# Managing 3R
# In your Research

C. Veyrat-Durebex, PhD
PHYM/SCMU

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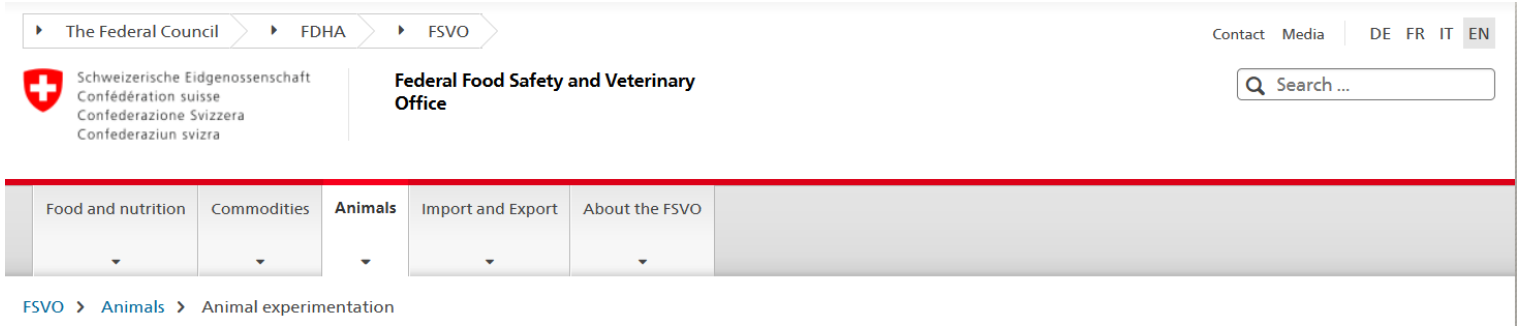



# Law

Animal Welfare Act from the 16th of Dec 2005

Animal Protection Ordinance (OPAn 2008)
Ordinance on animal experimentation (2010)

Source: https://www.fedlex.admin.ch/eli/cc/2008/414/en

# Written in the law ?

Researchers in Switzerland are obliged to keep animal experiments to a minimum. Rather than animal experiments, alternative methods must be used where possible.

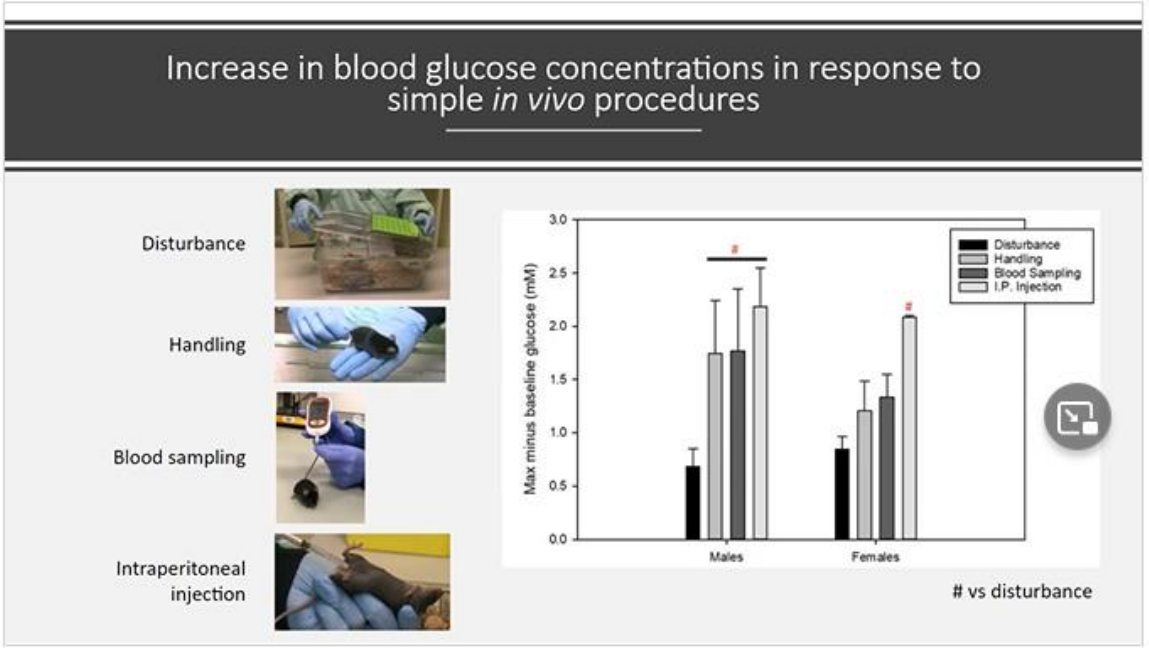
The 3R principles (replace, reduce, refine) call for the development and use of alternatives to animal experiments, the reduction of animal experiments to the absolute minimum and improvements in experiments to ensure that animals are subjected to a minimum of pain.

# Why introducing 3R in my research ?

- Ethical question

- Impact on the reliability of the data obtained: stress and pain have effects on the behavior and physiology of the animal

- Mice implanted with DSI sensors for measuring glycemia




Source: https://insidescientific.com/webinar/sex-drugs-and-protocol-how-researcher-choices-impact-experimental-outcomes-in-preclinical-diabetes-research/

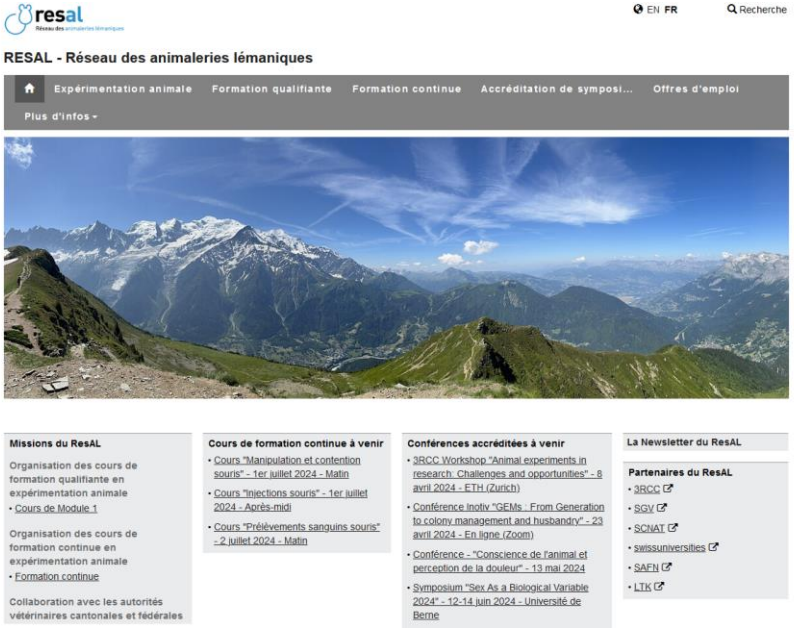
# How to Refine ?

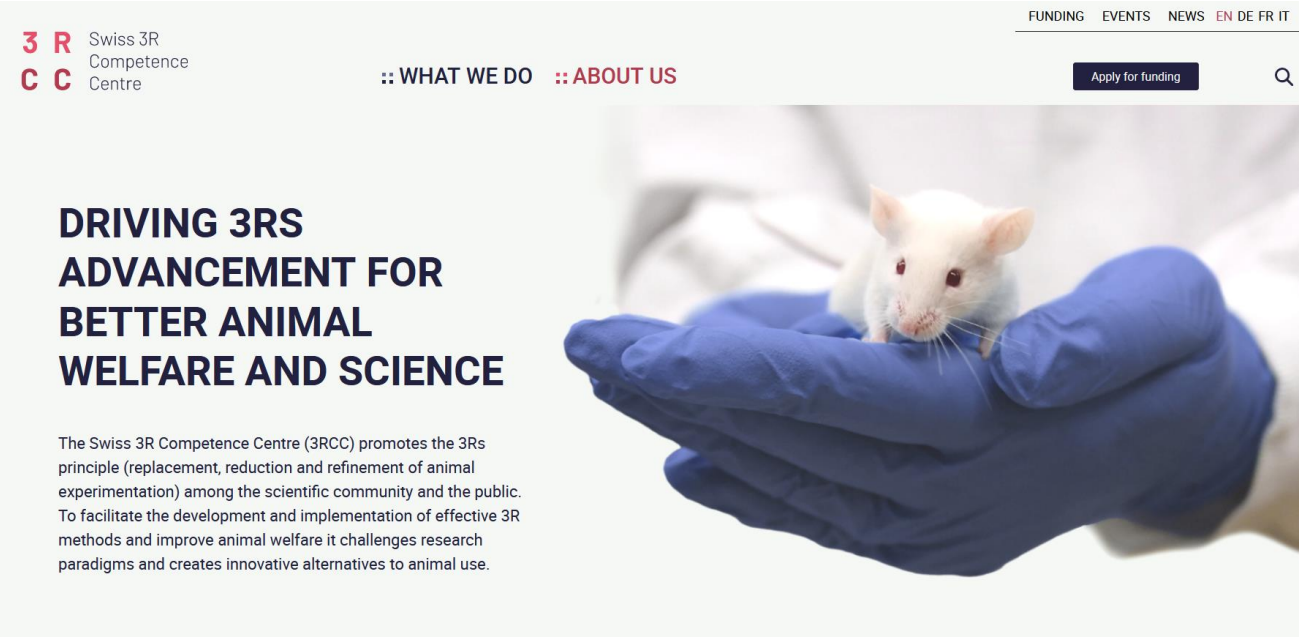
Refine : how be ensured that animals are subjected to a minimum of pain.

1. Knowing animal welfare and how to increase it
2. Knowing suffering of the animal and how to decrease/avoid it
3. Evaluating accordingly the degree of severity of your experiment

# How to increase animal welfare/decrease animal suffering ?

- Be informed and trained (continuous education) - RESAL

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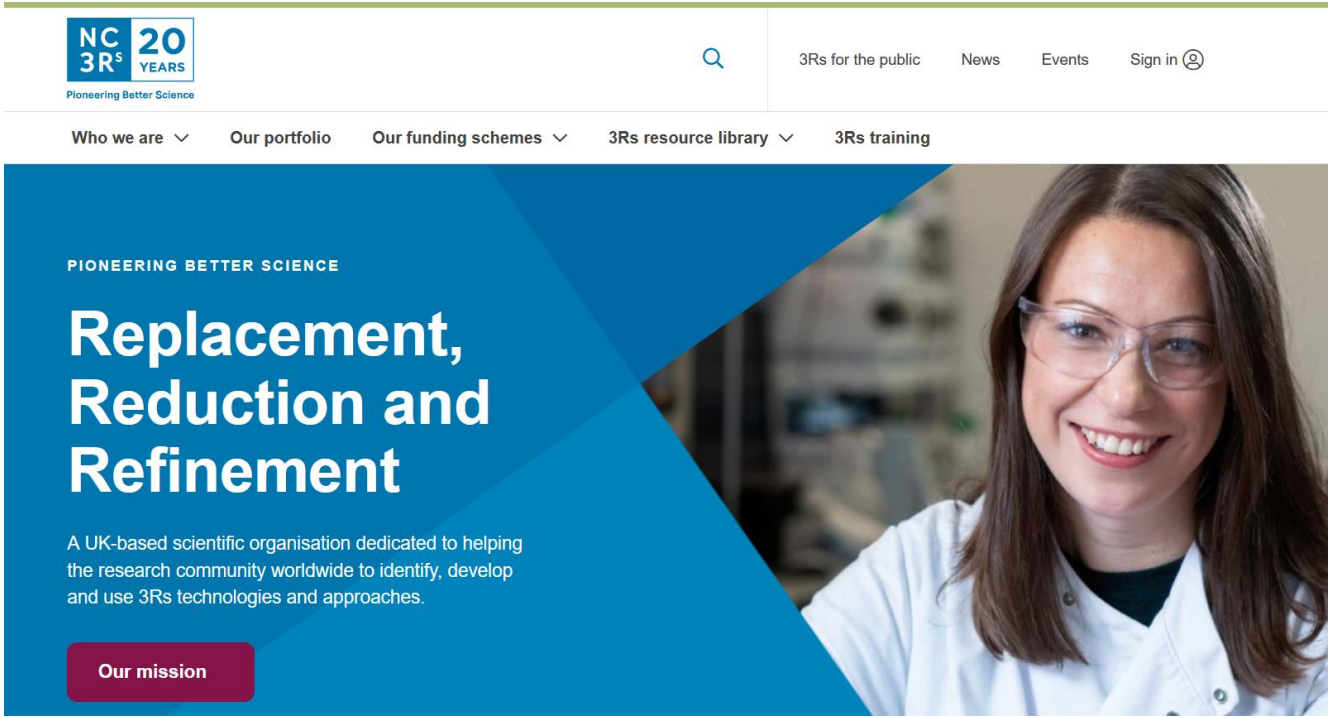
DRIVING 3RS ADVANCEMENT FOR BETTER ANIMAL WELFARE AND SCIENCE
The Swiss 3R Competence Centre (3RCC) promotes the 3Rs principle (replacement, reduction and refinement of animal experimentation) among the scientific community and the public. To facilitate the development and implementation of effective 3R methods and improve animal welfare it challenges research paradigms and creates innovative alternatives to animal use.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PIONEERING BETTER SCIENCE
Replacement, Reduction and Refinement
A UK-based scientific organisation dedicated to helping the research community worldwide to identify, develop and use 3Rs technologies and approaches.
Our mission

- Knowing your animal model

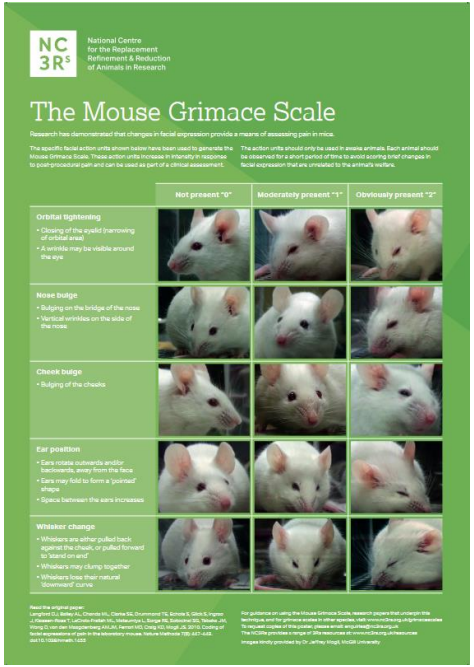
Ex: mice

- Housed in group as much as possible (cage size)
- Improved detention conditions: minimizing transport, light and noise
- Enrichment in the cage
- Tunnel and/or cup handling

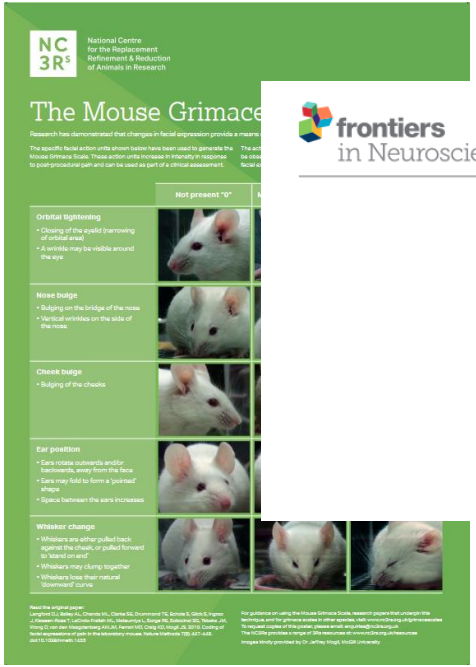
If working on Metabolism

Source: https://www.unige.ch/recherche/expanim/

- Knowing pain/suffering in your animal model




- Knowing pain/suffering in your animal model




- Evaluating accordingly the degree of severity of your experiment

According to article 24 of the Animal Experimentation Ordinance, the constraint suffered by animals caused by interventions or measures taken as part of animal experiments is divided into four constraint categories.

**Degree of severity 0:** No constraint/observational studies
**Degree of severity 1:** Slight constraint
**Degree of severity 2:** Moderate constraint
**Degree of severity 3:** Severe constraint

Source: https://www.blv.admin.ch/blv/en/home/tiere/tierversuche.html

Degree of severity (DS) also depends of the number/frequency of acts done on the same animal during its life

Addition of degree 1 experiments could be considered as degree 2

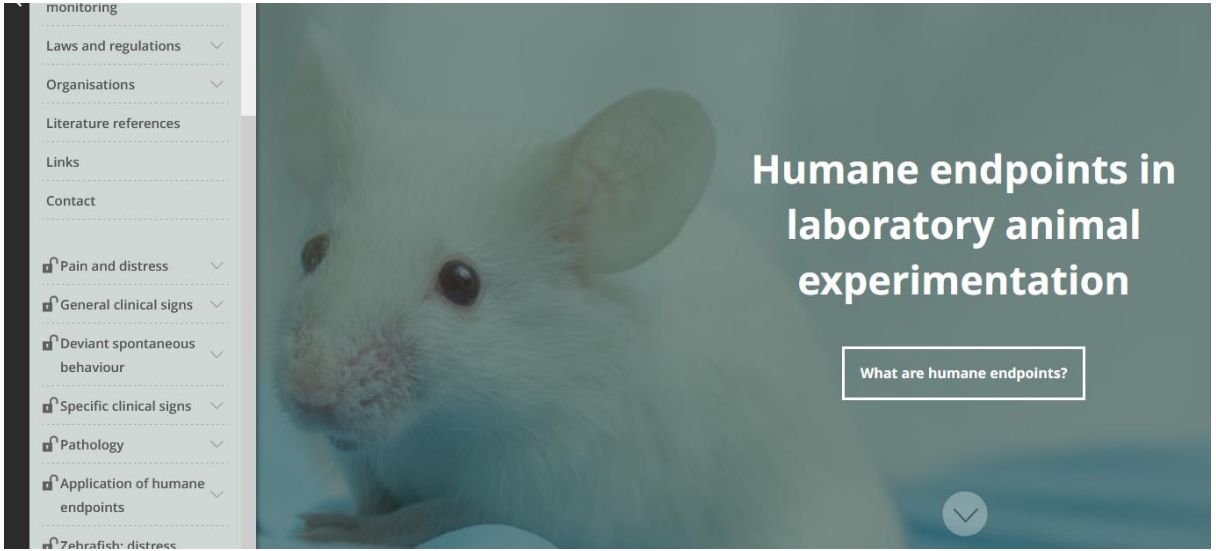
The DS will not influence how your FormA will be considered

The most important thing : your DS should be evaluated correctly

# How to alleviate the DS ?

- Introduce rest period between two tests
- Equilibrate experiments between several groups
- Include a score sheet and define endpoints
  (could be decisive for limiting the DS)

«Humane endpoints» : source of information on the detection of pain, distress and in laboratory animals. Tips, videos, information...




Source: https://www.humane-endpoints.info/en

# How to Reduce ?

Reduce : how to decrease animal experiments to the absolute minimum

1. Statistics : Improve experimental design and statistical analysis
   specific courses/statistical support

2. Group experiments to reduce duplication of control groups

3. Longitudinal follow-up of the same animals (especially if using non-invasive technics)

4. Discuss/Collaborate

- Colleagues
- Departments seminars
- Biobank/-80°C
- DEA / Core facilities…

# How the core facilities could help ?

- Technical help by trained people (Reduce/Refine)

***2. Personal Abilities***

*The stress experienced by the animal during blood sampling does not only depend on the technique and the blood volume collected, but essentially the skill of the person who executes it. This is why it is essential that people taking blood samples are familiar with the animal species and the chosen technique. If not, they should learn and practice the chosen technique under the supervision of an experienced person. It's necessary take special care to handle the animals with care and calm.*

- Help in experiments plan (Reduce/Refine)
- Help in the management of Pain/Anesthesia (Refine)
- Help in animal handling and procedures (Refine)
- Help in the writing of SOPs/Score sheets in the respect of animal welfare

=

Gain of time

# ChiRo (Surgeries in Rodent) Service from the PHYM department

- Technical help
- Technical development
- Protocol/technical advises/training
  - ✓ Animal welfare
  - ✓ Anesthesia/analgesia management
- SOP/score sheets/FormA redaction
- Continuous education

**Florian Visentin**

Florian Visentin
Technicien
+41 22 379 52 30
Courriel

**Christelle Veyrat-Durebex**

Christelle Veyrat-Durebex
Collaboratrice Scientifique
+ 41 22 379 52 10 / 16
Courriel

https://www.unige.ch/medecine/phym/fr/le-departement/le-departement/personnel-commun

# Anatomical and molecular preclinical imaging *in vivo* and *ex vivo*

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## SMALL ANIMAL PRECLINICAL IMAGING PLATFORM (PIPPA)

Academic Director: **Prof. Éric Allémann**
Operational Manager & contact: **Dr Didier Colin**
**didier.colin@unige.ch**; +41 79 553 44 58

https://www.unige.ch/medecine/pippa/

CIBM Center for Biomedical Imaging

## CENTER FOR BIOMEDICAL IMAGING (CIBM) PET HUG-UNIGE SECTION

Section Head: **Prof. Valentina Garibotto**
Operational Manager & contact: **Olivia Bejuy**
**olivia.bejuy@unige.ch**; +41 79 553 46 04

https://cibm.ch

### Small animal imaging as a bridge between bench and bedside to increase translational power

- To validate *in vitro* results in preclinical models
- To translate preclinical results to clinical trials

### Small animal imaging and 3Rs

- **Replace**
  - Partial replacement (fertilized egg models)
- **Reduce**
  - Longitudinal monitoring on the same animals
  - High translation power to clinical trials
  - Sharing imaging data between labs
- **Refine**

- Non-invasive technics
- Definition of novel endpoint criteria

# Metabolic phenotyping

## PHENOTYPING OF SMALL ANIMALS

**Phenotyping of small animals through physiological and metabolic analyses**
**Clamp glucose / insulin**

- Academic co-directors: Prof. Roberto Coppari
- Contact persons: Dr Franck Bontems
- Contact persons for clamp glucose / insulin: Dr Christelle Veyrat-Durebex

Tel: 022 379 52 16
Christelle.Veyrat-Durebex@unige.ch
Franck.Bontems@unige.ch
**https://www.unige.ch/medecine/phenotypage/en**

# Thank you