Equine species used for scientific purpose

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FELASA Working Group

on Health & welfare management of the Equine Species in research and education

Despite many years of using horses for research purposes, there are still no guidelines how horses should be kept

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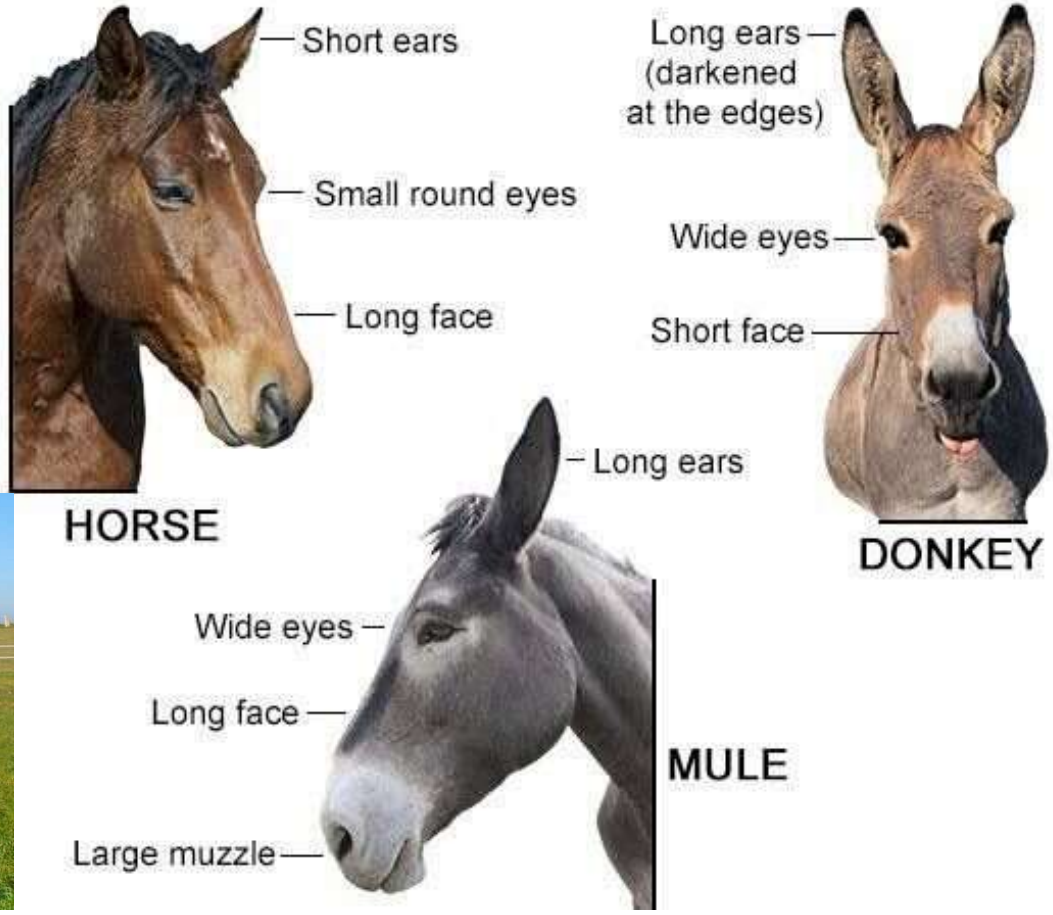
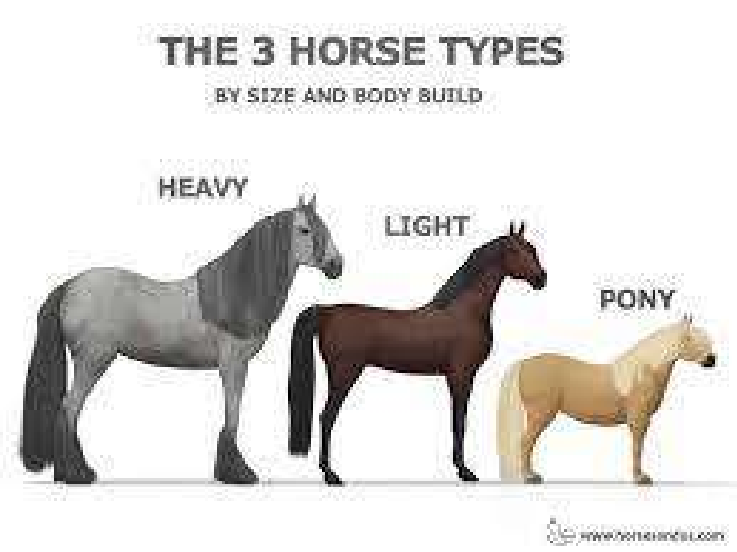
Species of Equine used in research

- Horse
- Pony
- Donkey
- Mule



How many Equids are being used for scientific purposes

- European survey reported that **1712** equids were used in European institutions in 2018
- horses and ponies are the most common equine species used for scientific purposes
- We use the term 'horse' generally, to describe most breeds of Equids used in research



Areas in which Equine are used for scientific purpose

- Animal models of horse and human diseases
- Research topics: physiology, anatomy, toxicology and pharmacology
- Production of medical substance: blood and plasma
- Models for education and training
- Sports medicine

Horses are not big mice

Advantages and disadvantages of using horses in research

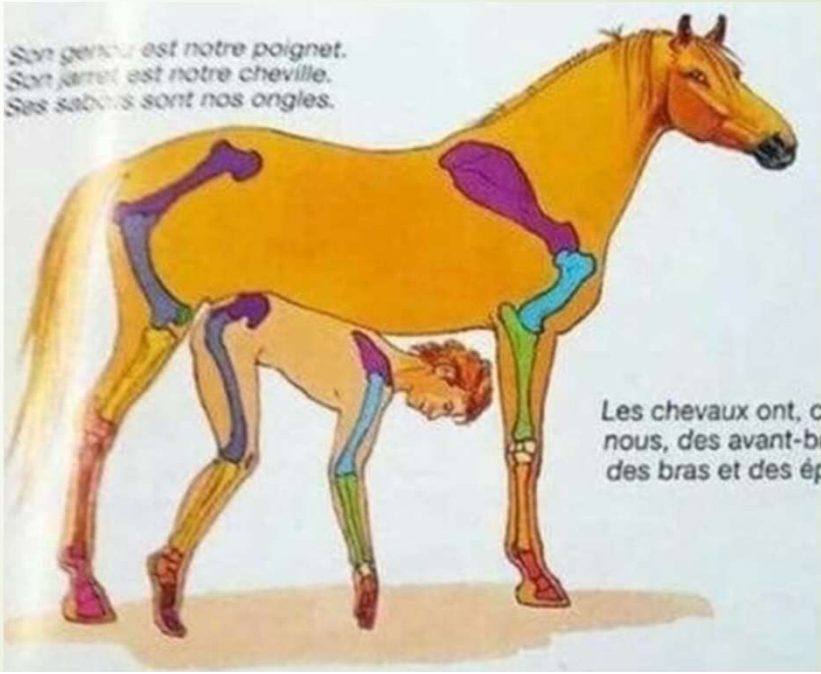
Advantages of using horses in research

- Disease research conducted in horses might be translated to similar health conditions in humans

- Good animal models for Human diseases: for example cancer (melanoma), respiratory diseases (asthma)
- Good animal models for animal diseases: West Nile, Influenza, Equine herpesvirus (EHV)
- horse's size: production of medical substance:

  serum, blood products and antibody's

A French anatomy book trying to illustrate how horse's bones are similar to ours



Disadvantages of using horses in research

- Compared to rodents, horses might not seem like great models for studying human physiology and disease

- Large size: need large living space
- Expensive to maintain: house, feed, Veterinary medicines and treatments
- Staff: Veterinarians and animal caretakers specializing in horses
- Safety: The bites and kicks of the horse can cause great damage
- Emotional aspects to the staff: horses raised as companion animals
- Zoonotic disease: Salmonella, West Nile and Rabies

Requirements to conduct research with horses?

- Animal use protocol- approved by the Institutional Animal Care and Use Committee (IACUC)
- Facility- a suitable facility for conducting experiments on horses
- Staff- Skilled veterinarians and animal caretakers trained to work with horses
- Horses- that are suitable for research requirements

Facility

- **Facilities** for horses should allow horses to behave naturally
- **Floors:** shall be selected for ease and comfort cleaning, sanitation and safety of the horse
- **Bedding:** proper bedding for indoor facilities
- **Outdoor housing:** sufficient shade and shelter should be provided
- **Whenever possible, horses should be socially housed**

Number of animals	Weight (kg)	Floor Area/Animal (ft^2)	Floor Area/Animal (m^2)
1-4	-----	72	6.6
>4	≤200	60	5.5
>4	>200	≥72	6.6

Stable for research

staff

- Veterinarians specializing in horses and laboratory animals
- Animal caretakers Skilled staff with experience working with horses

Selecting a horse, what should we considered

- Defining research needs: age, sex, weight of the horse
- The horse should be in good mental and physical health
- The previous history of the horse should be known
- Examining the behavioral aspects of the horse

Horse care

- Preventive health care
- Horse's diet
- Water Requirements
- Environmental Enrichment

Preventive health care

- Vaccination: Tetanus, Influenza, Equine herpesvirus (EHV) type 1 and 4, Rabies, West Nile
- Deworming: medicines that are given to the horse to kill intestinal parasites
- External parasites control: ticks and lice
- Fly and mosquitoes control
- Dental care: can reduce wasted feed and improve body condition
- Dust: Minimizing exposure to bedding dusts can decrease the risk of animal caretaker and equine asthma.

Horse's diet

- Horses usually eat many small meals throughout the day. Horses actually spend most of their time eating!
  - Pasture Grass- The natural and best diet of the horse
  - Hay- is the next-best choice
  - Concentrate Mixes- mixture grains, molasses for energy and flavor, vitamins and minerals
  - Salt and Minerals- in block or in the pellets

Water Requirements

- A horse's daily water requirements are influenced by:

1. age
2. body condition
3. the amount, type and quality of feed consumed
4. fitness level and activity level

- Horses consume approximately **20–55 liters** of water a day
- Ensure adequate ad libitum potable water is available

Automatic waterer

Exercise

Opportunities for exercise are essential for the behavioral and physiological well being of horses

- Horses should turned out for at least **1 h each day** it can prevent the rebound behavior
- If horses must be confined, they should be turned out periodically for sufficient time to engage in normal behaviors

Environmental Enrichment

Horses should be provided the opportunity to demonstrate typical behavior

- Examples of enrichment for horses include

1. social housing
2. exercise
3. toys

End of the experiment

- End point
- Re use of Equine
- Rehoming
- Euthanasia

Equine end point

- **Any actual or potential suffering, distress, or discomfort should be minimized by choosing the earliest end point consistent with the scientific objectives of the research**
- Appropriate endpoints in Equine are objective and relevant for the assessment of pain or distress
- Humane endpoints are based on those changes:
  - ✓ Clinical
  - ✓ Pathophysiological
  - ✓ Biochemical
  - ✓ Behavioral

Re use of Equine

- **It is re-use where an animal is used on a new study unconnected with any previous studies carried out**
- There are circumstances where animals are used in more than one study
- Different countries have different regulations on this subject
- When planning an experiment with an animal that has already undergone an experiment in the past, the experimental history of the horse must be taken into account

Rehoming

- **Rehoming** - a change in location for an animal previously used for scientific purposes where the animal spends the rest of its life at a location suitable for its needs without undergoing any further scientific procedures

- **The conditions that allows Rehoming:**
  - State of health of the animal allows it
  - There is no danger to public health, animal health or the environment
  - Appropriate measures have been taken to safeguard the wellbeing of the animal

Euthanasia

- The term euthanasia is of Greek origin and means "good death"
- To prevent animal suffering, animals must be euthanized as described in the approved protocol or if established humane endpoints

- **The acceptable techniques for euthanasia in horses**:
  - carried out only by trained personnel
  - General anesthesia before euthanasia is an adequate option
  - Euthanasia by barbiturate or potassium chloride
  - Death by gunshot (requires special training)

Summary

- Equine are used for different scientific purpose
- Before deciding to conduct research on horses, we need a good understanding of the necessary needs for the research
- We need a facility and staff trained to work with horses
- Horses should have optimal conditions
- We need to plan in advance what we will do with the horses at the end of the experiment
- Try to find a way to rehome the horses at the end of the experiment and to find a warm and loving home for them

Thank you

The Lipizzan or Lipizzane:
The name of the breed derives from that of the village of Lipica in Slovenia