Badji Mokhtar University

Faculty of Science

Biology Department

Course handout

Animal Ethics

Dr FERHATI Habiba

2024-2025

Foreword:

This course looks at the ethical aspects animal experimentation and clinical studies.

Acquiring the fundamental principles and putting them into practice in different care and research situations.

Description of the procedures to be followed in order to treat experimental animals correctly according to internationally accepted criteria.

terms scientific integrity, this course introduces students to the concepts of fraud, plagiarism and so on.

This handout is intended for Master 2 Neurobiology students.

Contents

Chapter 1 Animal ethics and morality

1- Introduction

There is no doubt that the animal has become an object of concern for our time. And not just in philosophers' offices! This concern manifests itself in the quite obvious form of a new concern for the suffering we cause animals.

Animal Liberation is the best example of this new awareness that cannot be ignored. By revealing to the general public the scandal of the suffering endured by millions of laboratory animals and billions of farm animals, this is usually the function of the whistleblower, who reveals to the general public, sometimes at great risk, a fact that ignorance alone made acceptable. This is the case, for example, with acts of torture: if such acts were committed clandestinely in a major democracy, the mere revelation of them would in principle be enough for them to be unanimously condemned.

But in the case of torture inflicted on animals, it is not exactly the same. In this specific case, the inhumanity of the treatment inflicted on animals is always potentially justified by the fact that the victims are not humans, but only animals. Of course, to inflict inhuman treatment on a human being is in itself unacceptable, precisely because it violates his human dignity, his human condition. But why should 77we feel obliged to treat a beast "humanely", if it is true that an animal is not a man?

Treating someone 'like a dog' is undoubtedly bad if it's a man... but isn't it the right thing to do if it's simply a 'dog'? Having refused to treat men like dogs, should we now also accept to treat dogs like men? Isn't this the kind of gross confusion that animal rights activists are guilty of?

In fact, the obstacle we encounter is the lack of empathy we may feel faced with the suffering of animals. A lack of empathy that is justified

Firstly, because the victims to considered are not like us. Is it not too much to apply the word 'murder' indiscriminately to killing a man or a horse? Should the life of a horse be considered in the same way as the life of a man? It is the whole humanist tradition, attached to the greatness and particular dignity Man, that seems to be

threatened here by this ecological concern. An experimentation was to serve as a benchmark in this area (the atrocities committed by Nazi doctors raised awareness of the power of medicine and its possible abuses). This is a ten-point declaration outlining the limits of medical experiments on human subjects.

Aristotle, for example, wrote:

"Plants exist for the sake of animals and wild beasts for the sake of man – domestic animals for his use and food, wild animals (or at least most of them) for food and other accessories of life, such as clothing and various tools. As nature never does anything unnecessarily or in vain, it is undeniably true that she has made all animals for the good of man".

2-History

Several factors contributed to the emergence of the contemporary debate in the 1970s. From the end of the nineteenth century, the practice of animal protection intensified, with the emergence of associations and organised movements, but the theory had not yet developed substantially. The catalyst was undoubtedly the protest against factory farming in England in the 1960s. It was in the wake of this that what Richard Ryder calls the "Oxford Group" was formed: a group of students and researchers at Oxford University who, in the early 1970s, laid the foundations of animal ethics.

Three students, Harris and the Godlovichs, published a collection entitled Animals, Men, and Morals in 1972. This book attracted the attention of three other students, Andrew Linzey, Stephen Clark and Peter Singer, an Australian doing his doctorate at Oxford. It was while reviewing this book that Singer first introduced the expression 'Animal Liberation', which became the title of an article he published in 1973, and then of a book published in 1974. An avalanche of publications immediately followed, all originating from the Oxford group or from people in contact with the group. This is what is known as the first generation of authors in animal ethics, laying the foundations for the contemporary debate.

Today, and exclusively in the English-speaking world, animal ethics is considered to be a genuine university discipline, giving rise to thousands of publications,

symposia, conferences, theses and numerous courses in philosophy, law, animal science and veterinary medicine. The first courses were developed in the late 1970s

and early 1980s in the United States and England.

This development, however, is highly regionalised: it is clearly Anglo-Saxon. There is much more talk of *animal ethics* than "animal ethics" - although this has begun to change in France in recent years.

3-Ethics and morals

3-1-Ethic

Ethics, from the Greek ethikê, "science of that which refers to social or moral behaviour", is a reflection on the behaviour to adopt to make the world humanly liveable. In this sense, ethics is a search for the ideal of society and the conduct of life.

Animal ethics can be defined as the study of the moral status of animals or, to put it another way, the study of man's moral responsibility towards individual animals. It therefore raises the classic questions of man's duties towards animals, possible animal rights and, more generally, the moral judgements (i.e. those formulated in terms of good or evil) to be made about our current treatment of animals.

Ethics is not a set of specific values and principles. It is a process of reasoned reflection with a view to doing the right thing. It involves looking at the moral values and principles that should guide our actions in different situations, with the aim of acting in accordance with them.

Examples:

"A company is dumping its polluting waste in the river! That's not very ethical of them!"

"It would be morally unacceptable for a pharmaceutical company to use humans to test a dangerous drug".

3-2-Morality

Morality comes from the Latin word more, meaning morals. It refers to a set of

values and principles that differentiate between right and wrong, just and unjust, acceptable and unacceptable, and which should be adhered to.The moral according to RUSS is : "A set of rules or standards of conduct specific to a given society. A set of

rules or standards of conduct specific to a given society." .

It is based on so-called moral values and principles. It is a way of being and doing that conforms to a certain idea of good and evil that we have. It is a universal vision of good and evil, and is therefore often subjective.

Moral values are higher ideals that we believe are important to obey. Moral principles are rules that we find fundamental and that we feel and believe are important to obey. They are derived from moral values. A moral judgement is a judgement based on moral values and principles as reference criteria. Throughout the ages and cultures, individuals have defended different conceptions of these principles and values. These different conceptions of morality are called "morals".

For example, Christianity proposes a set of values (charity, forgiveness) and principles ("love thy neighbour as thyself") that should guide human action. This is referred to as "Christian morality". So there are several morals.

The relationship between ethics and morality is very close, but there is a dividing line. While morality is a set of values and principles. Ethics is an argumented reflection with a view to doing the right thing. It involves reflecting on and questioning the moral values and principles that should guide our actions in different situations, with the aim of acting in accordance with them. Ethical reflection can take place at several levels, from the fundamental to the practical.

At present, ethics refers to a sectorial morality specialised in one area.

The first ethic seems to be the ecological ethic (the demand by young people and "greens" to respect nature).

Then came biomedical ethics, war ethics and business ethics.

Biomedical ethics began with the critical analysis of conflicts and cases of conscience.

This led to a number of declarations and ethical codes (Declaration of Human Rights, Nuremberg Code 1947, London Code of October 1949, Manila Declaration 81, European Conference 87, etc.).

The Nuremberg Code **(1947)** on human experimentation was to serve as benchmark in this area (the atrocities committed by nazy doctors raised awareness of the power of medicine and its possible abuses).

This is the ten-point declaration out lining the limits of medical experiments on humain subjects.

Chapter2 Morality and animal experimentation

1- Introduction

Since the dawn of time, man has used animals to meet his needs in various fields. He has domesticated them and made them his best companions (cats and dogs), draught animals and plough animals (cattle), leisure animals (horses) and sources of food to meet his nutritional requirements (all edible species, cattle, sheep, goats, etc.).

Furthermore, the usefulness of animals is not limited to these areas, but they have provided a great service to mankind, particularly in scientific research, and more specifically in the medical field.

Animals play an irreplaceable role in the advancement of experimental sciences,particularly fundamental biology, pharmacology and medicine.

Thanks to the laboratory animal, man has been able to understand and explain the complexity of certain physiological phenomena taking place in his own body, and to induce and treat certain diseases.

For this reason, mankind cannot do without animals, not only to meet its nutritional needs, but also to satisfy its scientific curiosity for discovery and exploration in the treatment of certain diseases that threaten humanity.

2- Animal experimentation

2-1 Definition of animal experimentation

Animal experimentation consists of any practical manipulation carried out on a living vertebrate animal in accordance with a protocol validated by the scientific committee, with the aim of studying any parameter whatsoever, identifying a molecule, etc., whereas experiments carried out on invertebrates, the embryonic forms of oviparous vertebrates or experiments consisting of monitoring the behaviour of animals that do not cause them any suffering or pain do not fall within

the scope of animal experimentation.

2-2 The advantages of animal experimentation

-In the basic sciences, animals are used as models for studying anatomy and physiology, to gain a better understanding of the human organism and the similarities between animals and humans. The mouse, for example, is the closest species, with a degree of similarity of 99%.

In applied research, animals are used to study certain pathologies in order to better control them and establish appropriate treatment.

2-3 Constraints of animal experimentation

Although animals are similar to humans, they are not identical and there are certain differences linked to each species. So the data obtained can only be applied to a certain extent.

In addition, failure to control the experimental conditions, i.e. the choice of animal and the rearing conditions, which can influence the animal's behaviour, can lead erroneous results.

2-4 Persons' rights in a research protocol

2-4-1The right to anonymity: The right to decide freely whether or not to participate in research The right to be informed of the purpose, methods used, etc., the duration of the research, treatment alternatives and the right to withdraw.

2-4-2 Non-patentability of the genome

"The human body, its parts and products and knowledge of the total or partial structure of a human gene may not, as such, be patented.

Law on the donation and use of elements and products of the human body, medically assisted procreation and prenatal diagnosis.

(Law no. 94-654, 29 July 1994)

2-4-3 Informed consent in research

- Principle arising from the right to information, which consists of seeking

the person's agreement to any decision concerning him or her. It implies :

- clear and sufficient information,
- the absence of influence or coercion
- the person's ability to decide for themselves.

-If she is not competent to do so, a guardian (authorised third party), also duly informed, must take her place.

To give informed consent, the person must:

-be able to understand the conditions and risks inherent in research,

-know the aim, the methods, the expected benefits and the treatment alternatives,

-be assured of the confidentiality of the results,

-sign the consent form.

The guardian or family may also sign if the person is unable to do so (in the case of children, the very elderly, psychiatric patients, people with intellectual disabilities, etc.).

2-5 The animal model in animal experimentation

There are many animal species used as study models in animal experimentation. The most widely studied are the mouse, the rat and the rabbit, but there are others such as the dog, the cat, the guinea pig, the monkey, etc.

In animal experimentation, the term "animal model" is used.

An animal model is a model that enables us to study spontaneous or induced biological, physiological or pathological phenomena that have one or more aspects in common with humans.

There are various animal models

a-wild or natural model: This model consists of animals that have not undergone any modification or manipulation, rather they are animals in which diseases exist naturally that are found in humans, such as diabetes, high blood pressure, arthritis, etc.

b-experimental model: this is a model in which a pathology is experimentally induced, such as cancer or diabetes mellitus induced by the injection of streptozotocin, a chemical molecule which causes the destruction of pancreatic

cells.

c- **Genetically modified model**: this is a model whose genetic code has been modified.

The aim of manipulating the genetic code is to induce a disease that exists in humans in order to study it in animals, identify its causes and propose possible treatments**.**

These manipulations involve inserting a DNA fragment, replacing it or neutralising it, resulting in genetically modified strains.

d-Negative model

This model consists of animals that are resistant to certain ailments or diseases, which is why research into the reasons or factors behind resistance is of great interest for human health.

3-Morality and experimentation

Animal experimentation is a set of procedures designed to gain a better understanding of how living organisms function, and in particular to produce therapeutic tools such as drugs. As it is based on the use of live animals, the vast majority of which are rats and mice, it raises moral objections as to its legitimacy. The majority of the population tacitly accepts this practice, which they finance through their taxes. A small number of radical opponents, who themselves should never take drugs, prefer to talk about "vivisection", a more "surgical" and "humane" term.

They called themselves "antivivisectionists". In the midst of this debate, how do we place today's animal experimentation in the context of moral reflection?

In Western, law-based societies, respect for animals tends to be expressed more and more in terms of "animal rights", philosophical rights, conceived by human beings in favour of individuals of other species, and which can then be transcribed into law to impose constraints, even on those humans who do not care about animals. There are already laws to protect individual animals. As far as animal experimentation is

concerned, measures are in place to protect vertebrate animals and certain of their embryonic forms from pain.

3-1Fundamental values

In the healthcare sector, certain values stand out:

- Autonomy: every human being must be able to decide for themselves how to live and what their future holds.
- Distributive justice: goods must be shared fairly between people without favouritism.
- Obligation to avoid anything that could cause harm to the patient.

There are two principles:

a - First principle (traditional)

The law states: "Everyone has the right to respect for their body. The human body is inviolable. The human body, its components and products may not be the subject of a property right".

The principle of non-infringement of physical integrity and the principle of respect and

primacy of the human person from the beginning of his or her life are in line with the constitutional principle of safeguarding the dignity of the human person (human rights and the abolition of slavery).

b- Second principle

"No one may harm the integrity of the human species".

- Any eugenic practice aimed at organising the selection of individuals is prohibited.

-no transformation may be made to genetic characteristics with the aim of modifying the person's descendants.

- carrying out a eugenic practice aimed at organising the selection of individuals is punishable by 20 years' imprisonment.

*The inviolability of the human body, by virtue of which any attack on the integrity of the person is prohibited.

* The human body, its components and products cannot be the subject of a property right. This means that the human body cannot be traded. Blood donation is free, as is organ donation

* The obligation to consent. It is the practical translation of respect for the individual's will and the two previous principles.

3-2 animal rights :

This pragmatic notion of a "conflict of rights" and of privileged respect for human rights when they appear as fundamental rights is consistent with the Universal Declaration of

Animal rights. We know that there are several different conceptions of animal rights.

According to the most radical conceptions, there is no need to distinguish between animals and humans when it comes to protection from pain.

Whereas:

- Animals are sentient beings, capable of suffering, endowed with cognitive and emotional capacities, and with physiological and behavioural needs specific to each species.

4-Charter for the ethics of animal experimentation

Article 1: The need for experimentation

The needs of biological, medical and veterinary research, and the current limitations of alternative methods, make **it necessary to resort to animal experimentation** in order to advance knowledge, improve the diagnosis and treatment of diseases, and generally protect health.

Article 2: The sentience and suffering of animals are **sentient** beings with cognitive and emotional capacities. They are **capable of suffering.** The experimenter has a duty to ensure that their health and well-being are not unnecessarily threatened. **The prevention of any unnecessary suffering will be his primary concern.**

(An ethics **charter** is an official document that enables a company or organisation to formalise its values and good business practices.**)**

Article 3: Qualifications of the Scientific and technical knowledge is constantly evolving. The experimenter must take care to maintain and extend his own skills and those of his collaborators.

Using the most appropriate techniques to achieve its scientific objectives, while respecting the physiological and behavioral needs of the animal species used.

Article 4: The 's responsibility Experimenting on animals is an act of **personal responsibility.** The experimenter undertakes to comply in all respects with the legal and regulatory requirements in force. Experimenters also have a moral responsibility towards the animals they use for scientific purposes. It is the responsibility of the experimenter to do everything possible to ensure **the ethics of his approach**, in particular with regard to the legitimacy of the purpose of the research and the relevance of the methods envisaged for carrying it out, and to ensure that there is a reasonable probability that his studies will lead to the acquisition of new knowledge.

Article 5: The usefulness of ethical deliberation

The experimenter cannot be the sole judge of the ethical legitimacy of his own work when it calls into question his relationship with living beings. The scientific community as a whole also feels the need to enrich its reflection on what is tolerable (bearable) and what is not, thus calling for the creation of specific ethics committees.

Article 6: The role of ethics committees in experimentation

These committees assess the **compatibility** between the proposed experimental protocols and ethical principles, in order to **help** the experimenter in his approach when recourse to animals is necessary. Their purpose is to provide an additional guarantee,

for society as a whole, of respect for animal life and the validity of the scientific request.

Admittedly, a great deal of progress still needs to be made. International databases of data, which would make it possible to avoid repeating identical experiments, are inadequate. Alternative methods are not sufficiently encouraged.

The training of future experimenters is still very incomplete in moral terms. And the ethics committees that have been set up to adhere to the "charter" have a decision-making role, but not a disciplinary one... But the spirit of **the Three Rs Rule** leaves the door open to further improvements.

Chapter 3 Ethics and animal welfare

(3 R'S RULE)

1-Ethics in animal research

Is animal experimentation necessary and compulsory for all research? Can we do without animal experiments altogether?

These questions remain unanswered to this day and have been the subject of controversy between researchers who wish to carry out their experiments on animals, either as part of fundamental research or biomedical research for human health, and radical animal defenders who categorically reject any manipulation of animals that inflicts stress, pain and suffering that is detrimental to their well-being, given that animals are living beings with a nervous system that can feel pain.

In the wake of these controversies, Animal Experimentation Ethics Committees (AEECs) were set up to take into account the framework for the use of animals without harming their well- being.

The AECBs are considered to be competent authorities with the right to make an ethical assessment of applications for authorisation to carry out research projects involving the use of animals.

CAMCs are essentially made up at least 5 people: a researcher, a veterinarian, an experimenter, an animal handler and a member of society not involved in the research activities.

The CAMC ensures that a validated protocol is followed and that it is deemed essential to use the animal without causing it unbearable pain and suffering that would be detrimental to the expected results. This is the principle of humane science. To this end, William Russell and Rex Burch in 1959 issued the 3Rs rule.

2-The 3Rs rule

The 3Rs rule brings together the three concepts whose aim is to reduce the degree stress to which the animal is subjected during experimentation.

The concepts are as follows: Replace, Reduce and Refine.

2-1 Replacement

This concept involves search for alternatives to use of animals in order to reduce their suffering during experimentation.

Researchers need to ask themselves, can't we do away with the use of animals and replace it with another study or technique?

That's right, certain studies have spared the animal its suffering, such as the blood cell, which was used as a biological membrane model, cell cultures and the "blood cells".

artificial skins that have served as a field of application for certain cosmetic products and to test their irritability without having to resort to the use of animals.

Induction of cerebral ischaemia in cultured nerve cells to spare an animal the pain of a stroke However, the use of isolated cells has its limits, because the reaction of an isolated cell to a treatment is not identical to that of an entire organism. As a result, we cannot completely dispense with the use of animals in our research.

- if the use of the animal is deemed essential, the second principle applies, reduction.

2-2-Reduction

This means reducing the number of animals to be used as little as possible, without compromising the reliability of the results or their statistical relevance.

According to this principle, the researcher must use certain methods and techniques that enable him to monitor a reduced number of animals instead of carrying out surgery or killing the animal.

The most commonly used methods are magnetic resonance imaging (MRI), computer tomography (CT) and radioactive tracers.

These methods can reduce the number of animals used by up to 80%.

2-3 Refinement

The constraint that can be encountered with this principle is the absence of specific material and equipment adapted to the animal.

This principle consists of reducing the stress inflicted on the animals as much as possible. Reducing the animal's pain, suffering and anxiety before, during and after the experiment.

Refinement is applied not only in the context of reducing the constraint of experience for the animal as well as for the reliability of the scientific results, because an animal organism subjected to stress of an intense degree or over a long period of time does not function normally and will have reactions that can lead to erroneous results.

The methods used to reduce these constraints are analgesics and anaesthetics, which allow the experiment to be carried out with less pain and constraint.

However, in animal experimentation, it's not just the handling that puts stress on the animals, but also the conditions in which they are kept.

In the case of rodents that live in social groups, separation causes them a great deal of stress and anxiety, so keeping them in a group reduces these situations, as do the rearing conditions. As rodents live their lives in cages, it is advisable to provide them with a certain level of comfort to reduce their stress. Studies carried out on rodents reared in bare cages have shown that these animals suffer behavioural problems as a result of impaired brain development. To this end, enriching the cage with bedding and certain devices that allow the animal to climb seems to be useful for reducing stress.

The aim of the ethics committees responsible for animal protection is to authorise the use of laboratory animals in experimental protocols that are deemed useful, but also to ensure that animal stress is reduced as much as possible by applying the principles of the 3Rs rule.

3-Examples

3-1Experiences causing severe suffering or death

In the past, the limit for animals used for vaccine trials or studies on infectious diseases, tumours, organ rejection or similar studies was sometimes death caused by the disease. When an animal is dying, it stops eating and drinking, leading rapidly to dehydration. With few exceptions, it can be predicted that death will occur shortly after the animal stops eating and drinking.

3-2 Toxicity tests

The LD50 test was required by regulatory bodies to assess the toxicity of new products. LD50is the dose that would kill 50% of the animals tested.

to the test. Many animals have been used to determine this dose precisely, although its relevance to toxicity in humans has not been established.

3-3 Spare solutions

A number of refinements have been developed for toxicity testing and have been accepted as guidelines by the Organisation for Economic Co-operation and Development (OECD). For acute toxicity testing, the Predetermined Dose Method (Guideline 420), the Acute Toxicity Class Method (Guideline 423) and the Dose Adjustment Method (Guideline 425) have now been accepted by member countries.

The LD50 test (Guideline 401) has been withdrawn and regulatory authorities in OECD member countries must now accept data obtained with one of the alternatives. In addition, recommendations published by the Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) describe how to use data from in vitro experiments to select the starting dose for the test, further reducing the number of animals required and improving the predictive value of the data.

4 Model and animal comfort

4-1 Animal welfare

The welfare and state of health of the animals are observed with sufficient attention and

frequency to prevent any lasting damage, pain, unnecessary suffering or distress.

Pain is the most unpleasant sensation that the animal may feel during experimentation. It may be physical pain caused by the various manipulations or stress and anxiety caused by separation, the type of holding or other factors.

As animals are living beings with a nervous system, they feel pain in the same way as humans, except that the expression of pain is different. For this reason, monitoring the animal's behaviour seems to be the best way of recognising its well-being and state of health, and this requires qualified staff.

Pain is the most unpleasant sensory and/or emotional experience that a person can have. This is caused by tissue damage which provokes motor reactions expressed as flight, fear and isolation.

4-2-Organisation of pet shops

The animal house that is supposed to house the laboratory animals must be designed according to international standards.

The design of the pet shop must meet the animal's needs in terms of comfort and well- being.

-Pet shops must be located away from public areas.

-The animal house must be designed to facilitate cleaning and disinfection. To do this :

-Walls, ceilings and surfaces must be made of resistant, waterproof materials that are easy to clean and disinfect to prevent the development of certain parasites, fungi and other organisms.

-The animal house must contain several rooms or boxes where the animals are kept separately according to species, to avoid contamination and the stress created by certain species.

-The animal house must have rooms for receiving new animals before are included in the experiment, and for sampling, handling and storing feed.

-monitor the environmental conditions in the animal house, respecting the requirements of each species.

*Ambient temperature is around 20-24C^0,

*12h/day lighting

* Tolerated humidity is 40-60%.

*Rooms must be equipped with ventilation systems to improve air circulation and renewal.

*The pet shop must be equipped a soundproofing system to reduce the stress caused by certain species, such as barking dogs.

-Access to the animal house must be reserved for authorised personnel only, in order to limit the risk of contamination from animals to humans or from humans to animals. Staff must protect themselves by wearing a smock, bib, gloves, overboots, etc.

*Animal cages**:** the cages in which the animals are kept must meet the requirements of each species. The cages must be made of stainless steel, easy to clean and disinfect, fitted with a bottle or teat for drinking and a hopper for feeding, and nest boxes for the young in the case of rabbits.

-The bedding, which is generally sawdust, must be changed periodically to prevent the development of parasites.

There are a number of factors that can influence an animal's well-being, leading to changes in certain biological and physiological parameters with repercussions for

Not only do they affect the animals themselves, but they also lead to modifications and even completely erroneous research results.

These factors include environmental factors such as temperature, air, humidity, lighting and noise, all of which need to be controlled, as well as other infectious agents that are harmful to the animal's health.

Chapter4 Animal Pain and Legal Protections

1. Understanding Animal Pain

Pain is a complex subjective experience with sensory, emotional, and cognitive dimensions. In animals, assessing pain presents both empirical and philosophical challenges, primarily due to the absence of verbal communication. However, advances in neuroscience and ethology have significantly improved our understanding.

1.1 Scientific Criteria for Pain in Animals

Researchers generally consider the following indicators to evaluate pain in non-human animals:

- **Nociception**: Detection of harmful stimuli by the nervous system.
- **Behavioral responses**: Vocalizations, avoidance, guarding behaviors.
- **Physiological responses**: Increased heart rate, stress hormones (e.g., cortisol).
- **Cognitive and affective capacities**: Learning from painful experiences, expressions of distress, preference for analgesia.

Species such as mammals and birds are widely accepted to experience pain. There is growing evidence that **fish, cephalopods (e.g., octopuses), and crustaceans** may also experience pain or pain-like states.

1.2 The Role of Neuroscience

Neuroscience supports the idea that many non-human animals possess neural architectures (e.g., the presence of nociceptors, central processing areas) sufficient for pain processing. The study of **sentience**—the capacity to feel—has become a key component in shaping welfare-oriented legislation.

2. Legal Approaches to Animal Pain

Legal systems vary in how they acknowledge and regulate animal pain. Most modern animal welfare laws are based on the recognition that animals are sentient beings capable of suffering.

2.1 International Frameworks

- **The Five Freedoms** (developed by the UK Farm Animal Welfare Council) form the basis of many animal welfare laws, especially in Europe. These include:
    1. Freedom from hunger and thirst.
    2. Freedom from discomfort.
    3. Freedom from pain, injury, or disease.
    4. Freedom to express normal behavior.
    5. Freedom from fear and distress.
- **OIE (World Organisation for Animal Health)** guidelines emphasize minimizing pain and suffering in all animal handling, especially in transport, slaughter, and veterinary care.

2.2 European Union Legislation

- **Treaty of Lisbon (2009)**: Recognizes animals as *sentient beings* under EU law.
- **Directive 2010/63/EU** on the protection of animals used for scientific purposes: Requires the 3Rs (Replacement, Reduction, Refinement), pain mitigation, and ethical review.
- **Council regulation (EC) No 1099/2009**: Addresses humane slaughter, including mandatory stunning unless exceptions apply.

The EU is one of the most progressive regions in legally recognizing animal pain, extending protections to vertebrates and, more recently, certain invertebrates.

2.3 Legislation in other regions

- **United States**: The Animal Welfare Act (AWA) excludes key species like rats, mice, and birds commonly used in research. However, pain must be minimized in federally funded research.
- **United Kingdom**: The Animal Welfare Act (2006) criminalizes unnecessary suffering and includes a duty of care to prevent pain.
- **New Zealand**: Legally recognizes animal sentience and includes protections for octopuses and crayfish.
- **Switzerland**: Notably includes social and psychological welfare in addition to physical pain.

3. Philosophical and Ethical Implications

The legal acknowledgment of animal pain reflects a deeper ethical shift. If animals are moral patients—beings whose suffering matters morally—then:

- Causing pain without necessity is unjustifiable.
- Our moral obligations extend beyond avoiding cruelty to promoting welfare.
- Policies must consider **species-specific needs** and capacities for suffering.

Moreover, **precautionary principles** argue for legal protection even when pain perception is uncertain (e.g., in invertebrates), especially if the cost of being wrong entails causing suffering.

Pain is a morally significant experience that increasingly guides legislation worldwide. As science deepens our understanding of animal sentience, laws evolve to reflect these insights—yet disparities remain. Bridging scientific findings with consistent ethical policies is a key challenge for future legal and philosophical work in animal protection.

Chapter 5 Scientific fraud and its consequences

Scientific activity is one of the privileged forms of the search for truth in society.
to build up reliable knowledge. Find out the truth about the laws of matter and the laws of physics.
is both its object and its purpose.
the honesty and objectivity of researchers on the fact that the very functioning of science constitutes an anti-fraud shelter, scientific fraud does exist.
There are generally three types of scientific fraud: the fabrication of
data, data falsification and plagiarism.

1- Scientific fraud

An act of scientific fraud is an action intended to deceive in the field of scientific research in order to gain personal advantage, sometimes to the detriment of others. It constitutes a violation of research ethics and the professional ethics in force within the scientific community. The term "scientific fraud" covers a wide range of behaviour. It is generally considered to take three main forms:

- Falsification of data, in particular by altering results that are unfavourable to a hypothesis;
- Data production ;
- Plagiarism.

1-1Examples of fraud in education

- Using all or part of another person's text by passing it on without reference in an examination, assignment or activity being assessed;
- The performance by another person of work or an activity subject to assessment;
- The use of any unauthorised assistance during an examination or to complete a task;
- Unauthorised presentation of the same work in different courses;
- Obtaining examination questions or answers by unlawful means ;
- Soliciting, offering or exchanging information during an examination.

1-2 Fraud prevention

Scientific fraud is presented by the scientific community as marginal. However, the fight against it is considered very important by both the scientific community and the political authorities.

It appears that dealing with suspicions of scientific fraud in research is a responsibility that is often shared between scientific and administrative managers and institutions. The division of roles varies from one country to another.

1-3 Investigating scientific fraud

When a reviewer or another researcher suspects or witnesses a case of fraud or conflict of interest, they can generally turn to the research institutions. If the case concerns one of their colleagues, they can contact the organisation where they work. If the fraud relates to a published article, they can contact the editors of the journal concerned.

Some research centres, institutes and universities have an office dedicated to scientific integrity, responsible for investigating cases of suspected fraud and, if necessary, imposing penalties on those found responsible.

Specialised software can help teachers and publishers detect certain types of fraud (plagiarism in particular).

1-4 Retraction of fraudulent publications

Researchers' work is published in scientific journals. These publications must comply with a number of rules, such as indicating as authors all the people who have made a significant contribution to the work, and declaring any conflicts of interest. Sometimes the content of a publication is the result of scientific fraud (unknown at the time of publication). If this fraud concerns the validity of the data published, publishers may ask authors to retract a publication, or even impose a retraction (depending on the journal and the situation).

This means that a note is published in the journal in question, informing readers of the retraction. On the online version of the article, a note appears indicating the retraction.

Some people have also proposed the creation of an oath for researchers, modelled on the Hippocratic oath for doctors.

Some American universities offer, or even make compulsory, courses in responsible practice of scientific research". In addition, there are a number of resources on approaches to educating and raising awareness of the responsible practice of scientific research.

2. Plagiarism

2-1Definition

Plagiarism is the appropriation of content (text, images, tables, graphs, etc.) in whole or in part without the consent of its author or without citing its sources. It is the use of another person's published or unpublished work, in particular theories, concepts, data, original documents, methods and results, including graphics and images, as if they were one's own without making the appropriate acknowledgements and, where applicable, without permission.

2-2 Different Forms of Plagiarism :

There are many types of plagiarism, but the most common forms are: direct plagiarism, paying someone off, self-plagiarism, paraphrasing without a source and "cut and paste" plagiarism.

2-2-1Direct plagiarism

Direct plagiarism is the most obvious form of plagiarism. It means that you take someone else's ideas or work and claim them as your own without quoting the authors. Even if you delete or change a few words here and there, if the majority of the structure and words are the same, that's direct plagiarism. Direct plagiarism is one of the worst types of plagiarism. It often results in expulsion and, if there is infringement of copyright.

2-2-2Paying for someone else's work

This type of plagiarism is explicit. If you pay someone to write a dissertation, thesis or essay for you, that's plagiarism.

The words are not yours and are therefore plagiarised. This also includes having a friend or family member write your text for you and hand it over with your name on it.

2-2-3 Self-plagiarism

Self-plagiarism is more difficult to understand and is often unintentional.

There are two different versions of self-plagiarism, the most common being using a

document you have already submitted for another course. Because you have already written this work, it's no longer new and original.

This can also happen when you use ideas or phrases from previous documents or assignments. For example, if you use pieces of essays you've already completed.

2-2-4 paraphrasing without quoting the source

Paraphrasing is not plagiarism as long as you quote your sources correctly. However, paraphrasing becomes plagiarism when you read different sources, pull out a few key points and rewrite those points as if they were your own ideas.

If you don't cite your sources for all the non-original ideas referenced in your article, then you're committing plagiarism.

Accidental plagiarism is often caused by paraphrasing without a source. It's simple and easy to avoid. Don't forget to quote your source correctly.

2-2-5 Copy and paste plagiarism

Cut and paste plagiarism is similar to paraphrasing with one very important difference: it is when you copy and paste different texts together to create a new text that it is plagiarism. This sometimes includes rewording the original parts while retaining the structure of the original texts.

This type of plagiarism requires a little more effort and is more insidious than simply paraphrasing a source. But it's not worth it in the end, as plagiarism scanners can easily detect this kind of plagiarism.

2-2-6 Examples of plagiarism

-Copying a passage verbatim from a book, magazine or web page without putting it in inverted commas and/or without mentioning the source.

-Insert images, graphics, data, etc. from external sources in a job without indicating the source.

-Summarising an author's original idea by expressing it in one's own words, but omitting to indicate the source.

-Translate all or part of a text without mentioning its source.

-Reuse work produced in another course without the prior agreement of the teacher.

-Use another person's work and present it as your own (even if that person has given their consent).

2-2-7 Checking for plagiarism

Plagiarism is a serious academic offence. Most universities use anti-plagiarism scanners that check for these problems. If your paper contains plagiarism, you are likely to receive a zero. As long as you keep these five common types of plagiarism in mind, you'll be able to avoid plagiarism.

Always check your university's academic code of conduct if you're not sure whether you're plagiarising or not. Or you can use a plagiarism checker, such as anti-plagiarism software.

Conclusion

In the field of animal experimentation, at both national and international level, the founding texts on the protection of laboratory animals largely preceded the introduction of ethical assessment. This approach, strongly influenced by the philosophical and religious contexts of previous centuries, has had a hard time gaining acceptance, but all the regulatory and ethical provisions are now in place and have enabled major advances to be made. Scientists have become aware of the need to conduct animal trials under the best possible experimental conditions and appreciate the support of ethics committees in this shared reflection.

Experimental designs and results have improved considerably as a result. In vitro techniques, which have been widely deployed thanks to the technological advances from which they have benefited, have made it possible to use animals only later in the research process, thereby greatly reducing the number of animals used. Thanks to the recent creation in France of the Comité national de réflexion éthique, which should very quickly facilitate dialogue and communication between public and private research ethics committees, animal protectors, philosophers and legal experts, the debate will broaden and go even further to prepare the future of animal experimentation.

References

-Caverni JP.1998.l'éthique dans les sciences du comportement .Puf, Que sais-je.

-Durand G.2005 , Introduction générale à la bioéthique, Paris, Editions du cerf, , 565p.

-Harbemas J.2010. De l'éthique de la discussion, Paris, Editions du cerf,.

- Jonas H.2009, Principle of Responsibility, Paris, Editions du cerf,

-M.F.W. Festing.1998. Reducing the use of laboratory animals in biomedical research: problems and possible solutions. ATLA, 26, 283-301

-M.F.W. Festing. 1994. Reduction of animal use: experimental design and quality of experiments. Lab Anim, 28, 212-221

-M.D. Mann.1994. Crouse E.D. Prentice. Appropriate animal numbers in biomedical research in light of animal welfare considerations. Lab Anim Sci, 41, 6-14.

Paycheng O. SZERMAN S. 1998, L'éthique dans les soins, Thoiry, les éditions heures de France, , 192p Anonymous . Laws for animal experimentation. La recherche,214 :1167.

-Publication de l'université de Montréal.2010, Stratégies de prévention du plagiat, Intégrité, fraude et plagiat,

-Ricoeur P.2001, Soi-même comme un autre, Paris, Seuil,

-Svandra Philippe.2005. Comment développer la démarche éthique en unité de soins. Paris: De Boeck, 232p.

-QuéréF.1991.L'ethique de la vie.Points,Odile Jacob -

http://extranet.inserm.fr/recherche-pre-clinique/l-experimentation-animale

-http ://www.recherche-animale.org/