

# Animals in Research

-Student Notes

*Directions:*

Fill in the blanks.

## **Research Animals Segment**

### **1. Research**

- Is the act of making extensive \_\_\_\_\_ in order to discover or revise facts, theories or applications

Clinic Corner: Because initial research of a medicine product, etc. cannot be conducted with humans, animals with similar traits to humans are utilized

### **2. Animal Research**

- Is the use of \_\_\_\_\_ animals in experiments
- Most commonly focuses on disease treatment and prevention
- Assesses the safety and \_\_\_\_\_ of medication and cosmetics

Clinic Corner: Animal research has played an important role in the development of penicillin, blood transfusions, insulin for diabetics and many other medical advancements.

### **3. Animal Research**

- Utilizes the Three Rs, which include:
  - refinement
    - minimizing animal \_\_\_\_\_ or pain
  - reduction
    - reducing the number of animals used in experiments
  - replacement
    - replacing \_\_\_\_\_ experiments with non-animal experiments

Clinic Corner: For the last 50 years, the Three Rs have been used by scientists before conducting any experiments in order to protect the welfare of animals

### **4. Common Animals Researched**

- Include:
  - mice/rats
  - rabbits
  - cats
  - \_\_\_\_\_
  - non-human primates
  - pigs

# Animals in Research

-Student Notes

## 5. Mice/Rats

- Are the most commonly used in research due to the following:
    - small size
    - low \_\_\_\_\_
    - prolific
  - Share more than 90 percent of \_\_\_\_\_ with humans
- Clinic Corner: Mice and rats are prolific, meaning they have a short gestation period, which results in having babies quickly and very often

## 6. Mice/Rats

- Are often used in research of the following:
  - cancer
  - product testing
  - \_\_\_\_\_
  - virology

## 7. Cancer

- Is a disease caused by the division of \_\_\_\_\_ cells, which spread into tissues throughout the body
- Is researched using mice and rats in order to understand the development, prevention and \_\_\_\_\_ of the disease

## 8. Product Testing

- Is performed on mice/rats to measure the safety of household items, such as:
  - food \_\_\_\_\_
  - \_\_\_\_\_ treatments
  - cosmetics

## 9. Toxicology

- Is the science or the study of \_\_\_\_\_ substances and their effects on living organisms
- Testing is performed on mice/rats for the following reasons:
  - to study short to long term effects
  - monitor continuous and \_\_\_\_\_ exposure
  - examine if irritant to skin or eyes

# Animals in Research

-Student Notes

## 10. Virology

- Is the science or the study of \_\_\_\_\_ and the diseases in which they cause
- Is used in \_\_\_\_\_ studies to determine effects of various vaccines

Clinic Corner: Pre-clinical is defined as a study which tests a drug, procedure or other medical treatment on animals

## 11. Virology

- Studies on mice/rats have led to the development of several vaccines, which have \_\_\_\_\_ the following diseases:
  - influenza
  - polio
  - \_\_\_\_\_
  - rabies

## 12. Rabbits

- Share similar physiology to humans and often suffer from the same diseases
- Are often used in research of the following:
  - cancer \_\_\_\_\_
  - cholesterol
  - \_\_\_\_\_ disorders
  - toxicology

Clinic Corner: Half of a million (i.e. 500,00) rabbits are used annually for scientific research.

## 13. Cancer Implementation

- Is the process in which cancer cells are injected into rabbits
- Is used in \_\_\_\_\_ to study the following:
  - chemotherapy and \_\_\_\_\_
  - prevention of cancer

Clinic Corner: Chemotherapy is the treatment of disease by the use of chemical substance. Immunotherapy is the prevention or treatment of a disease with substance which stimulate the immune response.

# Animals in Research

-Student Notes

## 14. Cholesterol

- Is a waxy substance created in the liver which is then circulated through the blood
- Is used to produce \_\_\_\_\_ hormones required for normal development and functioning
- Is harmful to the body if there are excess amounts
- Levels are \_\_\_\_\_ and studied in rabbits

Clinic Corner: A medicine called Probucol was tested on rabbits and was found to lower cholesterol and slow the hardening of arteries.

## 15. Eye Disorders

- Are often studied in rabbits and include the following:
  - entropion
    - a disorder when \_\_\_\_\_ are turned inward
  - glaucoma
    - a disease which damages the \_\_\_\_\_ nerve and leads to vision loss

## 16. Toxicology

- Testing on rabbits is performed to test the following:
  - \_\_\_\_\_
  - \_\_\_\_\_ products
  - personal products

## 17. Cats

- Account for less than one percent of animals used in research each year
- Contract similar diseases as \_\_\_\_\_ and are used to study the following:
  - AIDS
  - \_\_\_\_\_
  - type II diabetes
  - breast cancer

## 18. AIDS

- Is an immune system disorder which heightens \_\_\_\_\_ to opportunistic diseases and infections
- Is studied in cats and has led to the creation of a \_\_\_\_\_ which is being researched as a model for a human AIDS vaccine

# Animals in Research

-Student Notes

## 19. Leukemia

- Is cancer of the bone \_\_\_\_\_ which inhibits the normal manufacturing of red and white blood cells as well as platelets
- Is studied in \_\_\_\_\_ to understand the disease and may eventually lead to a cure

## 20. Type II Diabetes

- Is a disorder in which the body does not produce enough insulin or cells ignore the \_\_\_\_\_
- Is studied in cats to understand proteins which \_\_\_\_\_ insulin production and may eventually lead to a cure for the disease

## 21. Breast Cancer

- Is any type of \_\_\_\_\_ growth in the breast tissue and is the greatest killer in \_\_\_\_\_
- Is studied in cats to understand the disease which may eventually lead to a cure

## 22. Cats

- Are also used to research the following:
  - nervous system
  - \_\_\_\_\_

## 23. Nervous System

- Is a network of \_\_\_\_\_ and cells in the body which carries messages to and from the brain
- Studies in cats led to the understanding of how neurons function and how humans recover from the following:
  - \_\_\_\_\_
  - traumatic injuries

## 24. Nervous System

- Studies in cats allows for the exploration of \_\_\_\_\_, which causes the following:
  - human skeletal disorders
  - mental \_\_\_\_\_

# Animals in Research

-Student Notes

## 25. Anticoagulants

- Are used to prevent the \_\_\_\_\_ of blood
- Were \_\_\_\_\_ discovered after being studied on cats

## 26. Dogs

- Represent less than one percent of animals used in research each year
- Resemble the human \_\_\_\_\_ and cardiovascular systems
- Have been used to study the following:
  - \_\_\_\_\_ procedures
  - diabetes

## 27. Surgical Procedures

- Were often studied first in dogs and include the following:
  - heart surgeries, which include:
    - \_\_\_\_\_ bypass surgery
    - artificial heart valve surgery
    - \_\_\_\_\_ installation
  - hip replacements

## 28. Surgical Procedures

- Studied in dogs also include:
  - \_\_\_\_\_ of the heart, limbs, liver and kidneys
  - angioplasty
    - the unblocking of \_\_\_\_\_ arteries

## 29. Diabetes

- Is a metabolic disease where the body is unable to produce enough insulin resulting in elevated levels of \_\_\_\_\_ in the blood
- Has been researched in dogs and resulted in the discovery of the following:
  - an insulin \_\_\_\_\_ causes diabetes
  - insulin-cells can be transplanted to the pancreas

# Animals in Research

-Student Notes

## 30. Non-Human Primates

- Share more behavioral and \_\_\_\_\_ traits with humans than that of any other animal
- Include the following:
  - gorillas
  - \_\_\_\_\_
  - macaques

## 31. Non-Human Primates

- Have been used to research and study the following diseases:
  - poliomyelitis virus
  - HIV
  - hepatitis
  - \_\_\_\_\_
  - \_\_\_\_\_ respiratory disease

## 32. The Poliomyelitis Virus

- Is also known as polio and is a \_\_\_\_\_ contagious viral infection which can lead to paralysis, breathing problems and even death
- Was studied in non-human \_\_\_\_\_ to research the production and testing of the polio vaccine

## 33. HIV

- Stands for human \_\_\_\_\_ virus and is the virus which causes AIDS
- Is related to the simian immunodeficiency virus (SIV) which effects non-human primates, whose:
  - \_\_\_\_\_ are administered to stop viral progression which are being researched to apply to humans with HIV

## 34. Hepatitis

- Is the \_\_\_\_\_ of the liver caused by various infectious agents or toxins, including alcohol
- Includes the following \_\_\_\_\_:
  - A, B and C

# Animals in Research

-Student Notes

## 35. Hepatitis A

- Is an acute infection transmitted through \_\_\_\_\_ contamination of infected animals
- Has a \_\_\_\_\_ which was created after researching and testing on non-human primate

## 36. Hepatitis B

- Is a more serious infection transmitted through \_\_\_\_\_ fluids
- Has a \_\_\_\_\_ which was created after researching and testing on non-human primates

## 37. Hepatitis C

- Is also a serious infection transmitted through bodily \_\_\_\_\_
- Does not have a vaccine, but non-human \_\_\_\_\_ are still being used for research to find one

## 38. Malaria

- Is a life threatening blood disease caused by parasites and is transmitted through \_\_\_\_\_ bites
- Vaccinations are being tested on infected non-human primates, although a \_\_\_\_\_ has not been found

## 39. Acute Respiratory Disease

- Is an infection which interrupts normal \_\_\_\_\_ and often leads to a viral infection of the respiratory system
- Affects both humans and \_\_\_\_\_ and vaccines are being tested on chimpanzees

## 40. Pigs

- Are often used for research because they are closely related to humans in the following ways:
  - skin
  - body systems
  - \_\_\_\_\_
- Have been used to research the following:
  - \_\_\_\_\_
  - CAT scan



# Animals in Research

-Student Notes

## 41. Xenograft

- Is the \_\_\_\_\_ of living tissue from one species to another
- Is often completed on human burn victims using swine tissue
- Procedures have been so successful that xenograft transplantation is now being looked at in \_\_\_\_\_, which will allow organs to be transplanted into humans

## 42. CAT Scan

- Is a special \_\_\_\_\_ test which makes cross sectional images of the body
- Was developed by using swine as \_\_\_\_\_ for humans

## ***Animal Research Laws, Policies & Regulations Segment***

### **1. Federal Agencies**

- \_\_\_\_\_ the protection, safety and well-being of research animals
- Include the following:
  - U.S. Department of Agriculture (USDA)
  - U.S. Public \_\_\_\_\_ Service

### **2. U.S. Department of Agriculture**

- Is a U.S. federal executive department whose responsibilities include governing policies of farming, agriculture, \_\_\_\_\_ and food
- Includes the following:
  - Animal and Plant Health Inspection Service (APHIS)
  - Institutional Animal Care & Use \_\_\_\_\_ (IACUC)

### **3. Animal & Plant Health Inspection Service (APHIS)**

- Is a branch of the USDA and is responsible for protecting and promoting U.S. animal health, administering \_\_\_\_\_ and registration of regulated research facilities and regulating the following:
  - Animal Welfare Act
  - The \_\_\_\_\_ Sanctuary Act

# Animals in Research

-Student Notes

## 4. Animal Welfare Act

- Was passed by the U.S. Congress in 1966
- Protects animals from \_\_\_\_\_ treatment
- Requires minimum standards of treatment and care
- Guarantees research animals the following:
  - veterinary care
  - \_\_\_\_\_ or pain relievers
  - opportunity to exercise daily
- Requires Institutional Animal Care & Use Committees at research institutions

## 5. The Institutional Animal Care & Use Committees (IACUC)

- Are required at \_\_\_\_\_ institutions by the Animal Welfare Act
- Are used to \_\_\_\_\_ and evaluate the institution's animal care and use program

## 6. The Institutional Animal Care & Use Committees (IACUC)

- Responsibilities include:
  - reviewing the facility's animal care and use program
  - inspecting the animal labs at least twice a year
  - monitoring research \_\_\_\_\_
  - responding and acting upon \_\_\_\_\_
  - reporting improper use and care

## 7. The Chimpanzee Sanctuary Act

- Guarantees lifetime care for chimpanzees used, \_\_\_\_\_ or bred for research at the following facilities:
  - Food and Drug Administration
  - National Institutes of Health
  - other U.S. \_\_\_\_\_

## 8. U.S. Public Health Service (PHS)

- Provides federal funding for animal research facilities and certifies facilities \_\_\_\_\_ to the following:
  - Public Health Service Policy on \_\_\_\_\_ Care & Use of Laboratory Animals
  - Guide for the Care and Use of Laboratory Animals

# Animals in Research

-Student Notes

## 9. Public Health Service Policy on Humane Care & Use of Laboratory Animals

- Provides guidelines and principles, which includes the following:
  - government \_\_\_\_\_
  - animal welfare assurance
  - \_\_\_\_\_ and reporting requirements
  - ethical conduct

## 10. Guide for the Care and Use of Laboratory Animals

- Provides research institutions animal care and use protocol which is scientifically and humanely \_\_\_\_\_
- Includes scientific, humane and \_\_\_\_\_ principles to follow

## *Animal Research Founders, Supporters & Activists Segment*

### 1. Animal Research

- Includes the following founders and supporters:
  - Aristotle
  - Charles \_\_\_\_\_
  - Louis Pasteur
  - Rudolph Jaenisch
  - \_\_\_\_\_ Pavlov

### 2. Aristotle

- Is known as the father of biology
- Was a Greek \_\_\_\_\_ and scientist who was among the first to experiment on animals
- Divided organisms into two groups
  - plants and animals
- Divided animals into three groups based on how they moved
  - walking, \_\_\_\_\_ or swimming

### 3. Charles Darwin

- Created the Theory of \_\_\_\_\_ in 1859
  - supported testing of animals for \_\_\_\_\_ in physiology and medicine

Clinic Corner: The Theory of Evolution is the process by which organisms change over time due to heritable physical or behavior traits and became the scientific reason for using animal experiments to learn more about humans.

# Animals in Research

-Student Notes

## 4. Louis Pasteur

- Was a French chemist and biologist who experimented on the origins of bacteria
- Proved the germ theory by using anthrax in sheep and invented the process of \_\_\_\_\_
- Explained the importance of prevention by vaccination
- Developed the \_\_\_\_\_ vaccine

## 5. Claude Bernard

- Was a French physiologist and was known as the “Prince of Vivisection”
- Studied the physiology of digestion, \_\_\_\_\_ and contributed to discovery of homeostasis
- Argued the effects of experimenting on animals is \_\_\_\_\_ to the health of humans

Clinic Corner: Vivisection is defined as performing operations on live animals for experimentation or scientific research

## 6. Ivan Pavlov

- Experimented on dogs, in the late nineteenth century, to evaluate their “\_\_\_\_\_” responses (salivation), which also led to the study of behaviorism

## 7. Rudolf Jaenisch

- Is a scientist who used mice to produce the first transgenic mammal which lead to a more advanced understanding of cancer, neurological and connective tissue diseases and \_\_\_\_\_ abnormalities

## 8. Animal Research

- Activists want an end to all animal research, \_\_\_\_\_ of the consequences
- Includes the following activists:
  - Peter \_\_\_\_\_
  - People for the Ethical Treatment of Animals (PETA)

## 9. Peter Singer

- Wrote against animal \_\_\_\_\_ with his book “Animal Liberation”
- Suggested \_\_\_\_\_ were capable of human emotions

# Animals in Research

-Student Notes

## 10. People for the Ethical Treatment of Animals (PETA)

- Was founded in 1980
- Is the \_\_\_\_\_ animal rights organization in the world
- Focuses on \_\_\_\_\_ farms, clothing trade, laboratories and the entertainment industry
- Believes animals are not meant to:
  - eat
  - wear
  - experiment on
  - use for entertainment
  - abuse
  - exploit