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ANATOMY

ANA 314

QUESTION 1

What is comparative anatomy?

Comparative anatomy is the study of similarities and difference in the anatomy of different species. The study of comparative anatomy predates modern study of evolution. It is closely related to evolutionary biology and phylogeny (the evolution of species.)

Early evolutionary scientists like Buffon and Lamarck used comparative anatomy to determine relationship between species. Comparative anatomy is an important tool that helps determine evolutionary relationships between organism and whether or not they share common ancestors.

QUESTION 2

Highlight the criteria necessary to caring for laboratory animals

Housing: Cages, pens, or runs should provide adequate space to allow for normal physiologic needs, permit postural adjustment, and meet requirements for species-specific behavior.Primary enclosures should be constructed of durable materials, easily cleaned and sanitized, and designed for comfort and safety.

Temperature, relative humidity, ventilation rates, lighting conditions (spectrum, intensity, and photoperiod), gaseous pollutants (eg, ammonia), and noise should be carefully controlled at all times and monitored as appropriate. Unstable environmental conditions can have a profound effect on the comfort, well-being, and metabolism of animals and therefore on the quality of experimental data derived. In general, temperature should be maintained at 68°–79°F (20°–26°C) for most rodents; 61°–72°F (16°–22°C) for rabbits; 59°–64°F (15°–18°C) for ferrets; 64°–84°F (18°–29°C) for primates, dogs, and cats; and 61°–81°F (16°–27°C) for most farm animals and poultry. Within these ranges, optimal systems should maintain temperatures within ±1°F of the set point. Relative humidity should be

maintained at 30%–70% for most species and preferably within 10% of the set point. Ventilation rates should be 10–15 fresh air changes/hr. Air should not be recirculated unless it has been treated to remove particulate and gaseous contaminants. Lighting should be distributed evenly and sufficiently intense to promote animal well-being and to allow personnel to observe the animals and to perform all husbandry and sanitation duties safely and effectively

Bedding:Bedding materials should be nonirritating, absorbent, free of chemical contamination and pathogens, and unpalatable. Adequate quantities should be used to dilute and limit contact with excreta, promote air quality and other environmental factors by suppressing microbial growth, and keep animals dry and clean between changes of bedding or caging. The major types of contact bedding used are derived from ground corncobs, hardwood chips, recycled paper, heat-treated softwood shavings, and virgin cellulose. Untreated softwoods are not recommended because they contain volatile oils that may alter hepatic enzyme systems and affect certain kinds of research. Depending on research requirements, bedding may be sterilized by autoclaving or irradiation before use or used as is.

Feeding: Feed should be of adequate quantity, palatable, free of contaminants, nutritionally adequate, easily accessible, and provided using means that meet behavioral needs according to specific species requirements. Feed should be manufactured, transported, stored, and used in ways that minimize its deterioration, contamination, or infestation. Most small animals consume food in relation to their energy requirements as influenced by the environment and dictated by their genotype and are fed ad lib; rabbits, laboratory carnivores, swine, aquatic amphibians, and primates may be restricted to measured quantities of feed each day. As a general rule, laboratory animals minimally consume 4%–6% of their body weight in food daily. In addition to commercially prepared and usually pelleted natural ingredient diets of varying specification (eg, quality control and assurance of ingredients), semisynthetic or completely synthetic diets and all-liquid preparations can be formulated for use in certain kinds of research. Autoclavable or irradiated diets are available for rodents and can be used when sterilization of feed is desired.

Water: Water quality is the most important environmental variable for aquatic species and a key determinant of health Potable, uncontaminated water should be provided in adequate quantities to meet specific species requirements. Quality

assurance programs that measure pH, hardness, chemical content, and microbial load are recommended. Highly purified, deionized, acidified, chlorinated, or sterile water may be required under certain experimental or husbandry conditions. Water is usually provided ad lib in manually filled or automated watering devices. Particularly in the housing of rodents, an automated water supply enhances the advantages of ventilated caging systems and reduces operational costs/expenses, increases safety for animal care technicians, saves labor, reduces disruptions of the mice by caretakers, and provides consistently high water quality. The drawback of the use of automated drinking water supply for rodents is the risk of hypothermia, drowning, or dehydration of cage inhabitants as a consequence of failure of the in-cage water delivery valve.

Sanitation:Housing rooms and ancillary support space should be cleaned and sanitized as often as necessary to keep them free of dirt, debris, and potentially harmful contamination. For rodents in solid-bottom cages, usually 1–3 changes per week will suffice; for rodents, rabbits, and nonhuman primates in suspended cages over excreta pans and for mice in ventilated caging systems, cage changes every other week should be adequate. For larger animals, excreta and soiled bedding should be removed daily, and primary enclosures cleaned and sanitized daily, or at minimum every other week. Water bottles and other watering or feeding devices should be cleaned and sanitized at least weekly. Automated watering devices on cages, racks, or in rooms should be designed and programmed to flush continually or regularly or they should be manually drained, rinsed, and sanitized at regular, frequent intervals. All caging and other equipment should be rinsed thoroughly after treatment with detergents or disinfectants.

Vermin control:Professionally directed programs to prevent, identify, and eradicate or control insects or escaped, feral, or wild rodents must be instituted, regularly scheduled, and consistently documented. The use of pesticides should be as a last resort and generally be confined to areas not used for animals or for storage of feed or bedding. If these agents are used in proximity to animals or their food and bedding, researchers should be informed of the use. Relatively inert substances, such as silica aerogel or boric acid powder, are recommended and are useful for control of crawling insects, eg, cockroaches

QESTION 3

Highlight the similarities and difference in the digestive system anatomy of amiphibians and man

Similarities between man and amphibians (Frog)

- They both have teeth
- Presence of oesophagus
- Presence of tongue
- Presence of mouth
- Presence of small intestine

Difference:

Man digestive system	Frog digestive system
Chewing is a mechanical digestion in humans.	Frogs swallow their prey without chewing.
The tip of the tongue is straight.	The tip of the tongue is folded backwards.
Man has a longer small intestine and the three parts of the intestine are duodenum, jejunum and ileum.	Frogs have shorter intestine and the two parts of the intestine are the duodenum and ileum.
Absorption of nutrient of man occurs in the jejunum.	Absorption of nutrients of frogs occurs in the ileum.
Elimination of undigested food occurs through the rectum.	Elimination of indigestion occurs through the cloaca.