

Question Paper

Exam Date & Time: 16-May-2024 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

Pharmacological Screening Methods [PHA-BP810ET -S1]

Marks: 75

Duration: 180 mins.

I Multiple Choice Questions (MCQs)

Answer all the questions.

Section Duration: 30 mins

- 1) What is the primary advantage of using inhalant anaesthetics in animal studies? (1)
- [Cost-effectiveness](#)
 - [Long duration of action](#)
 - [Precise titration of anaesthesia](#)
 - [Limited adverse effects](#)
- 2) Which blood collection method is commonly used in preclinical or animal studies for obtaining large volumes of blood without repeated sampling? (1)
- [Tail vein puncture](#)
 - [Saphenous vein puncture](#)
 - [Cardiac puncture](#)
 - [Jugular vein cannulation](#)
- 3) What is the defining characteristic of a "Breed"? (1)
- [Morphological differences in form and function.](#)
 - [Presumed common ancestry having clear-cut physiological differences.](#)
 - [Similar individuals capable of exchanging genes.](#)
 - [Having common characteristics and can be divided into subordinate kinds.](#)
- 4) Which method of euthanasia is preferred for aquatic species in preclinical studies to minimize distress and ensure rapid unconsciousness? (1)
- [Decapitation](#)
 - [Immersion in anesthetic solution](#)
 - [Hypothermia](#)
 - [Electrocution](#)
- 5) In rat models used for animal experimentation, which organ/center is typically not present? (1)
- [Hypothalamus](#)
 - [Gall bladder](#)
 - [Pancreas](#)
 - [Adrenal glands](#)
- 6) The tail suspension test is primarily used to evaluate: (1)

- [Motor coordination](#)
- [Appetite regulation](#)
- [Anxiety-like behaviour](#)
- [Visual acuity](#)

7) What purpose does a vehicle control serve in experimental research? (1)

- [To validate the efficacy of the experimental treatment](#)
- [To provide a baseline for comparison with the experimental group](#)
- [To ensure consistency in administration procedures](#)
- [To induce side effects for comparison](#)

8) The triple response in guinea pigs, induced by histamine injection, is primarily observed when administered _____ . (1)

- [Intradermal](#)
- [Intramuscular](#)
- [Intravenous](#)
- [Oral](#)

9) Intraocular pressure (IOP) measurement is crucial for the diagnosis and management of _____. (1)

- [Macular degeneration](#)
- [Colour blindness](#)
- [Astigmatism](#)
- [Glaucoma](#)

10) In preclinical screening models for glaucoma, what type of interventions or stimuli are commonly employed to induce the disease phenotype? (1)

- [Administration of anti-inflammatory drugs](#)
- [Exposure to bright light](#)
- [Injection of hypertonic saline solution](#)
- [Genetic manipulation to mimic human mutations](#)

11) In preclinical screening models for spinal anaesthesia, what type of behavioural responses are commonly assessed following administration of anaesthetic agents? (1)

- [Auditory responses](#)
- [Motor coordination](#)
- [Pain sensitivity](#)
- [Visual acuity](#)

12) Which parameter is typically measured or observed in preclinical screening models to assess the effects of sympathomimetic drugs? (1)

- [Blood glucose levels](#)
- [Respiratory rate and vital capacity](#)
- [Heart rate and blood pressure](#)
- [Liver enzyme activity](#)

13) In the cat nictating membrane assay for sympatholytic drugs, what type of response is expected following drug administration? (1)

- [Constriction of the nictating membrane](#)
- [Elevation of intraocular pressure](#)

[Dilation of the pupil](#)

[Retraction of the nictating membrane](#)

- 14) What method is frequently utilized to screen compounds for their ability to modulate the cholesterol biosynthesis pathway *in vitro*? (1)

[CETP inhibition assay](#)

[PPAR \$\gamma\$ activation assay](#)

[HMG-CoA reductase activity assay](#)

[ACAT2 expression assay](#)

- 15) In preclinical screening models for anti-arrhythmic drugs, what type of arrhythmias are commonly induced to evaluate drug efficacy? (1)

[Sinus bradycardia](#)

[Atrial fibrillation](#)

[Ventricular tachycardia](#)

[First-degree atrioventricular block](#)

- 16) Which model involves the genetic modification of animals to induce hyperlipidemia? (1)

[Triton WR-1339-induced model](#)

[ApoE-deficient model](#)

[Diet-induced model](#)

[ACAT inhibitory model](#)

- 17) The Lipschitz test assesses the diuretic effect by measuring _____. (1)

[Blood pressure changes](#)

[Glomerular filtration rate](#)

[Urinary excretion of sodium](#)

[Renal blood flow](#)

- 18) Which of the following is an advantage of using large animal models, such as dogs or pigs, in preclinical screening for anti-arrhythmic drugs? (1)

[Lower cost compared to small animal models](#)

[Higher throughput for screening purposes](#)

[Closer physiological resemblance to humans](#)

[Ease of handling and maintenance](#)

- 19) Which parameter is often assessed in preclinical studies to evaluate the gastroprotective effect of anti-ulcer drugs? (1)

[Serum gastrin levels](#)

[Duodenal pH](#)

[Gastric mucus secretion](#)

[Gastric ulcer index](#)

- 20) Which of the following outcomes would be indicative of a successful inhibition of bronchoconstriction and thrombocytopenia in the guinea pig model induced by spasmogens and arachidonic acid or platelet activating factor (PAF)? (1)

[Increased serum eosinophil count](#)

[Reduced lung function parameters](#)

[Decreased platelet aggregation and improved lung function](#)

[Elevated levels of platelet-activating factor \(PAF\) in the blood](#)

II Long Answers

Answer all the questions.

- 1) Detail the floor plan and essential features required for the operation of an experimental animal research facility to be established within an institution. Include explanations of the facilities, environmental considerations, husbandry systems, and any other relevant details. (10)
- 2) Outline a chemical-induced animal model employed in drug screening for insulin-dependent diabetes mellitus stating its advantages and disadvantages. (10)

III Short Answers

Answer all the questions.

- 1) Explore methods for assessing the impact of drugs on the transient inflammatory phase using an appropriate animal model. (5)
- 2) What methods are employed to determine the initial human dose (FIH) based on preclinical study data? (5)
- 3) Illustrate an *in vivo* model employing electrical stimuli to induce pain used for evaluating the efficacy of analgesics. (5)
- 4) Detail an *in vivo* model tailored for evaluating the centrally acting skeletal muscle relaxant effects of baclofen, a GABA mimetic. (5)
- 5) Analyse the distinctions and similarities between diet-induced and endocrine hypertensive animal models in the context of their utility for screening anti-hypertensive drugs. (5)
- 6) Explain the importance of the MTT assay in evaluating the efficacy of potential chemotherapeutic agents. (5)
- 7) Discuss an *in vivo* model characterized by the presence of skin papillomas, utilized in the screening of drugs targeting skin cancer. (5)

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