rabbit**
 - b) Armadillo
 - c) Chinchilla
 - d) Squirrel
93. Suspended estrous cycles of females housed together can be restarted by exposure to male pheromones, a phenomenon known as
- a) Bruce effect
 - b) Whitten effect**
 - c) Lee boot effect
 - d) None of the above
94. The tendency for female mice to terminate their pregnancies following exposure to the scent of an unfamiliar male is called

- a) **Bruce effect**
 - b) Whitten effect
 - c) Lee boot effect
 - d) None of the above
95. Pregnancy block is another name for
- a) Lee boot effect
 - b) Whitten effect
 - c) **Bruce effect**
 - d) None of the above
96. Which of the following lab animals is not altricial?
- a) Rat
 - b) Mice
 - c) **Guinea pig**
 - d) Rabbit
97. Which among the following is the 4th “R” introduced by CPCSEA?
- a) Replacement
 - b) Reduction
 - c) Refinement
 - d) **Rehabilitation**
98. Which among the following is not an outbred stock of guinea pigs?
- a) Dunkin Hartley
 - b) Pirbright-Hartley
 - c) **Sprague-Dawley**
 - d) None of the above
99. Which among the following belongs to the order Lagomorpha?
- a) Rabbit
 - b) Hare
 - c) Pika
 - d) **All of the above**
100. Group of individuals sharing a presumed common ancestry and having a clear-cut physiological but not usually morphological distinctions are called
- a) Breed
 - b) **Strain**
 - c) Line
 - d) Variety
101. Which among the following is a variety of rats?
- a) REX
 - b) SATIN
 - c) DUMBO
 - d) **All of the above**
102. Which strain of rat is the most ideal model for obesity studies?
- a) WISTAR
 - b) **ZUCKER**
 - c) SPRAGUE-DAWLEY
 - d) LONG-EVANS
103. The term _____ is used to denote an outbred population whereas the term _____ is used to denote an inbred population.
- a) Strain, Stock
 - b) **Stock, Strain**
 - c) Strain, Variety
 - d) Variety, Stock
104. Mark the most appropriate option concerning the following statements.
Statement – I: Wistar rats are more active than Sprague-Dawley.
Statement – II: Sprague-Dawley rats have a longer tail than Wistar.
- a) Statement – I is true but Statement – II is false

- b) Statement – II is true but Statement – I is false
- c) **Both the statements are true**
- d) Both the statements are false

105. Mark the most appropriate option concerning the following statements.

Statement – I: Wistar rats were developed in Wisconsin.

Statement – II: Sprague-Dawley is an inbred strain.

- a) Statement – I is true but Statement – II is false
- b) Statement – II is true but Statement – I is false
- c) Both the statements are true
- d) **Both the statements are false**

106. Mark the most appropriate option with regard to column A & B.

	A		B
1	WISTAR	I	Wisconsin
2	SPRAGUE-DAWLEY	II	California
3	ZUCKER	III	Germany
4	LONG-EVANS	IV	Massachusetts

- a) 1(I), 2(II), 3(III), 4(IV)
- b) **1(III), 2(I), 3(IV), 4(II)**
- c) 1(III), 2(II), 3(IV), 4(IV)
- d) 1(III), 2(IV), 3(I), 4(II)

107. Which among the following is an example of hairless rats?

- a) rnu (Rowett nudes)
- b) fz (Fuzzy)
- c) shn (Shorn)
- d) **All the above**

108. Which among the following associations is true?

- a) Fuzzy – chromosome 1
- b) Shorn – chromosome 7
- c) **Both a & b**
- d) None of the above

109. Which among the following was the first model organism to be used in polio research?

- a) Mice
- b) Kangaroo rat
- c) **Cotton rat**
- d) Gerbil

110. Djungarian hamster is also called as

- a) Winter white hamster
- b) Russian dwarf hamster
- c) Siberian hamster
- d) **All of the above**

111. The strain developed when a complete chromosome of one strain is transferred on the background of the second strain with back-crosses is called

- a) Congenic strain
- b) Recombinant Inbred strain
- c) **Consomic strain**
- d) Co-isogenic strains

112. Presence of specific genes of one strain on genetical background of another strain is a feature of

- a) Isogenic strain
- b) Co-isogenic strain
- c) **Congenic strain**
- d) RI strains

113. Which among the following is also known as mutant strain?

- a) Isogenic strain
b) Co-isogenic strain
 c) Congenic strain
 d) RI strain
114. Recombinant-Congenic strains involves crossing of 2 strains followed with 3 back-crosses to one of the original strains and inbreeding with crossing brother x sister for at least _____ times.
 a) 7
b) 14
 c) 21
 d) 28
115. Which of the following is a replacement for DRAIZE test of eye irritability?
 a) Neutral red assay
 b) Ames test
 c) 3T3 NRU phototoxicity test
d) EYETEX screen test
116. Select the correct option with regard to the sequence of steps in production of knockout mice.
 (I) Selection of transformed cell
 (II) Construction of vector
 (III) Embryo-transfer in pseudo-pregnant mouse
 (IV) Transfection of vectors to ES cells
 (V) Injection of transformed cells into ICM of mouse blastocyst
 a) I->II->III->IV->V
b) II->IV->I->V->III
 c) II->III->I->V->IV
 d) II->IV->V->I->III
117. According to Farm Animal Welfare Council (FAWC), animals have the right to have freedom from
 a) Hunger & thirst
 b) Fear & distress
 c) Pain, injury, disease
d) All of the above
118. Which of the following strain of rat is also known as calm rat?
 a) WISTAR
 b) ZUCKER
c) SPRAGUE-DAWLEY
 d) LONG-EVANS
119. Which coat colour of mice is the wild type?
a) Agouti
 b) Yellow
 c) White
 d) Black
120. Increase in the inbreeding coefficient per generation in case of outbred stock is
a) <1%
 b) <2%
 c) <3%
 d) <5%
121. Which of the following is an example of isogenic animals?
 a) Monozygotic twins
 b) Clones
 c) Inbred F1 hybrids
d) All of the above
122. Which of the following is an appropriate term for the strain that possesses nuclear genome introduced into the cytoplasm of other strain by repeated backcrossing?
 a) Consomic
 b) Congenic

- c) **Conplastic**
d) Syngenic
123. The presence of 'X' in standard lab animal nomenclature signifies the naming of
a) Hybrid
b) Recombinant
c) Backcross
d) Double hybrid
124. Collaborative mouse strain has ancestry of a total of
a) 4 Recombinant Inbred strains
b) 8 Recombinant Inbred strains
c) 16 Recombinant Inbred strains
d) 32 Recombinant Inbred strains
125. In calculation of backcrossing generations for congenic strains in lab animals, F1 generation is taken to be
a) 0
b) 1
c) 2
d) 3
126. The phenomenon in which the gene order along chromosomes of different species often is conserved is called as
a) Syncosmy
b) Isocosmy
c) Synteny
d) Isoteny
127. Choose the experimental animal used for FMD research
a) Guinea pig
b) Hamster
c) Mice
d) Rat
128. Choose the experimental animal for determining GPV of a feed.
a) Rat
b) Rabbit
c) Guinea pig
d) Chick
129. The animal in which serum is particularly rich in antienzyme, poor in leucocytes and suppurative conditions is not commonly seen, is-
a) Chick
b) Hamster
c) Guinea pig
d) Rabbit
130. Which among the following is an induced ovulatory?
a) Cat
b) Rabbit
c) Mink
d) All of the above
131. Prevention of coprophagy in rabbits leads to
a) Decrease digestibility of food
b) Decrease protein utilization
c) Decrease nitrogen retention
d) All of the above
132. Whitten effect is most commonly observed in
a) Rat
b) Mice
c) Hamster
d) Rabbit

133. The space between the incisors and the cheek teeth of rabbits and rodents is known as
- Diastema**
 - Philtrum
 - Dewlap
 - Acromion
134. Choose the lab animal most suitable for typing FMD virus
- Guinea pig
 - Hamster
 - Weaned Mice**
 - Rat
135. Prolonged absence of males results in anestrus but housing the female mice together will result in synchronization of their estrous cycles known as
- Lee boot effect**
 - Bruce effect
 - Whitten effect
 - None of the above
136. Timed mating implies
- Pair mating
 - Trio mating
 - Hand mating**
 - Harem mating
137. "Breeder chow" diet of mice is known for its high content of
- Protein
 - Fat**
 - Carbohydrate
 - Minerals
138. Which of the following is not an intervention undertaken in mice breeding in case of non-productive males is?
- AI
 - IVF
 - GnRH**
 - ICSI
139. Interventions undertaken in mice breeding in case of non-productive females is
- Ovary transplant
 - IVF
 - Fostering
 - All of the above**
140. Pregnancy toxemia is common in which lab animal?
- Rat
 - Guinea Pig**
 - Hamster
 - Gerbil
141. Mark the correct option regarding the formula for floor space requirement in lab animals.
- $A = n (3W + 5\sqrt{W})$ sq. inch**
 - $A = n (0.7W + 6\sqrt{W})$ sq. inch
 - $A = n (3W + 5\sqrt{W})$ sq. cm.
 - None of the above
142. "Kausali" is a strain of
- Rat
 - Mice**
 - Hamster
 - Guinea pig
143. "Charles Foster" is a strain of
- Gerbil
 - Hamster

- c) **Rat**
d) Guinea pig
144. Which among the following is popular strain of guinea pig?
a) Peruvian
b) English
c) Abyssinian
d) **All of the above**
145. Shasidhara & Bhandari are associated with transgenic
a) Mice
b) Rat
c) **Fruit fly**
d) None of the above
146. Mark the correct option with regard to the ideal sex ratio in a harem mating system.
a) Mice – 1:2-6
b) **Rat – 1:10**
c) Guinea pig – 1:10
d) Hamster – 1:7
147. Quarantine period for lab animals is
a) **1 week**
b) 2 weeks
c) 3 weeks
d) 4 weeks
148. The acronym IAEC in relation to animal experimentation research in India stands for
a) **Institutional animal Ethics Committee**
b) Iowa Association of Electric cooperatives
c) International Atomic Energy Commission
d) International Academic Education Consortium
149. “Zona reaction” is absent in
a) Mice
b) Rat
c) **Hamster**
d) Gerbil
150. Which of the following lab animal can't vomit as crucial sling can't relax and prevent opening of oesophageal sphincter thereby missing necessary neural connection?
a) **Rat**
b) Guinea pig
c) Hamster
d) Ferret
151. Minimum quarantine period for larger laboratory animals (Cat, monkey etc) are
a. 2-3 weeks
b. **4-6 weeks**
c. 8-10 weeks
d. 10-12 weeks
152. CPCSEA stands for
a. Council for the purpose of control and studies on experiments on animals
b. **Committee for the purpose of control and supervision on experiments on animals**
c. Council for the purpose of control and supervision on experiments on animals
d. Committee for the purpose of control and studies on experiments on animals
153. The name of CPCSEA was changed to
a. CPSEA
b. CPCEA
c. CCPEA
d. **CCSEA**
154. The headquarter of Animal Welfare Board of India (AWBI) is situated in
a. **Ballabgarh, Haryana**

- b. Chennai, Tamil Nadu
 - c. Shadipur, Delhi
 - d. Pune, Maharashtra
155. Who is the current chairman of AWBI
- a. Abijith Mitra
 - b. O.P. Chaudhary**
 - c. Parshottam Rupala
 - d. Himanshu Pathak
156. Any experiment involving hazardous agents should be approved by
- a. CCSEA
 - b. Institutional Biosafety committee
 - c. IAEC
 - d. Both b and c**
157. In normal conditions the maximum time period for experimentation on a single animal
- a. 1 year
 - b. 2 years
 - c. 3 years**
 - d. 5 years
158. Important guidelines for restraining the animals:
- A. Restraint devices can be used simply as a convenience in handling or managing animals.
 - B. Period of restraint should be the minimum required to accomplish the research objectives.
 - C. Animals to be placed in restraint devices should be given training to adapt to the equipment.

Which of the above statements are true?

- a. A and B
 - b. A and C
 - c. B and C**
 - d. All are true
159. Ideal small animal rooms should occupy about ----- of the total animal facility area
- a. 40-50%
 - b. 50-60 %**
 - c. 60-70%
 - d. 70-80%
160. Which of the following statements regarding animal facilities are FALSE?
- A. Windows are generally not recommended for small animal facilities
 - B. Floors should be smooth, moisture proof, non-absorbent, skid-proof and resistant to wear
 - C. Floor drains are generally essential in all rooms used exclusively for housing rodents
 - D. To prevent high humidity, drainage must be adequate to allow slow removal of water and cooling of surfaces
- a. A and D
 - b. A, C and D
 - c. C and D**
 - d. B and C
161. Which of the following statements regarding animal facilities are TRUE?
- a. All experimental procedures in small animals should be carried out in a separate room in the place where animals are housed.
 - b. All experimental procedures in small animals should be carried out in a separate area near from the place where animals are housed.
 - c. All experimental procedures in small animals should be carried out in a same area from the place where animals are housed.
 - d. All experimental procedures in small animals should be carried out in a separate area away from the place where animals are housed.**
162. Ideal temperature and humidity for small animal housing facility
- a. 12 to 22°C and 40 to 60%
 - b. 8 to 15°C and 20 to 50%

c. **18 to 28°C and 30 to 70%**

d. 25 to 36°C and 40 to 90%

163. Animals whose specific gene (s) have been disrupted leading to loss of function can be termed as

a. **Knockout animals**

b. Transgenic animals

c. Recombinant animals

d. Gnotobiotic animals

164. According to CPCSEA guidelines, the ideal floor area recommended for laboratory animals

Animal (Weight in grams)	Floor area / Animal (cm ²)
(a) Mice (> 25)	(i) 103.2
(b) Rat (up to 300)	(ii) 96.7
(c) Hamsters (up to 100)	(iii) 187
(d) Guinea pigs (< 350)	(iv) 387

a. (a)– (i), (b) – (iii), (c) – (ii) and (d) – (iv)

b. **(a)– (ii), (b) – (iii), (c) – (i) and (d) – (iv)**

c. (a)– (ii), (b) – (iv), (c) – (i) and (d) – (iii)

d. (a)– (i), (b) – (iv), (c) – (ii) and (d) – (iii)

165. According to CPCSEA guidelines, the ideal floor area recommended for rabbits (Mother with kids)

a. 4.0 Sq.ft

b. **4.5 Sq.ft**

c. 5.0 Sq.ft

d. 5.5 Sq.ft

166. Minimum height recommended for monkeys (Upto 12-15kg)

a. 50 cm

b. 62 cm

c. **72 cm**

d. 90 cm

167. Maximum number of mice per cage during transport by road according CPCSEA guidelines

a. 15

b. **25**

c. 35

d. 40

168. Which of the following methods of euthanasia are not recommended for laboratory animals?

a. **Electrocution**

b. Exsanguination

c. Decapitation

d. All of the above

169. In which of the following animals Carbon Dioxide is not recommended for euthanasia

a. Mouse

b. Hamster

c. Rabbit

d. **Monkey**

170. The recommended physical method for euthanasia in guinea pig is

a. Electrocution

b. **Exsanguination**

c. Decapitation

d. Cervical dislocation

171. Route of administration of ketamine for euthanasia in rats

a. I/M

b. I/P

c. I/V

d. **(a)and (b)**

172. IBSC stands for
- Indian Biosafety Council
 - Indian Biosafety Committee
 - Institutional Biosafety Council
 - Institutional Biosafety Committee**
173. The length of 1 bp equals to
- 0.33 nm**
 - 3.33 nm
 - 0.03 nm
 - 33.3 nm
174. Chinese Hamster zygote contains ----- number of chromosomes
- 11
 - 22**
 - 33
 - 44

175. Match the following

Species	Chromosome number (2n)
(a) <i>Oryctolagus cuniculus</i>	(i) 46
(b) <i>Cavia porcellus</i>	(ii) 42
(c) <i>Callithrix jacchus</i>	(iii) 44
(d) <i>Rattus norvegicus</i>	(iv) 64

- (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
 - (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
 - (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)**
 - (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
176. The genome size of *Drosophila melanogaster*
- 140 Kb
 - 140 Mb**
 - 140 Gb
 - 4.1 Gb
177. Ear punching in rats is usually performed
- At the time of birth
 - Before 1 week of age
 - 1 week to 2 weeks of age
 - After 2 weeks of age**
178. In microchipping the chip is introduced into
- Intra dermal
 - Subcutaneous**
 - Intra muscular
 - None of the above
179. Which of the following methods used for identification require prior anaesthesia?
- Ear punching
 - Neonates Micro tattooing
 - Adult Micro tattooing**
 - Toe-clipping
180. In case of Toe-clipping, the bone of toe removed is
- 1st and 2nd phalanges
 - 3rd phalanx**
 - 4th phalanx
 - 3rd and 4th phalanges
181. Which of the following are non-permanent methods of identification?
- Ear-tagging

- b. Micro-tattooing
- c. Ear-punching
- d. Non-toxic fur dyes**

182. Match the following

Method	Ideal age
Ear-tagging	> 7 days
Microchipping	5-7 days
Toe-clipping (Rats)	Any age
Fur dyes	14 days or more

- a. **(a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)**
- b. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)
- c. (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)
- d. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

183. The reconstitution of IAEC must take place in every

- a. 2 years
- b. 3 years
- c. 4 years
- d. 5 years**

184. Average life span of mice

- a. 1-1.5 years
- b. 1.5-2.5 years**
- c. 2.5-3.5 years
- d. 3.5-4 years

185. Total number upper incisors present on adult rat is

- a. One**
- b. Two
- c. Three
- d. Four

186. Repeated inbreeding of 40 generations can result in ----- homozygosity

- a. 96.5 %
- b. 98.4 %
- c. 99.2 %
- d. More than 99.5%**

187. Why are the inbred syngeneic individuals preferred in experiments?

- a. Easy for identification
- b. Reduces the bias of the experiment**
- c. Less aggressive behaviour
- d. Easier for handling

188. The laboratory animals who are grown in general environment but free from diseases communicable to humans like mycobacteria, Pasteurella, Sarcoptes Scabiei etc are called

- a. Germ free animals
- b. Conventional animals**
- c. Gnotobiotic animals
- d. Specific Pathogen free animals

189. Ideal sex ratio for rabbit (Male: Female)

- a. 1:1**
- b. 1:3
- c. 1:5
- d. 1:6

190. Gestation period of Guinea Pig is

- a. 35-37

- b. 45-47
 - c. 55-57
 - d. 65-67**
191. Age of first mating in rats
- a. 45 days
 - b. 1.5-2.5 months
 - c. 2.5-3.5 months**
 - d. 4.5-5.5 months
192. Gestation period of Syrian Hamster
- a. 16**
 - b. 21
 - c. 25
 - d. 28
193. Birth weight of rabbit
- a. 5-10 grams
 - b. 20-30 grams
 - c. 50-70 grams**
 - d. 90-100 grams
194. Average litter size of mice
- a. 2-4
 - b. 4-6
 - c. 6-8
 - d. 7-12**
195. Match the following

Animal	Life span (Years)
Mice	5-6
Rat	1.5-2.5
Guinea Pig	2-3
Rabbit	3-5

- a. (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)**
 - b. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)
 - c. (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
 - d. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)
196. Number of mammary glands in Guinea pig
- a. 1**
 - b. 2
 - c. 3
 - d. 4
197. Average resting period for females in mice between 2 successive mating (days)
- a. 10
 - b. 15**
 - c. 21
 - d. 28
198. Which of following statements are false about dirty corridor?
- a. Placed in front of animal room**
 - b. To check contamination of incoming food/feed
 - c. To remove the garbage by having a washing room
 - d. To prevent direct cold drift or entry of sunlight in animal rooms
199. The housing Standards for cage of four adult mice
- a. 25 cm length x 15cm width x 22.5 cm height**
 - b. 35 cm length x 25cm width x 22.5 cm height
 - c. 35 cm length x 15cm width x 22.5 cm height
 - d. 25 cm length x 25cm width x 22.5 cm height
200. Oestrous duration in mice and rats

- a. 16-24 hours
 - b. 1-2 days
 - c. 2-4 days
 - d. 4-5 days**
201. Weaning age of mice and rabbits respectively
- a. 15 days and 4 weeks
 - b. 21 days and 7 weeks**
 - c. 30 days and 7 weeks
 - d. 45 days and 4 weeks
202. The presence of vaginal smear/ Copulatory plug is observed in
- a. Mice**
 - b. Guinea pig
 - c. Hamster
 - d. Rabbit
203. The phenomenon wherein the initiation of the initial estrous cycle in young, prepubertal female mice takes place due to their exposure to the pheromone-laden urine of a sexually mature male mouse
- a. Bruce effect
 - b. Lee boot effect
 - c. Whitten effect
 - d. Vandenberg effect**
204. Ideal weight of Chinese hamster and Syrian hamster at the time of mating
- a. 35-40 and 80-90**
 - b. 50-55 and 80-90
 - c. 70-80 and 70-80
 - d. 80-90 and 35-40
205. Hand mating is practiced in
- a. Mice
 - b. Rats
 - c. Hamster**
 - d. Guinea pig
206. Male and female hamsters are housed in separate quarters and brought together only at the time of mating because
- a. Females are usually stressed in presence of males and fail to be in oestrous
 - b. Males may attack the females and cause serious damage
 - c. Females may cause serious injuries to tail and testes of males**
 - d. Chances of random mating will be high
207. Mating in Hamsters usually takes place on which day following oestrous sign
- a. 1
 - b. 2
 - c. 3
 - d. 4**
208. Hip swaying and Mounting activity as an oestrous sign can be observed in
- a. Hamster
 - b. Guinea pig**
 - c. Rabbit
 - d. Rat
209. Furrowing is usually communal in
- a. Rabbit
 - b. Hamster
 - c. Guinea pig**
 - d. Rat
210. Harem method of breeding is also known as
- a. Monogamy
 - b. Polygamy**
 - c. Continuous mating

- d. Discontinuous mating
211. Usually in Harem method
- One male with one female is mated
 - One male with more than one female is housed in single cage**
 - One female with more than one male is housed in single cage
 - More than one male with more than one female together in a cage
212. Tail gripping for handling of the animals is recommended for
- Mice**
 - Rats
 - Hamster
 - Guinea pig
213. Protein requirement in feed of mice and rats are
- 5-10%
 - 10-15%
 - 15-20%**
 - 20-25%
214. The form of feed preferred for mice and rats are
- Pellet**
 - Mash
 - Crumbles
 - Semi-mash
215. Hair loss is a normal phenomenon in case of
- Rats
 - Mice
 - Hamsters
 - Guinea pigs**
216. Vitamin C is specially required in diet of
- Rats
 - Mice
 - Hamsters
 - Guinea pigs**
217. Which of the following statements on copulatory plug on mice are false?
- The ejaculate from the male accessory sex glands forms a short-lived, white to yellowish plug in the vagina of the female
 - Presence of a plug does guarantee the pregnancy of the mice**
 - Absence of a plug does not guarantee the mice is not pregnant
 - None of the above
218. Eyes are opened in new born mice around how many days after birth
- 2-4 days
 - 6-9 days
 - 12-14 days**
 - 18-21 days
219. Milk spots on the new born of mice are seen in
- 2- 4 days after birth**
 - 6-9 days after birth
 - 12-14 days after birth
 - 18-21 days after birth
220. Weaning index is given as
- Total number of pups weaned/ Total number of pups born per month
 - Total number of pups weaned/ Total number of alive pups born per month
 - Total number of pups weaned/ Total number of times the parents are mated per month**
 - Total number of pups weaned/ Average number of pups weaned in the month
221. Average retiring age of mice are

- a. 4-6 months
- b. 6-8 months**
- c. 8-10 months
- d. 10-12 months

222. Who is known as the father of transgenesis?

- a. Ralph Brinster**
- b. Thomas Wagner
- c. Rudolf Jaenisch
- d. Ingo Potrykus

223. Match the following for the fur dyes used

Colour	Dye used
Yellow	3-5% methyl violet
Red	Saturated Picric acid
Purple	3-5% ethylene
Malachite green	3-5% carbol fuchsin

- a. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)
- b. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)**
- c. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
- d. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

224. Long term genetic stability is very high for

- a. Inbred animals
- b. F1 hybrid animals**
- c. Outbred animals
- d. None of the above

225. The wildlife protection Act was passed in

- a. 1960
- b. 1972**
- c. 1973
- d. 1963

226. Experimentation on animals is described in which chapter of PCA, 1960

- a. Chapter I
- b. Chapter II
- c. Chapter III
- d. Chapter IV**

227. First CPCSEA was constituted in

- a. 1960
- b. 1962
- c. 1964**
- d. 1965

228. Indian School Certificate (ISc) removed dissection of animals from a part of biology practical from the year

- a. 1995
- b. 1996
- c. 1998
- d. 2000**

229. BSL 3-ag for removing agricultural hazards comes

- a. Before BSL 1
- b. In between BSL 2 and BSL 3
- c. In between BSL 3 and BSL 4**
- d. After BSL 4

230. The family which Rattus norvegicus belong to

- a. Murinae
- b. Muridae**
- c. Myomorpha

- d. Rodentia
231. House of rabbit is termed as
- Coop
 - Nest
 - Hutch**
 - Lodge
232. Computer assisted learning (CAL) software, containing various programs which simulate animal experiments in pharmacology issued by Pharmacy Council of India is
- Ex-Pharm Software**
 - Ex-Physio Software
 - Digi-Frog Software
 - None of the above

233. Match the following

Safety level	Pathogens handled
ABSL-1	Small pox, H5N1 virus, Ebola virus
ABSL-2	SARS corona virus, Coxiella burnetti
ABSL-3	Canine hepatitis
ABSL-4	Dengue fever, hepatitis A B

- (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
 - (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)
 - (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)**
 - (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
234. AAALAC stands for
- American Association for Assessment of Laboratory Animal Care
 - Accredited American Association of Laboratory Animal Care
 - Association for Assessment and Accreditation of Laboratory Animal Care**
 - Affiliates of the American Association of Laboratory Animal Care
235. AAALAC was created and incorporated as an independent nonprofit organization in
- 1955
 - 1958
 - 1962
 - 1965**
236. Institute for Laboratory Animal research (ILAR) is governed by
- USA**
 - United Kingdom
 - France
 - India
237. Which of the following laboratory animal don't have tail
- Mice
 - Rats
 - Hamsters
 - Guinea pig**
238. Mark the most appropriate option with regard to the following statements.

Statement I: Barbering is the act of either guinea pigs pulling out each other's hair or engaging in self-inflicted hair removal.

Statement II: Barbering is linked to feelings of boredom or stress resulting from overcrowded conditions.

- a. Statement – I is true but Statement – II is false
 - b. Statement – II is true but Statement – I is false
 - c. Both the statements are true**
 - d. Both the statements are false
239. Duration of Estrus cycle in *Cavia porcellus*
- a. 16-17 days**
 - b. 20-21 days
 - c. 24-26 days
 - d. 30-31 days
240. Disease which can cause hemorrhagic fever with renal syndrome in humans but are asymptomatic in rats
- a. Leptospirosis
 - b. Mycoplasmosis
 - c. Hanta virus**
 - d. Tyzzers
241. Site for intramuscular injection for birds
- a. Wings
 - b. Thigh muscles
 - c. Pectoral muscles**
 - d. Trapezius muscles
242. Mark the most appropriate option with regard to the following statements.
- Assertion (A): Killed rabies virus vaccine should be administered to nonhuman primates
- Reason (R): Vaccines with modified live viruses are capable of replicating in the body, posing a potential risk of causing illness in individuals with compromised immune systems.
- a. Both A and R are true and R is the correct explanation of A**
 - b. Both A and R are true but R is not the correct explanation of A
 - c. A is true but R is false
 - d. A is false but R is true
243. The number of lobes in left and right lungs of rats are
- a. 2,4
 - b. 1,4**
 - c. 4,2
 - d. 4,1
244. New-borns with fully developed and functional ears are of
- a. Mice
 - b. Rats
 - c. Rabbits**
 - d. Hamsters
245. Dental formula of 2(1/1, 0/0, 0/0, 3/3) are observed in
- a. Mice**
 - b. Rabbits
 - c. Guinea pigs
 - d. Ferrets
246. Which of the following animals have canines
- a. Mice
 - b. Rabbits
 - c. Guinea pigs
 - d. Ferrets**
247. Which of the following animal is excluded from protection under the Animal Welfare Act
- a. A rhesus monkey used in viral studies

- b. A gerbil used in epileptic studies
c. A laboratory bred mouse used in cancer studies
d. A wild rat used in tumour studies
248. Blood collection: It is safe to draw 1% of the body weight of a healthy mouse in every
a. 2-3 days
b. 7-10 days
c. 2-4 weeks
d. 1-1.5 month
249. Site recommended for intraperitoneal injections in rats
a. Upper right abdominal quadrant
b. Upper left abdominal quadrant
c. Lower right abdominal quadrant
d. Lower left abdominal quadrant
250. The recommended needle size for injection in mice
a. 10 gauge
b. 25 gauge
c. 50 gauge
d. 100 gauge
251. The extra set of incisors in rabbits are called as
a. Rat teeth
b. Cuspids
c. Wisdom teeth
d. Peg teeth
252. Which of the following statement is false regarding female rabbit
a. Referred to as a doe
b. Exhibit a noticeable dewlap
c. Possess 4-5 pairs of mammary glands
d. Have a bicornate uterus and a single cervix
253. In the mouse, blood cells are carried through the circulatory system in
a. Lymph
b. Serum
c. Plasma
d. Saline
254. Match the following
- | | Species | | 2n |
|---|-----------------------------|-----|-----------|
| a | <i>Mesocricetus auratus</i> | i | 68 |
| b | <i>Panthera tigris</i> | ii | 44 |
| c | <i>Cervus elaphus</i> | iii | 42 |
| d | <i>Rattus norvegicus</i> | iv | 38 |
- a. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
b. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)
c. (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)
d. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
255. Pregnant and pre-weaned young mice should be picked up by
a. Picking the base of the tail
b. Grabbing the neck along with abdomen
c. Scooping the animal with one or both hands
d. None of the above
256. Which of the drug administration must be performed under anaesthesia in mice
a. Subcutaneous injection
b. Intradermal injection
c. Intraperitoneal injection
d. Intravenous injection

257. Site for large volume blood collection in mice
- Jugular vein
 - Retro-orbital sinus
 - Intra-cardiac puncture**
 - Lateral tail vein
258. Internal organ which acts as a reservoir for anaesthetics in rabbits
- Jejunum
 - Caecum**
 - Colon
 - Rectum
259. Average life span of guinea pig is
- 1-2 years
 - 2-4 years
 - 5-7 years**
 - 7-9 years
260. Which of the following physical methods are not acceptable for euthanasia of mice?
- (i)Electrocution (ii) Exsanguination (iii) Decapitation (iv) Cervical dislocation

- (i) and (ii)**
- (i), (ii) and (iii)
- (ii), (iii) and (iv)
- (i), (ii), (iii) and (iv)

261. The composition of IAEC should be

- A Biological Scientist
- 2 Scientists from different biological disciplines
- A veterinarian involved in the care of Animals
- 2 animal welfare activists
- Scientist In -Charge of Animal house Facility

- (i), (ii), (iii)
- (i), (ii), (iii), (iv)
- (i), (ii), (iii), (v)**
- All of the above

262. Which of the following statements are true regarding selection of laboratory animals for breeding?

- Animals selected for breeding should have good parental record
- Animals which is bigger in litter be preferred
- If litter consists more males and less female, the whole litter should be rejected
- If litter consists more females and less male, the whole litter should be rejected
- Laboratory animals are mostly smaller in size are preferred
- Laboratory animals are mostly larger in size are preferred

- (i), (ii),(iii),(vi)
- (i), (ii),(iii),(v)**
- (i), (ii),(iv),(vi)
- (i), (ii),(iv),(v)

263. Gerbil are susceptible to

(i)Hyperlipidaemia (ii) Hypolipidemia (iii) Hypercholesterolemia (iv) Hypocholesterolaemia

- a. **(i) and (iii)**
- b. (i) and (iv)
- c. (ii) and (iii)
- d. (ii) and (iv)

264. Which are the purposes of using animals for experiment

(i)For the testing and development of cosmetic products

(ii)For basic medical research

(iii)For application in veterinary and human medicine

(iv)For the development of biological weapons

(v)For the detection of environmental hazards

- a. (i), (ii), (iii), (iv)
- b. (ii), (iii), (v)**
- c. (i), (iii), (iv), (v)
- d. (ii), (iii), (iv)