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## **Session III-4: Replacement alternatives and teaching objectives – determining if and when student learning objectives require the use of animals**

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### **Session III-4: Oral presentations**

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III-4-158

## **New innovative elements in the FELASA Category C course for researchers: towards a more effective literature search and systematic reviews of animal studies**

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Thorough analysis of already existing literature and data is a prerequisite for executing well designed animal experiments. In this way, the maximum amount of information for animals (and humans) will be derived from previously performed studies, and unnecessary duplication is prevented. Systematic reviews are the most suitable way to carry out such a thorough analysis, since all relevant studies are identified, appraised, selected and data extracted to generate new data. Within clinical research, systematic reviews are common practice (evidence-based medicine). This is not yet the case within animal research. Because systematic reviews contribute to (1) better quality science, (2) implementation of the 3Rs and (3) better patient safety it is important to apply them. To introduce this evidence-based approach into animal research, we have implemented education

on the basic principles of systematic reviews of animal studies into our FELASA category C courses over the last 2 years. Special attention is given to the development of comprehensive literature search strategies in a hands-on practical. We have also expanded the education on systematic reviews to a special dedicated 1 EC course for Master Biomedical Science students. The education is considered – both by teachers and students – to have an added value and to be a necessary part of education of future researchers. The content of the education, number of students and the evaluation reports will be discussed in the presentation. We suggest that these topics be included in all FELASA category C courses.



III-4-479

## Replacement and *in vivo* learning objectives in European competence training

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The FELASA Accreditation Board reviews courses and curricula which follow FELASA guidelines for the four European competence categories (A-D). Laboratory animal specialists (D) will have gained both theoretical and practical competences in laboratory animal science, which may or may not involve the use of animals. Caretakers (A) must be well-acquainted with the behaviour of animals, observing signs of illness or poor welfare, and correct procedures for handling and restraint; training is inevitably practically-based, preferably under guidance of skilled practitioners. Category B persons, who conduct experiments, must work sensitively and with minimal impact on animal well-being. Although the use of animals can be minimised, at some point the technical expertise associated with working with sentient animals needs to be acquired under close supervision. Category C persons, who design and oversee experiments, do not always need to acquire practical expertise in their work, but they must clearly understand its impact on the biology and ethology of the animals being used. Although this can be taught using

a basic theoretical approach, often with considerable success, it may be necessary to present these attitudes within a context in which animals are actually used. Survey findings (Howard, 2000; Carlson et al., 2001) suggest that students proposing to enter careers involving whole-animal research gain a great deal from supervised work with animals whilst attending FELASA-type courses; for those not entering such employment in the near future, the case for attending *in vivo* practical classes is less apparent.

### References

- Carlsson, H.-E., Hagelin, J., Höglund, A. U. and Hau, J. (2001). Undergraduate and postgraduate students' responses to mandatory courses (FELASA category C) in laboratory animal science. *Lab. Anim.* 35, 188-193.
- Howard, B. R. (2000). *First experiences: animals in undergraduate courses*. Dissertation submitted in part fulfilment of the med. degree, University of Sheffield.

III-4-209

## Reducing the number of animals used in teaching and training of graduate students and scientists – possibilities and limitations

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When educating graduate students and scientists that are supposed to independently design, conduct and perform animal experiments (FELASA category C persons), it is essential for the students to practice various procedures on animals. Previous investigations have shown that animal handling and procedures are among the topics that students of this category appreciate the most and also request more practice in. This is, however, in conflict with the general striving of reducing animals in education. Thus, it is highly important to identify in which cases the use of live animals is necessary, and in which cases it is not. At our department, we offer FELASA accredited category C

courses that contain practical hands-on exercises in handling, injections, blood sampling and surgery, where live animals are used. Practical exercises in anesthesia and behavior, however, have been replaced with video-based exercises, where animals have been filmed. This has turned out to be very successful, and this presentation will describe the educational advantages of this strategy, how it has been perceived by the students, and to what extent it has reduced the number of animals used. The presentation will also bring to discussion the possibilities and limitations of replacing live animals in general, when teaching FELASA category C persons.



III-4-583

## A survey of animal use and alternatives in higher education in Europe

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A study was conducted in 2010 to determine the extent to which animals were still being used or had been replaced by computer-based alternatives across a selection of universities from 10 European countries: UK, France, Germany, Spain, Italy, Poland, Holland, Slovenia, Czech Republic and Macedonia. Response rates varied between 73.1% (UK) and 26.3% (Romania) thus making valid comparisons difficult.

A questionnaire, designed to collect information on the use of innovative technologies in teaching physiology and pharmacology and containing questions relating to animal was delivered online using the UK Bristol Online Survey service.

Universities in the UK, Spain, and France had the highest average levels of animal usage with the highest total use in the UK. Spanish universities used the highest number of mammals and those in the UK the most amphibians and guinea pigs for

teaching. Of the four eastern European countries surveyed, Romania had the highest use of animals in teaching.

Computer-based alternatives (both commercially available and freeware) were used to some extent by all countries. Romania, Spain, and Poland had the highest reported use with Macedonia, Italy and France the lowest. Major barriers to the introduction of alternatives were “resources not available in local languages”; “difficulty finding resources”; “lack of money to purchase resources” and “available resources don’t meet learning objectives”.

Major factors which would persuade academic staff to introduce alternatives were: “published evidence of effectiveness” and “recommendation from a colleague”. In western European institutions students’ objecting to the use of animals in teaching was an important driver.

III-4-409

## Alternatives to animal testing in the faculty of veterinary medicine of the National Autonomous University of Mexico

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The use of non-human animals is the most accepted way to obtain knowledge and psychomotor skills needed for future professionals in the academic system. The UNAM is not the exception and the Faculty of Veterinary Medicine mistreats non-human animals in different ways causing pain, stress and injury. In recent years, there have been doubts in the minds of many students and teachers about the unethical way the medicine principles are being taught and they are forced to commit these acts of abuse against animals, feeling their sensitivity and moral or ethical principles violated, and therefore their integrity. Dissections and/or vivisection send the wrong message to students. Instead of learning the anthropocentric and specist values, which claim that non-human animals are the subject of moral consideration,

they learn that life is disposable and that nonhuman animals can be used at will. Consciously or unconsciously these acts remain qualities such as sensitivity and compassion to the future professionals. The alternatives are ethical educational media and should completely replace the harmful use of non-human animals and be used in combination to achieve the educational objectives. The use of alternative methods allows the acquisition of the desired knowledge plus ethics and respect for life should be the trend to continue throughout the world.

This work considers the ethical conflicts which students enter as they are forced to harm animals and their right to conscientious objection, and provides proposals of the existing methods to replace the use of animals in education.



## Session III-4: Poster presentations

III-4-117

### Perception of animals used in education and research in Brazil by students and professors

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Animal use in education and research has raised ethical questions in society. The objective of this work was to study the way students and professors see animal use. Thus, a study was performed on the perception of animal use by 70 students and 17 professors of five areas – biology, engineering and management, humanities (philosophy, physical education, languages and pedagogy), social sciences (accounting sciences) and law – of 17 university programs, through an open and objective questionnaire. Regarding animal use in teaching, the interviewees agree (63%) with the use of living animals, mainly the mouse, in veterinary medicine and biology, even though they report not being aware of their purpose. In an open question about the

use of animals for teaching purposes, part of the interviewees (48.5%) would not use them, but only 18.5% cited the use of alternatives, whereas 41.5% had no restrictions. Of the latter, 20% alleged the need to use animals. In research, the use of white mice was considered correct and fundamental for drug production (27%), especially by the interviewees of the biological areas (85%). The results reflect the traditional vision that the benefits of using animals surpass the costs for their welfare. However, it is necessary to continue the present study and increase the sample size.

III-4-136

### The opinion on the use of animals in higher education in Brazil: comparison across programs and between first and last year students

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The use of animals in education and research is an ethical and polemic issue. Currently, the Brazilian legislation is in transition with the recently approved Law no. 11,794 (2008). In this study we evaluated the ethical matters in the use of animals at the Federal University of Paraná through a qualitative analysis by using questionnaires and interviews. The objective was to compare the opinion of interviewees from different programs and freshmen versus veterans. The analyzed group was composed of 101 students and 20 professors of biology, pharmacy, medicine and veterinary medicine programs. Approximately half of the students (44.6%) do not know the legislation that regulates the use of animals in education. Regarding the use of alternative methods by the professors, most of them believe that

it cannot perfectly approach the learning goals. Professors who use animals for teaching represent 35.0% of the interviewees and for research 55.0%, of which 13.3% practice vivisection. Some alternative methods are used by 70.0%, but only 38.9% of the professors and 29.7% of the students trust them. The students in biology (90.9%) and veterinary medicine (73.3%) are more likely to be concerned with animal welfare in education and research than those in other programs. Students nearly graduated present similar knowledge of legislation as freshmen, and the majority of the interviewees (68.9%) do not believe that alternative methods present high quality. Results suggest that it is necessary to extend the discussion on alternatives to animal use in the academic environment.



III-4-383

## Teaching in pharmacology and 3Rs: problems and ways forward

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The advance in the discovery of drugs has increased the quantity of scientific available information to be evaluated, creating new challenges in the selection of the knowledge to be given in the university classroom. Drug-discovery research requires accurate quantification of the affinity, selectivity and biological effects of new compounds. From *in vitro* assay, it is possible to get information indicating its potential efficacy and safety but *in vivo* studies are essential for determining whether the *in vitro* activity does in fact, translate to the *in vivo* situation. Integrative pharmacologists, who understand the potentials and the risks inherent to a pharmacological mechanism with the ability to build intellectual and technical bridges between molecular, cellular and intact organisms, are needed to evaluate new drugs. However, there is currently a severe shortage of pharmacologists

with the skills needed to carry out *in vivo* studies in medical research. Economical and ethical factors have led to a decline in the teaching of *in vivo* pharmacology but this knowledge and appreciation of integrated responses must be given proper emphasis in any pharmacology courses for undergraduate and postgraduate students. Videos, experimental design, statistical analysis, and data handling exercises related to animal experimentation used in the educational process, could improve animal welfare and the quality of biomedical research and testing in our country. Although economical obstacles must be overcome, this will provide a mechanism by which most biomedical science students can become aware of issues related to the use of animals in research.

III-4-407

## Education and animal experimentation, ethics in higher education

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We aim to promote respect for animals in the existing national laws and regulations on their handling and use and to promote quality and humane education.

Animals are used for education that puts them in a situation that enables us to observe and obtain information but this situation does not consider their welfare. They are giving us an invaluable service, but against their will. They are beings capable of suffering and some scientists have difficulty recognizing their suffering. Therefore, we believe that education provided in the Faculty of Zaragoza, UNAM, must not forget the humanitarian part in education. We must not confuse our students, we ask them to follow the laws and rules that exist but on the other

hand many teachers ignore them to take the shortest route when we use animals in class, regardless the emotional characteristics of students, teachers or animals themselves. Ethics does not excuse us for doing so. Teachers need to build the transcendental value system that forms the basis of the academic vocation, individually and as a group. In many cases, they are resistant to change. They believe the best is the use of animals and software reduces the quality of teaching. However, there are several studies comparing the effectiveness of alternative methods to traditional methods. Therefore, we need to make teachers aware of the principles of the Three Rs – reduction, refinement and replacement; this last one the goal of our university.



III-4-603

## Training for Reduction

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A recent survey has shown significant deficits in experimental design and reporting in studies published in quality biomedical journals across a range of disciplines (Kilkenny et al., 2009). The faults are so widespread that they would be expected to pervade those elements of regulatory work where guidelines do not stipulate a design. The FRAME Reduction Steering Committee is attempting to correct the inconsistencies. At a FRAME/LASA conference bringing together researchers and statisticians it was clear that a major problem was that even when statisticians were consulted their lack of appreciation of the biomedical questions and constraints made it difficult for them to advise on the best design. FRAME has brought together a group of teachers with both biomedical and statistical understanding to offer training for younger researchers that enables them to avoid the common

errors, to appreciate how to select efficient designs, and to pose biomedical questions in a way that helps statisticians provide best advice. Several courses have now been run, which have attracted participants from across Europe and received excellent ratings. Pre- and post-tests confirm the enhancement in understanding achieved in only a few days. This understanding should have an impact in reducing animal numbers and waste of people's time and resources in the studies in which the attendees are involved and follow-up has indicated that this is the case.

### Reference

Kilkenny, C., Parsons, N., Kadyszewski, E. et al. (2009). *PLoS One* 4, e7824.