

Rat dissection essay sample



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1. Is your left like your right side?

It should be similar to your right but there can be differences like if damage was done to one side or if one side was mutated and disfigured. 2. Name an animal that doesn't have a left and right side. Snakes don't have a left and right side but there is an interesting study about that which is that Adult snakes (16 of 20 snakes) preferred to coil in the clockwise direction. Many female snakes (15 of 20 snakes), but few male snakes (only 4 of 10 snakes), also tended to coil in a clockwise pattern. This suggests that the location of internal organs such as the lungs, kidney and stomach may affect coiling direction. For example, in some snakes, the right lung is pushed aside by the stomach and the left lung is smaller than the right lung. These anatomical features may influence coiling direction so that the snake can maximize behaviors such as striking or regulating body temperature. Coiling direction may also be influenced by differences in the anatomy of the right and left sides of the snake brain. Just as humans have a right or left brain dominance for many behaviors, snakes may also have brain asymmetries to control what they do. 3. What kind of symmetry does it have?

Patterns on its skin and the way it coils.

4. Describe the rat's feet, snout, ears and eyes. How do they function according to where it lives and what it eats? The rat has evolved to match its environment its feet are used to feel around and move very fast at the same time. Snout is developed to smell food or anything bad that it should stay away from. The ears are very sensitive to hearing and can pick up movement. The rats eyes are made to see in dark environments. 5.

Familiarize yourself with the compass points and describe the meaning of

anterior, posterior, dorsal, ventral, distal, proximal, caudal, and cranial. (The left and right always refer to the specimen's left and right). Anterior & Posterior: from head end to opposite end of body or tail. Dorsal & Ventral: . from spinal column (back, dorsal) to belly (front, ventral). Distal: from where it joins the body (proximal part), to the tip of an appendage (distal part). Caudal: The polar opposite to the anterior end is the posterior end Cranial: the cranial end (Greek κρᾶνίον (kranion); skull)

6. Explain how there could be a problem if your left and right were the reference point. Because depending on the way you're standing around the rat or the way the rat is set up is different left and right. 7. What is meant by bilateral symmetry?

Capable of division into symmetrical halves by only one longitudinal plane passing through the axis 8. Explain why a starfish is not bilaterally symmetrical? Humans are bilateral symmetrical since if you cut them down the middle they are symmetrical. Starfish are not bilaterally symmetrical however they are radially symmetrical. Also remember the technical name for starfish is seastar. 9. Are you bilaterally symmetrical?

Yes since you can cut a human down the middle.

10. Explain your answer and name two internal organs that are bilaterally symmetrical. Bilateral symmetry, sometimes called reflection symmetry or mirror symmetry, means that an object or shape has two halves that are mirror images of each other. For example, the capital letter T and an isosceles triangle are bilaterally symmetrical. The biology term is to

organisms that have two symmetrical halves when divided along only one plane. 11. What is dissection?

Dissection is the process of disassembling and observing something to determine its internal structure and as an aid to discerning the functions and relationships of its components. 12. Why would a scientist do a dissection?

Scientists perform dissections in order to view the anatomy of the subject, discover the cause of death, or to learn about the course of a fatal disease or the lethal damage inflicted by an accident. Students do dissections most often to learn the anatomy of their subject; in medical school the prospective doctors dissect cadavers to enhance their understanding of the human anatomy. 13. What is the difference between surgery and dissection?

Dissection is the cutting and separating of something for medical study
surgery is

i) a branch of medicine

ii) medical procedure in which a patient's body is manipulated usually by cutting open the body 14. What are two problems that make a dissection

more complicated than just cutting? The two problems are that you have to cut the rat open without damaging the organs and you also have to be careful with bones.

Lab safety

Formalin Aceto-Alcohol Solution

WARNING! Flammable liquid and moderately toxic by ingestion, inhalation, and skin absorption. Severe body tissue irritant. Flammable liquid, keep

away from all ignition sources. Target organs: Central nervous system, eyes, liver, kidneys, heart. This material is considered hazardous by the OSHA Hazard Communication Standard Section 13: Disposal Considerations

Check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulations. Small amounts of this material may be suitable for sanitary sewer or trash disposal.

Phenol

Section 2: Hazards Identification

This material may be a liquid or a solid depending on the storage temperature, colorless to light pink solid. Characteristic odor.

DANGER! Strongly corrosive to body tissue and toxic by ingestion, skin absorption, and inhalation. Combustible liquid.

Target organs: Liver, kidneys.

This material is considered hazardous by the OSHA Hazard Communication Standard Section 13: Disposal Considerations

Check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulations. Use a licensed chemical waste disposal firm for proper disposal.

Ethylene Glycol

Section 2: Hazards Identification

Clear viscous liquid; odorless.

WARNING! Combustible liquid and moderately toxic by ingestion and inhalation. Target organs: Central nervous system, kidneys, liver.

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This material is considered hazardous by the OSHA Hazard Communication Standard Section 13: Disposal Considerations

Check with all applicable local, regional, and national laws and regulations.

Local regulations may be more stringent than regional or national regulations. Small amounts of this material may be suitable for sanitary sewer or trash disposal.

Organ| System| Location| Function| Description|

esophagus| Digestion| Throat| Carry food| Long cylindrical| diaphragm|

Respiratory| chest| Brings and expels air| large| heart| circulatory| chest|

Pump blood to your body| Large muscular| aorta| circulatory| Chest to

abdomen| Carries blood away from the heart| Long cylindrical| lungs|

Respiratory| chest| Inhales air exhales carbon dioxide| Spongy| trachea|

respiratory| chest| Breathing| Long cylindrical| bronchi| respiratory| chest|

Conducts air into lungs| Grape shaped| liver| Digestive| Abdomen| Detoxifies

| Muscular|

stomach| Digestive| Abdomen| Stores food| Muscular hollow| small intestine|

Digestive| Abdomen| Moves food| Long tube| pancreas| Digestive| Abdomen|

Produces hormones| Oval muscular| spleen| Digestive| Abdomen| Cleans out

red blood cells| Looks like a brain and is muscular| mesentery| Digestive|

Abdomen| Protects organs| Tissue| large intestine| Digestive| Abdomen|

Absorb water| Long tube | caecum| Digestive| Abdomen| Used for plant like

foods | Pouch like| | | | |

Application Questions

1. In the rat the allele for red eye colour is dominant over the allele for brown

colour. Consider a cross between a rat that is homozygous dominant for eye colour and a rat that is homozygous recessive for eye colour. A) Show the parental genetic cross between the two rats.

RR rr

Rr

b) Use a Punnett square to show the F1 (Filial generation).

| R| R|

R| Rr| Rr|

R| Rr| Rr|

c) Indicate the genotype and phenotype of the F1 generation. Rr- red eyed rat

d) With the results of the F1 generation, construct a Punnett square showing the results of a F2 (generation). | R| r|

R| RR | Rr|

R| Rr| rr|

e) Indicate the genotype and phenotype of the F2 generation. RR- red eyed rat (25% chance)

Rr- red eyed rat (50% chance)

rr- brown eyed rat (25% chance)

2. Classify the rat for all seven categories of taxonomy.

Kingdom – Animalia

Phylum – Chordata

Class – Mammalia

Order – Rodentia

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Family - Muridae

Genus - Rattus

Species - Rattus Rattus or Norvegicus

3. Research when the rats you dissected first appears in the evolutionary history as a fossil record. The rats we dissected first appeared in the fossil record approximately 54 million years ago. Rats are considered to come from Asia, and came to other countries with the help of human boats.

4. Rats are known to for spreading deadly diseases.

i) Name the common disease associated with rats.

Some of the common diseases that are associated with rats are the Bubonic plague, Leptospirosis, Rat-bite Fever, Hantavirus Pulmonary Syndrome , and Salmonellosis. ii) What role does the rat play in spreading these diseases?

The rats is involved in the spreading of these diseases because with the Bubonic plague, the fleas that are contaminated from a rat, then bite a human can cause a fatal infection which can kill humans. Rats are associated with leptospirosis, when infected urine comes in contact with the eyes, mucous membranes, or broken skin. The rat- bite fever occurs when humans come in contact with an infected rats discharge or blood. Hantavirus Pulmonary Syndrome comes from rat urine, droppings and saliva. Finally Salmonellosis is caused by eating or drinking food or water that is contaminated by rat feces.

5. The rat has an unusually long tail.

i) How does the long tail help rats in their struggle for survival? The long tail on the rats helps them with their struggle for survival because it works as a

temperature gauge. On the warm summer days the tail vessels expand allowing a lot of heat to travel through the tail and out of the body. On the other hand, when the rat is cold its tail vessels contract which restricts the blood from flowing through the tail, allowing its body heat to remain. ii) How would Jean-Baptiste Lamarck's and Charles Darwin's explanations on evolution of the tail differ from each other? Jean-Baptiste Lamarck's evolution theory about that rat's tail differs from Charles Darwin's theory because Lamarck's theory is based off of the use of the tail, whereas Darwin's theory is based on the survival for the fittest. Lamarck would assume the rat's tail grew, for an increase in greater surface area allowing heat to escape in the summer. On the other hand Darwin would say the rat's tail evolved over many generations and years, through mutations in the chromosomes. The development of the offspring and ability to survive different temperatures will allow it to live on.

iii) How might modern science support these early theories on the adaptive evolution of the rat's tail? Today's modern science proves that Lamarck's theory is wrong since, a rat's children's appearance depends on the genes of both the mother and father. If the mother and fathers tail were cut off, the children would still be born with tails. Even though the mothers and fathers tails were cut off, it does not change the genes of which the children would receive. Today's modern science would support Charles Darwin's theory because the fossil records demonstrates a connection, in body types and number of bones an animal had millions of years ago compared to now. Natural selection is a possibility on how people and creatures came into existence. For example a Tailless rat would survive in colder temperature

than a rat with a tail since it can hold heat longer; however it could over heat in the warm temperatures, and die off.