

# History of Animal Research

US275 Scientific Ethics  
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## Erisistratus described the organs of humans and animals

- Greek physician ~300 B.C.
  - father of physiology
- Compared human and other mammal brains
  - human brain more folds
  - represented greater complexity



*Erasistratus discovers the cause of the illness of Antiochus.*  
Jacques-Louis David, 1774

## Galen was one of the first to do experiments on animals.

- Greek Physician
  - (129 - 216 A.D.)
- father of vivisection
  - *vivus* - alive
  - *sectio* - cutting
  - first experiments involving surgery on living animals



CLAUDE GALIEN.  
*Claudius Galen*  
Pierre Roche Vignerou, 1865

## With prohibition against human dissection, animals were used as a model for anatomy and physiology.

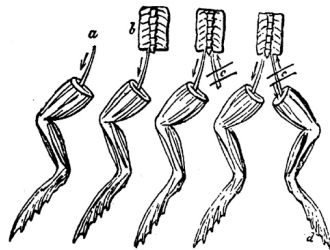
- Robert Hooke
  - Function of the lungs, 1667
- Stephen Hale
  - Measurement of blood pressure in horse, 1726
- Louis Pasteur
  - Germ theory – vaccine against anthrax protects sheep, 1881



A physiological demonstration with vivisection of a dog.  
Emile-Edouard Mouchy, 1832

## Physician Marshall Hall supported animal research, but recognized the Victorian Society's concern for animal suffering.

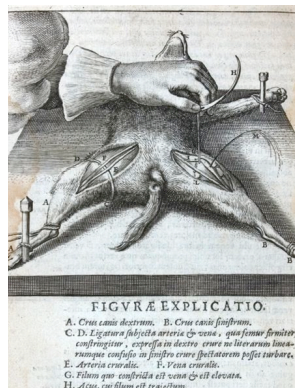
- Proposed principles to stimulate debate
  - The lack of an alternative;
  - A clear objective;
  - The avoidance of repetition of work;
  - The need to minimize suffering; and
  - Full and detailed publication of the results.



Marshall Hall's Experiments (1850)

## In 1874, the Royal Society for the Prevention of Cruelty to Animals brought charges after a demonstration.

- Eugene Magnan
  - French Doctor
- Annual meeting of British Medical Association 1874
- Lecture on physiological effects of alcohol on dogs
  - Intravenous injection of absinthe
  - Induced experimental epilepsy



## In 1876, the British legislature passed the Cruelty to Animals Act

- Supported by Queen Victoria
- Required review and authorization of animal experiments
  - Issued license to conduct animal research



Queen Victoria  
Franz Xaver Winterhalter, 1859

## 1876 British Cruelty to Animals Act established 5 points to determine if an experiment should take place

- Is the experiment necessary
- Does it have the possibility of achieving the desired result
- Can the protocol be modified to reduce discomfort
- Has the experiment been done before
- Will the protocol produce valid results?



William Blackstone, British Jurist  
Commentaries on the Law of England, 1809

## In 1958, British Scientists Russell and Burch published *Principles of Humane Experimental Technique*.

- Universities Federation for Animal Welfare recognized the need for
  - the advance animal welfare in research
  - and supported studies on humane techniques



William Russell and Rex Burch

# Burch and Russell established the 3 R's of

- REPLACEMENT

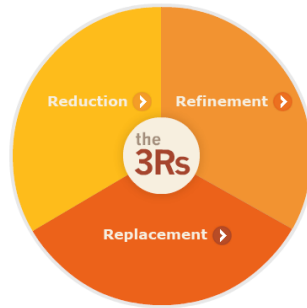
- of animal use with other techniques.

- REDUCTION

- of the number of animals in experimentation whenever possible.

- REFINEMENT

- of experimental design to ensure that animals are used judiciously
- prevent or minimize pain.



<http://www.novartis.com/innovation/animals-research/animal-welfare/the-3rs/index.shtml>

## Replacement is the use of alternatives or adjuncts

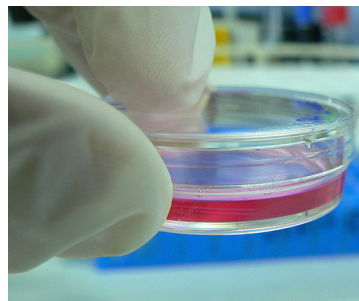
- Many biological similarities exist between human beings and various animals.
- Supplement existing models:
  - Not replacement of animals in research
  - Used to apply better methods and tools
- Examples:
  - Move to "lower animals" or invertebrates
  - Computer models
  - Immune system test rather than live rabbit for pregnancy tests.



*Drosophila repleta*  
Wikimedia Commons

## Reduction in number of animals used in the experiments.

- animal sharing
- in vitro methods:
  - many cell cultures collected from single animal



*Cell Culture*  
Wikimedia Commons

# Refinement of techniques to minimize pain and comfort.

- better anesthesia and pain killers (analgesics)
- decrease invasiveness:
  - modern diagnostic techniques
- smaller sample volume needed for accurate analysis than previously



*MRI Machine,*  
U.S. Navy Joint Operating Base, Bastion Afghanistan  
Wikimedia Commons

# The overlying principle of animal research is the 4<sup>th</sup> “R”

- Scientists are RESPONSIBLE
  - to see that all research animals
  - receive good care and humane treatment.



# Readings

Chapter 1. Introduction. pp. 1 - 12

Chapter 2. The context of animal research: past and present. pp. 13 - 30

Nuffield Council on Bioethics, (2005). *The Ethics of Research Involving Animals*.

[http://www.nuffieldbioethics.org/go/ourwork/animalresearch/publication\\_178.html](http://www.nuffieldbioethics.org/go/ourwork/animalresearch/publication_178.html)



*The Traveller*  
Camilo Mori, 1923

# Any Questions?

Email me at:  
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<http://www.vipitbullkennels.com/images/animated-question-mark.gif>