For (1)

Animal testing improves human health by contributing to many life-saving treatments.

"almost every 20th century medical achievement relied on the use of animals in some way during the development process" [*Royal Society of London Report*]. For example:

- Experiments in which dogs had their pancreases removed led directly to the discovery of insulin, critical to saving the lives of diabetics.
- Animal research has contributed to major advances in understanding and treating conditions such as breast cancer, brain injury, childhood leukemia, cystic fibrosis, malaria, multiple sclerosis, tuberculosis, and many others.
- Animal research was important in the development of heart pacemakers, artificial heart valves, and anesthetics.

For (2)

There is no adequate alternative to testing on a living, whole animals, because human beings and animals are extremely complex.

Alternatives to using live animals don't work as well, for example:

- Studying cell cultures in a petri dish, while sometimes useful, does not provide the opportunity to study interrelated processes occurring in other body systems.
- Examining a drug for side effects requires a circulatory system to carry the medicine to different organs.
- Complex conditions such as blindness and high blood pressure cannot be studied in tissue cultures.
- Computer models can only be reliable if accurate information from animal research is used to build the models in the first place. Even the most powerful supercomputers are unable to accurately represent the workings of complex organs such as the brain.

For (3)

Animals are appropriate research subjects because they are similar to human beings in many ways:

- Chimpanzees share 99% of their genetic makeup with humans, and mice are 98% genetically similar to humans.
- All mammals, including humans, have the same set of organs (heart, kidneys, lungs, etc.) that work in essentially the same way, with the help of a bloodstream and central nervous system. Using mammals in experiments will therefore produce similar results in humans.
- Because animals and humans are so biologically similar, they can get many of the same conditions and illnesses, including heart disease, cancer, and diabetes.

For (4)

Animal testing has been essential in developing many different drug treatments

- The causes of, and vaccines for dozens of infectious diseases, including diphtheria, tetanus, rabies, whooping cough, tuberculosis, measles, mumps and rubella, have been developed using animal experimentation
- The polio vaccine reduced the global occurrence of the disease from 350,000 cases in 1988 to 27 cases in 2016.
- Hepatitis vaccines: "we wouldn't have a vaccine for hepatitis B without chimpanzees, and the use of chimps is our best hope for finding a vaccine for Hepatitis C " [*Chris Abee, Director of the Anderson Cancer Center, University of Texas*]
- Thalidomide was not tested on animals until after it caused problems in humans; if it had been properly tested on pregnant animals, its potential for causing severe birth defects would have been discovered before the drug became legal for human use.

For (5)

Medical research using animals is conducted using well tried scientific methods to produce evidence

- About 70% of the Nobel prizes for physiology or medicine have involved animal research. Many award-winning scientists said that they could not have made their discoveries without animals.
- A 2011 poll of nearly 1,000 biomedical scientists conducted by the science journal *Nature* found that more than 90% "agreed that the use of animals in research is essential."
- The scientific method is used: researchers use animals in their experiments to learn more about a particular disease, and then make predictions which are tested to find a treatment, which proves or disprove their theories.
- The written results of animal research are checked by other scientists before they are published in journals that are publically available

Against (2)

Medical breakthroughs involving animal research may still have been made without the use of animals.

- There is no evidence that animal experiments were essential in making major medical advances, and if enough money and resources were devoted to animal-free alternatives, other solutions would be found.
- Many discoveries made by non-animal methods were later verified by animal experiments, giving false credit to animal use. For example the function of ovaries was demonstrated in 1895 in surgical procedures on women, yet history credits the discovery to an experiment done in rabbits in 1896.
- The 'discovery' of insulin is widely credited to experiments on dogs in 1922. However, the discovery of insulin dates back to 1788 when an English physician, Thomas Cawley, performed an autopsy on a diabetic person. [*Humane Research Australia*]

Against (5)

Alternative testing methods now exist that can replace the need for animals.

- Studying cell cultures in a petri dish, can produce more relevant results than animal testing because human cells can be used.
- Micro-dosing can be used in human volunteers, whose blood is then analyzed.
- Artificial human skin is made from sheets of human skin cells grown in test tubes and can produce more useful results than testing chemicals on animal skin.
- Microfluidic chips lined with human cells recreate the functions of human organs, are in advanced stages of development.
- Computer models can predict the toxicity of substances without experiments on animals.

Against (4)

Animals are very different from human beings and therefore make poor test subjects.

- The large differences in the anatomy, chemistry and cell structure between animals and humans make animals poor models for human beings.
- "It's very hard to use an animal that equates closely to what we're trying to achieve in the human." [*Paul Furlong, Professor of Clinical Neuroimaging at Aston University*]

Against (1)

Drugs that pass animal tests may not work in humans and are not necessarily safe.

- Thalidomide was tested on animals prior to its release, but it caused 10,000 babies to be born with severe deformities. Later tests on pregnant mice, rats, guinea pigs, cats, and hamsters did not result in birth defects unless the drug was administered at extremely high doses.
- Animal tests on the arthritis drug Vioxx showed that it had a protective effect on the hearts of mice, yet the drug went on to cause more than 27,000 heart attacks and sudden cardiac deaths in humans before being removed from human use.
- 94% of drugs that pass animal tests fail in human clinical trials.
- Over 100 stroke drugs that were effective when tested on animals have failed in humans
- Over 85 HIV vaccines failed in humans after working well in monkeys.

Against (3)

Most experiments involving animals are flawed, wasting the lives of the animal subjects.

- One study found serious flaws in the majority of animal studies using rodents and primates in the US and UK. Over 80% of the animal studies failed to reduce bias by the researchers.
- A study in 2017 found other flaws in animal research including:
  - incorrect interpretation of the results
  - unforeseen technical issues
  - selective reporting of the data
  - blatant fraud in some cases