

TIME PERIOD I

TIME PERIOD I <i>Third and second centuries B.C.E.</i>
<p>At the medical school in Alexandria, Egypt, humans and animals were vivisected. Vivisection is surgery conducted for experimental purposes on a living organism to view living internal structures.</p> <p>Historians believe that more than 600 criminals were subjected to vivisection while they were alive. Human dissection and vivisection were generally forbidden throughout the rest of Egypt and in the Roman Empire due to moral concerns.</p>
<p>Views of Animals • Contributions to Health Mistreatment • Laws & Regulations • Protest</p>

TIME PERIOD I <i>150 – 200</i>
<p>The Greek physician Galen frequently practiced vivisection on animals. Vivisection is surgery conducted for experimental purposes on a living organism to view living internal structures. In particular, Galen vivisected goats, pigs, monkeys, oxen, and dogs.</p> <p>Galen made some important anatomical discoveries about the internal structures of animals, such as the importance of the brain and the presence of blood inside arteries. Galen's writings and teachings formed the basis of Western medical science well into the Middle Ages.</p>
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TIME PERIOD I <i>1500s</i>
<p>Belgian doctor Andreas Vesalius studied blood circulation by performing autopsies (dissections on non-living organisms) on human corpses. He also practiced vivisection on animals without using any sort of anesthesia. Vivisection is surgery conducted for experimental purposes on a living organism to view living internal structures. Vesalius wrote about the importance of autopsies and vivisection in the study of anatomy (internal structures and systems).</p> <p>British physician and anatomist William Harvey performed animal vivisection and dissected the corpses of executed criminals. He discovered the true role of the heart in pumping blood throughout the body.</p>
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* TIME PERIOD I <i>1596 – 1650</i>
<p>French philosopher René Descartes and his followers believed that animals were unthinking, unfeeling machines. This allowed researchers to perform all manner of experiments on live animals without any moral concerns.</p>
<p>Views of Animals • Contributions to Health Mistreatment • Laws & Regulations • Protest</p>

* TIME PERIOD I

1764

French **philosopher** François-Marie Arouet de Voltaire noted that vivisection uncovered organs of feeling in animals, proving that animals were not machines, but feeling beings. Vivisection is surgery conducted for experimental purposes on a living organism to view living internal structures.

Later in the century, British **philosopher** Jeremy Bentham summarized his thoughts on the subject: "The question is not, can they reason? Nor, can they talk? but, can they suffer?"

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1866

The **American Society for the Prevention of Cruelty to Animals (ASPCA)** was the **first humane society** to be established in North America. Humane treatment means treating animals with respect and care.

A law to prevent the beating of horses came about through early action from ASPCA. Later, this law was used to prosecute a parent who was beating her child, as there were no laws at the time preventing the abuse of children. Nine years later the **American Society for the Prevention of Cruelty to Children** was founded.

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TIME PERIOD I

1871

Harvard University founded one of the first vivisection laboratories in the country, despite opposition from the **Massachusetts Society for the Prevention of Cruelty to Animals (MSPCA)**. Vivisection is surgery conducted for experimental purposes on a living organism to view living internal structures.

Various **anti-vivisection groups were founded**, including the **American Anti-Vivisection Society (AAVS)** and the **New England Anti-Vivisection Society (NEAVS)**. The new anti-vivisection groups tried, unsuccessfully, to outlaw the practice of vivisection.

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1881

French scientist Louis Pasteur proved the controversial theory that diseases were caused by microscopic organisms ("germs"). Using yeast, silkworms, and sheep, Pasteur found that microbes could travel through the air and that the **spread of disease could be controlled by sterilization**, which includes the use of heat, chemicals, pressure, irradiation, or filtration to remove or kill microbes. This discovery had wide application to surgical techniques and medicine.

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TIME PERIOD I

1890s

Legislation was passed in the United States that **outlawed** repetition of painful animal experiments for the purpose of teaching or demonstrating well-known and accepted facts.

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1903

Writer Mark Twain (1835–1910) published a short story called “A Dog’s Tale” in Harper’s Magazine. The story was written to **protest cruelty to animals** and their use in research. It is told from the viewpoint of a dog that lives with the family of a scientist. The dog saves the family’s baby from a nursery fire but later sees her own puppy blinded and killed during an experiment performed by the scientist to impress his friends. Critics condemned the work as overly sentimental, but animal welfarists were pleased that it brought public attention to the issue of animal experimentation.

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TIME PERIOD I

1906

Controlling **malaria** was vital to the building of the Panama Canal. Malaria is an infectious disease caused by a parasite that is transmitted through the bite of an infected mosquito. Of the 26,000 people working on this strategic project, over 21,000 were hospitalized for malaria some time during their work.

Biologist Ronald Ross tested the theory that malaria might be caused by mosquito bites by studying the avian (bird) form of malaria in the crow. Work with crows, sparrows, pigeons, weaver birds, and larks led Ross to believe that the parasite accumulated in the salivary gland of the mosquito. This led to a mosquito control program which greatly reduced the incidence of malaria in Panama and elsewhere. Ross was awarded the Nobel Prize in medicine for his discoveries.

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1906

The U.S. Congress passed the **Pure Food and Drug Act (PFDA)** which made it against the law to use false or misleading claims about a food or drug. As it applied to “man and other animals,” it also covered animal feed and veterinary drugs. The act did not, however, require any type of testing to ensure that a product was safe or effective.

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TIME PERIOD I

1907

The **American Medical Association** started to advocate for the benefits of research with animals and developed **regulations for the humane treatment** of animals used in medical schools. Humane treatment means treating animals with respect and care.

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TIME PERIOD I

1913

Once known as the “strangling angel of children,” **diphtheria** is a highly contagious childhood illness caused by a bacteria. The dreaded disease would begin with cold-like symptoms and lead to death in as little as a week. Death rates for diphtheria were high, and the need for a vaccine was clear.

German scientist Emil von Behring found that low doses of modified toxin (a damaging substance naturally produced by diphtheria bacteria) injected into rats, mice, or rabbits appeared to protect them from the illness. After more than 15 years of research, von Behring produced long-lasting immunity in guinea pigs, monkeys, and donkeys. This research was used in the first vaccination studies on humans.

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* TIME PERIOD I

1920s and 1930s

A cosmetics company introduced a brand of eyelash and eyebrow dye called Lash-Lure. The dye contained chemicals (aniline compounds) that were well-known to be **harmful to the eyes**. Doctors reported thousands of eye injuries and even deaths after patients suffered serious infections. Other popular cosmetic products of the time contained **high concentrations of toxic (damaging or poisonous) chemicals** such as silver, lead acetate, or rat poison. Doctors lobbied the U.S. Congress to crack down on dangerous drugs and personal products sold to Americans, but they were opposed by powerful marketing groups. Injuries also prompted calls for products to be tested on animals before being put on the market for human use.

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* TIME PERIOD I

1922

For 150 years, doctors had been researching ways to treat **diabetes**, a disease in which a person has high blood sugar levels. Juvenile diabetics would usually fall into a coma and die a year or two after symptoms of the disease first appeared. Through studies with dogs, it was known that the pancreas produced an important substance (“insulin”) that regulated blood sugar.

Canadian doctor Frederick Banting extracted insulin from beef pancreases and used it to successfully treat a 14-year old boy dying of diabetes, who at the time weighed only 65 pounds. Families with diabetic children rushed to Toronto for treatment. The Toronto Star called the extract “one of the greatest achievements in modern medicine.” Banting and colleagues won the Nobel Prize for their work.

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TIME PERIOD II

TIME PERIOD II 1937-1938

Nearly 100 people (mostly children) died after drinking a raspberry-flavored product used to treat sore throats called Elixir of Sulfanilamide. The medicine contained drugs dissolved in the same toxic (poisonous) chemical found in antifreeze. It had been tested for flavor, appearance, and fragrance, but not for toxicity—the degree to which it was poisonous or damaging to health. At the time, there were no requirements for safety testing. The product had also not been tested on animals. The public was outraged and pressured the U.S. Congress to strengthen the original **Food and Drug Act** and include cosmetics. The federal **Food, Drug, and Cosmetic Act (FDCA)** was passed, containing a **requirement for animal testing** for drugs.

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* TIME PERIOD II 1947

During World War II, German Nazi doctors performed gruesome **experiments on prisoners** who were Jewish, homosexual, mentally disabled, physically disabled, or children. These prisoners were forced into being test subjects. Several tens of thousands of people died in these experiments, and many of those who survived were disfigured.

In response, the “Nuremberg Code” was developed to describe ethical conduct in human research. The Code was widely adopted in scientific research communities. One of the ten points of the code stated a **requirement for animal research** before human research to minimize the harm to humans.

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TIME PERIOD II 1950s

During the 1950s, many children were not allowed to go to swimming pools, movie theaters, amusement parks, beaches, and other public places as **fear of the polio virus** grew. This crippling disease involved the spinal cord and brain. Some people who were affected with it could not breathe without a ventilator or “iron lung.”

Scientists grew and extracted the virus from cell and tissue cultures. Because the virus was too small to be seen with available technology, the fluid extracted from the cultures was injected into mice and monkeys in order to check that scientists were actually working with the polio virus. These techniques allowed viruses to be isolated and, eventually, a vaccine to be developed.

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TIME PERIOD II 1959

Members of the research community published *The Principles of Humane Experimental Technique*. One of its core messages, the **3 Rs** (Replacement, Reduction, and Refinement), became widely accepted by scientific communities. In many countries, the 3 Rs are the principles currently guiding the use of animals in research.

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TIME PERIOD II

1960s

Francis Oldham Kelsey was a new employee at the **Food and Drug Administration** in 1960 when she was asked to evaluate a drug, **Thalidomide**. At the time, Thalidomide was already in widespread use in Canada and Europe to treat nausea in pregnant women. Her previous work with drug metabolism in pregnant rabbits made her cautious, so she held back Thalidomide's approval for use in the U.S.

The use of this drug elsewhere resulted in more than 10,000 deformed babies, many born without arms or legs. Although the drug had been extensively tested on animals, it had not been tested on pregnant animals. **As a result, new guidelines** for testing the effects of drugs on animal reproduction and fetal development were incorporated.

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* TIME PERIOD II

1961

After World War II, the Federal government began supporting biomedical research in ways it never had before, **increasing the budget** of the National Institutes of Health (NIH) 150-fold between 1945 and 1961. Additional research money created a demand for more research animals.

Dogs, which had played a large part in animal research in the past, were especially sought after. People's fears of dog-napping are reflected in the 1961 Disney movie **101 Dalmatians**, which tells the story of pet dogs stolen by a cruel villain.

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TIME PERIOD II

1962

The federal **Food, Drug, and Cosmetic Act (FDC Act)** was amended to require that all drugs not only be safe but **effective**. This amendment did not distinguish between medicines for humans and animals. Regulations for animal drugs, medicated feed, and veterinary food additives were strengthened.

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TIME PERIOD II

1963

A group of veterinarians formed the **Animal Care Panel** and soon published the first edition of **The Guide for the Care and Use of Laboratory Animals**. Currently, the Guide informs scientists on the proper housing of various animals, good practices of veterinary care, training requirements of caretakers, and more.

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*** TIME PERIOD II**
1965

Pepper, a Dalmatian dog, disappeared from her family's backyard in Pennsylvania. The family tracked the dog to an animal dealer who had sold her to a hospital in New York City that conducted a pace-maker experiment on her heart, which she did not survive. Pepper's story was widely publicized and an **outraged public** demanded more accountability in animal research, especially research using dogs.

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TIME PERIOD II
1965

A group of scientists and veterinarians form the **Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC)**, a nonprofit organization working to increase the standards of care in research institutions. If institutions demonstrated a willingness to go above and beyond the minimums required by law, they received an accreditation or "seal of approval" from AAALAC. Accreditation assured the public that the institution was committed to the **responsible use and treatment of animals** in science.

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*** TIME PERIOD II**
1966

Life magazine ran an article called "Concentration Camps for Dogs," describing a police raid on a dog dealer's facility. With increased public pressure after the article's publication, the U.S. Congress passed what would become the **Animal Welfare Act (AWA)**. It called for humane care and treatment of animals in research facilities and regulated the "transportation, purchase, sale, housing, care, handling, and treatment" of such animals by the USDA. Animal dealers and laboratories had to be **licensed and inspected**. The act applied to dogs, cats, primates, guinea pigs, hamsters, rabbits, and several other warm-blooded animals, though it did not include rats, mice, and birds.

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*** TIME PERIOD II**
1966 on

The demand for dogs and cats as research subjects begins to decline due to public opinion, research trends, institutional policies, and the increased use of other animal models, such as mice. The number of dogs and cats used in research will continue to fall significantly in the next 30 years.

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*** TIME PERIOD II**
1973

Leukemia is a cancer of the blood or bone marrow. At this time, nine out of ten children with the most common form of leukemia (acute lymphocytic leukemia) died from the disease.

Scientists working with a leukemia mouse model named Skipper discovered the importance of killing every single malignant (cancerous) cell in a patient's body, as just one cell can divide and eventually kill the patient. This and other discoveries were crucial to advancements in cancer chemotherapy, a combination of drugs that kills cells that divide rapidly, including cancer cells.

Today, about three out of ten children die from this form of leukemia.

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TIME PERIOD II
1975

Australian **philosopher** Peter Singer's book *Animal Liberation* brought more coverage to the use of animals in scientific research. The book included disturbing photographs and descriptions of animals being subjected to all sorts of painful procedures for questionable purposes. Singer argued that the pain and suffering inflicted on the animals was **too high a moral price** to pay for scientific research.

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TIME PERIOD II
1977

Smallpox is an infectious disease caused by a virus. It causes rashes, fluid-filled bumps on the skin, blindness, and death. Smallpox had been a scourge since ancient times and large-scale epidemics are thought to have affected the course of history. The most virulent (strongest) strain would kill 20-60% of those infected; of those who survived, most were left with disfiguring scars and one-third of survivors were blinded.

A vaccine was developed through over 250 years of research that, at various times, used cows, prisoners, children, and orphans as test subjects. The last case of naturally-acquired smallpox is treated in Somalia. After a ten-year vaccination campaign by the **World Health Organization**, the disease is considered **eradicated from the planet**.

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TIME PERIOD II
1977

Animal Liberation Front (ALF) is founded. ALF is an animal rights group that believed in militant and **extreme means** to end the use of animals on all fronts. ALF members were involved in various acts, including slashing tires and breaking windows of hunters' cars, setting fire to animal research facilities, raiding chicken breeders and gun shops, releasing or taking animals from fur farms, and verbally harassing employees of such institutions. Spin-off groups of the ALF also sent letter bombs to various companies and placed firebombs under the cars of researchers.

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TIME PERIOD III

* TIME PERIOD III 1977

Animal activists brought awareness to the **testing of cosmetics** on animals, particularly the Draize test, in which chemicals were put into the eyes of rabbits. In full-page advertisements in major newspapers, major cosmetics companies were accused of being **cruel to animals**. Public response was immediate. Several companies, including Revlon and Avon, announced their intention to cease animal testing.

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TIME PERIOD III 1977

Lesley and John Brown, a young English couple, had been unable to conceive a child for nine years. Lesley Brown had blocked fallopian tubes. Having gone from doctor to doctor for help to no avail, she was referred to Dr. Patrick Steptoe. In 1977, Lesley Brown underwent the very experimental *in vitro* (“in glass”) fertilization procedure in which an egg was extracted from one of her ovaries and fertilized outside her body with John’s sperm. The two-day-old embryo was placed back into Lesley’s uterus and the pregnancy resulted in the first successful **“test tube baby.”** This work was made possible by decades of research with mice, rabbits, and hamsters. Dr. Steptoe’s colleague won the Nobel Prize.

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* TIME PERIOD III 1979

Each research institution that uses animals and receives federal money is required to have an **Institutional Animal Care and Use Committee (IACUC)** to oversee the use of all vertebrates—animals with backbones (including rats, mice, fish and birds). The IACUC has to include five members with expertise to regulate animal welfare at that institution—at least one scientist familiar with animal research, at least one veterinarian, and at least one community member not associated with the institution or animal research. Though not required of private companies not funded by the federal government, many private facilities adopt these practices and seek AAALAC accreditation.

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* TIME PERIOD III 1980

The first transgenic mouse is created. A transgenic organism is a living organism in which genes, or gene regulatory regions, have been added, removed, or modified. The change in DNA will cause the organism to exhibit a new property (immune system change, genetic disorder, etc.) which can be passed to its offspring.

Scientists create mice with human genes. To more effectively study human diseases and cures, these **transgenic** mice become the research subject of choice. Currently, **more than 90%** of animals used in research are mice.

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TIME PERIOD III

1981

The national **Cosmetics, Toiletries, and Fragrance Association** funded the founding of the **Center for Alternatives to Animal Testing (CAAT)** at Johns Hopkins University. CAAT promotes humane science by supporting the development and use of alternatives to animals in research, product safety testing, and education. They work with scientists to find new ways to **replace** animals with non-animal methods, **reduce** the numbers of animals used in research, or **refine** methods to make them less painful or stressful to the animals involved

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TIME PERIOD III

1981

A little-known organization called **People for the Ethical Treatment of Animals (PETA)** gained national prominence with an exposé on research that involved depriving monkeys of sensory input into their spinal cords to give them numbed arms. The monkeys gnawed and licked their arms, producing wounds. A co-founder of PETA worked as a laboratory assistant, photographed the monkeys, then reported the lab to authorities. A subsequent raid led to the filing of **animal cruelty charges**, loss of funding, and the end of the research. The incident came to be known as the **Silver Springs Monkey Case**.

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* TIME PERIOD III

1985

Congress amended the Animal Welfare Act to require that researchers **minimize animal pain and distress** whenever possible through use of anesthesia (numbing drugs), analgesics (painkilling drugs), and humane euthanasia (drugs that cause death). New requirements were added regarding the physical and psychological well-being of dogs and primates used in research work. The act also addressed employee training and searching for ways to reduce or replace animal use.

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* TIME PERIOD III

1986

Research on rats, mice, dogs and primates led to the development of **Azido-thymidine (AZT)**. AZT became the first approved drug **treatment for HIV and AIDS**, which affected about 10,000 people worldwide at this time. Originally developed in the 1960s as an anti-cancer agent but never licensed, AZT slowed the progress of HIV in humans. Six months into a human clinical trial, only one member of the group receiving AZT died, compared to 19 deaths in the placebo group (the people enrolled in the study for comparison purposes who did not receive AZT). Since the results were positive, the trial was stopped early so that AZT could be given to the placebo group, giving them a better chance of survival.

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TIME PERIOD III

1990

All charges against the researcher involved in the **Silver Springs Monkey Case** (inhumane treatment of monkeys in a research lab) were overturned by 1983. The researcher contended his work was scientifically valid and the monkeys were neglected while he was on vacation and the care of the animals fell to the lab assistant who took the exposé photos. After almost a decade of custody battles in the courts for the monkeys, the monkeys that had not been disabled were given to a zoo. The research monkeys were euthanized and autopsied. Analysis showed a remarkable degree of brain restructuring (“neuroplasticity”) that was previously thought to be unlikely. The knowledge gained from this research is now used widely with stroke patients.

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1992

In response to **destruction and damage** caused by animal activists, the **Animal Enterprise Protection Act** was enacted against “animal enterprise terrorism.” The law prohibits “causing physical disruption to the functioning of an animal enterprise.” Animal enterprises included food and fiber production, research, testing, zoos, aquaria, circuses, rodeos, fairs, and others.

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* TIME PERIOD III

1995

Scientists search for a vertebrate (having a backbone) **animal that could function as a model organism** because it is easier to study rather than humans and higher organisms, making it a **more ethical research subject**. A model organism tends to be small, able to reproduce rapidly with many offspring, inexpensive to house and maintain, able to be manipulated genetically on the molecular level, and well-studied by other scientists.

Many scientists advocate for the use of zebrafish as a model organism. Zebrafish are commonly found in pet shops and home aquaria. They are small, hardy, breed readily, lay many eggs, and have genes more closely related to humans than fruit flies or worms. Their eggs are fertilized externally and embryos develop quickly, are transparent, and can be genetically manipulated. Zebrafish were therefore particularly attractive for studying developmental biology and modeling human disease. Currently, there are at least **600 laboratories** around the world that use zebrafish, and several researchers use only zebrafish in their research.

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* TIME PERIOD III

1999

A new animal rights group calling itself **Stop Huntingdon Animal Cruelty (SHAC)** began using radical and violent means against Huntingdon Life Sciences (HLS), one of the largest companies employing animal research in England and later the U.S. HLS employees were **harassed** and sometimes **assaulted**. Cars were **firebombed** and homes **vandalized**. Actions included splattering homes with paint, filling locks with glue, breaking windows, and setting off smoke bombs in offices. SHAC also picketed companies with ties to HLS (banks, brokerage houses, and investment companies) and flooded them with threatening letters, faxes, and e-mails.

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2002

The Coulston Foundation (TCF) facilities housed hundreds of primates. These facilities were closed after **violations of the Animal Welfare Act (AWA)** were brought to light by an animal welfare group called **In Defense of Animals**. TCF was also cited by the USDA numerous times for housing and care violations and lack of qualified veterinarians. TCF was also in trouble with the Food and Drug Administration (FDA) regarding its animal testing procedures. **Save the Chimps**, an organization that had formed a small, well-respected chimp sanctuary in southern Florida, raised millions of dollars to buy out TCF.

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2009

The European Union (EU) **bans the use of animals to test cosmetic ingredients**. They also implement a “marketing ban” that prohibits the sale of products from outside the EU that contain ingredients tested on animals. The marketing ban will be implemented slowly, with some animal tests allowed until 2013. The European Union is uncertain whether the 2013 deadline can be met because replacement tests have not yet been fully developed. The ban also contradicts laws requiring safety testing of certain chemicals.

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TIME PERIOD III

Current

The vast majority of the scientific community agrees that **healthy and well-maintained** animals are beneficial to and necessary for quality research. Most institutions voluntarily comply with regulations that are above and beyond what is mandated by law.

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Current to Future

As technology and information improve, so do models used to carry out simulated experiments **in place of experiments on animals**. Currently, computers model the structure and actions of new drugs and predict their safety. A model of the human placenta and fetus helps treat problems affecting unborn babies. A 3-dimensional human skin model has been internationally approved for assessing skin irritation from new drugs and products. Hopes for the **future** include computer models of **whole biological systems** with which “virtual” experiments can be conducted as alternatives to experiments on animals.

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