

Mainstreaming Replacement through pervasive education



Centro 3R

The 12th World Congress on Alternatives and
Animal Use in the Life Sciences
«Implementing the 3Rs in higher education»
August 29th, 2023



Arti Ahluwalia



Interuniversity Center for the Promotion of the 3Rs Principles in Teaching and Research CENTRO 3R



Centro 3R

Vision: an interuniversity infrastructure for guiding the implementation and integration of the 3Rs in scientific curricula and in basic and applied research

Mission: promote humane and evidence-based thinking through education and research *for the mutual benefit of humans, animals and the environment (ONE HEALTH)*

Strategy: sharing teaching and learning methodologies and resources.

3Rs=better science



CURRENT MEMBERS



UNIVERSITÀ
DI PISA



UNIVERSITÀ
DI GENOVA



CAMPUS BIOMEDICO



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DI MILANO



UNIVERSITÀ DI PAVIA



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DI MILANO BICOCCA



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POLITECNICA DELLE
MARCHE



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DI TORINO





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IMPROVE

**3Rs concepts to improve the quality of
biomedical science**



<https://www.cost.eu/actions/CA21139/>



Funded by
the European Union



2023

WC12, Niagara Falls, Canada
August 27th-31th, 2023



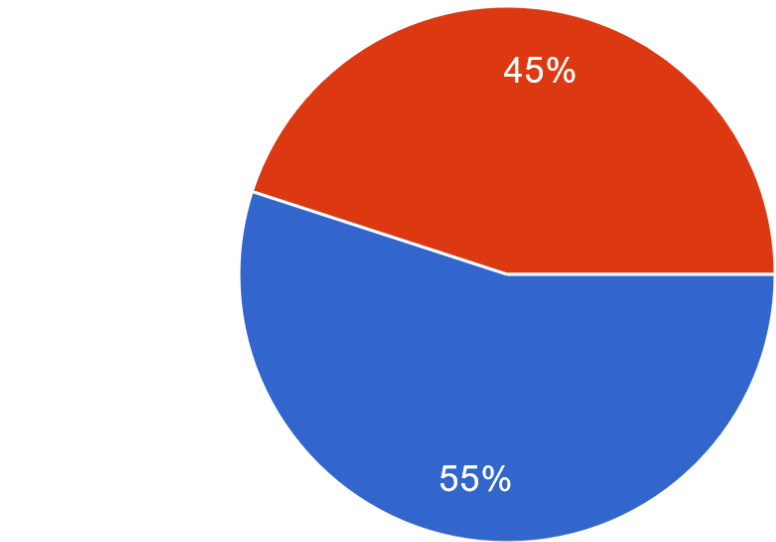
Research Center E. Piaggio
University of Pisa



Why don't we use alternative non animal methods for basic research at our universities?

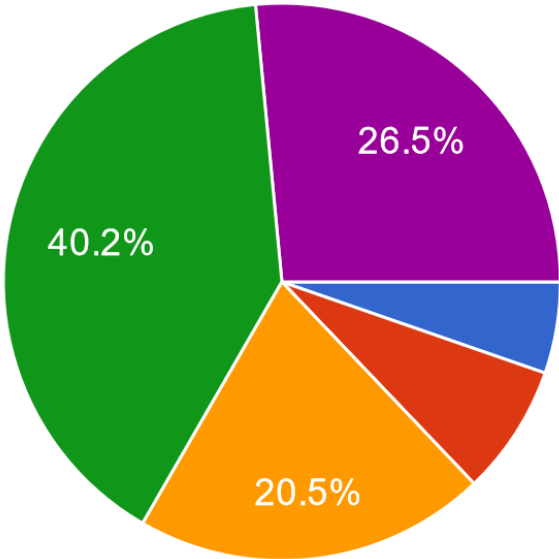
Questionnaire 2019

Do you know of the 3Rs?



- Yes
- No

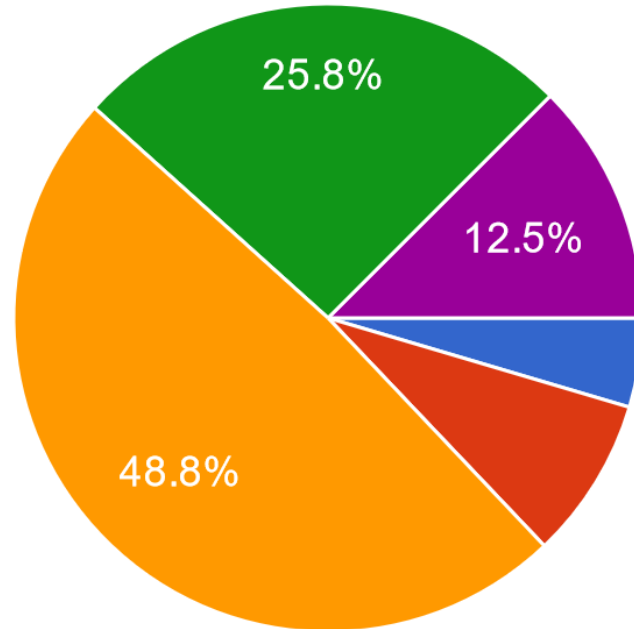
When you first hear of the 3Rs?



- More than 20 years ago
- 11-20 years ago
- 5-10 years ago
- 1-5 years ago
- This year

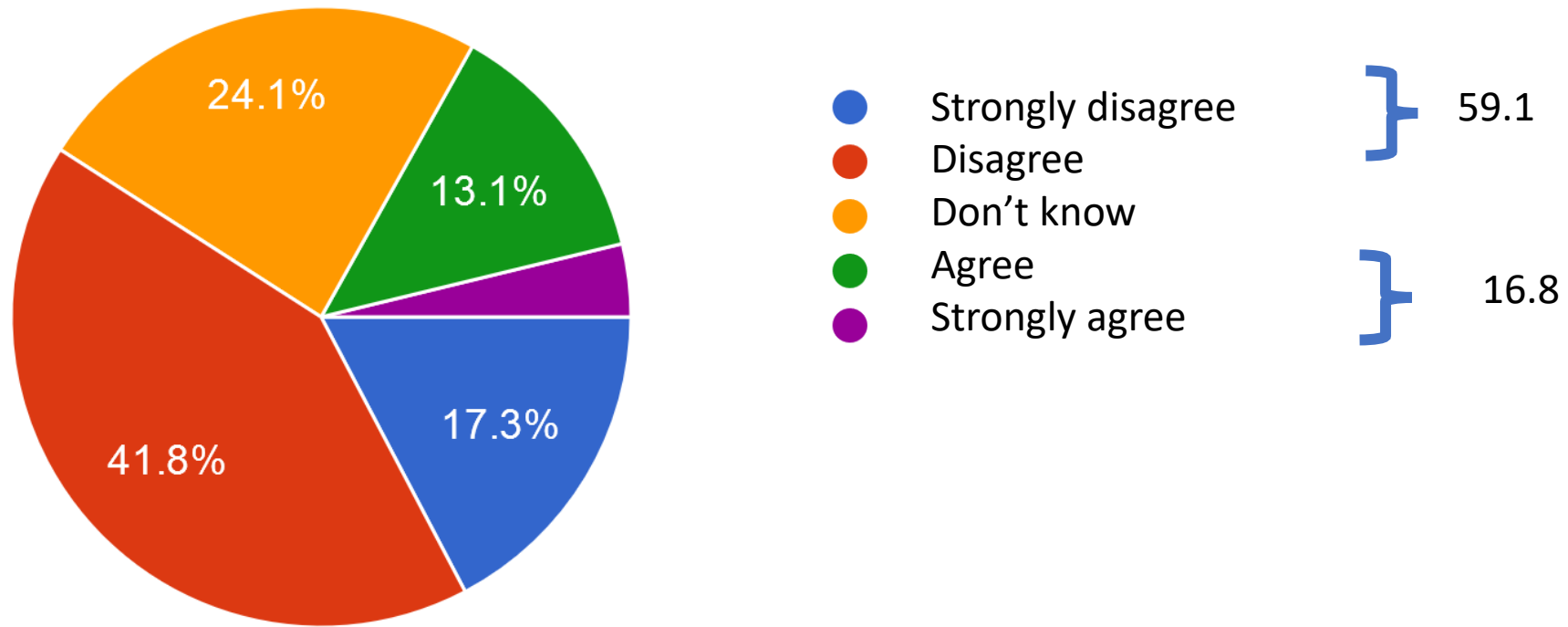
Questionnaire 2019

Italian law safeguards lab animal welfare sufficiently



- Strongly disagree
- Disagree
- Don't know
- Agree
- Strongly agree

The use of alternative methods (to animals) will damage the quality of science



<<L'universita' e' la sede della ricerca libera>>



- Freedom of choice
- Freedom to conduct research
- Freedom to choose the appropriate method on the basis of the research question
- Access to appropriate choices for conducting research through knowledge and training
- Access to appropriate technology

Pervasive training

Education, education, education



PERVASIVE TRAINING

**Refresher and
Extra University-
Courses**

PhD Courses

**Summer Schools/
Theoretical-
Practical
Courses/Workshops**

**Master/Bachelor
Degree Courses**



**BIOLOGY,
MEDICINE**



**ENGINEERING,
INFORMATICS**



**LAW, ETHICS,
PHILOSOPHY**

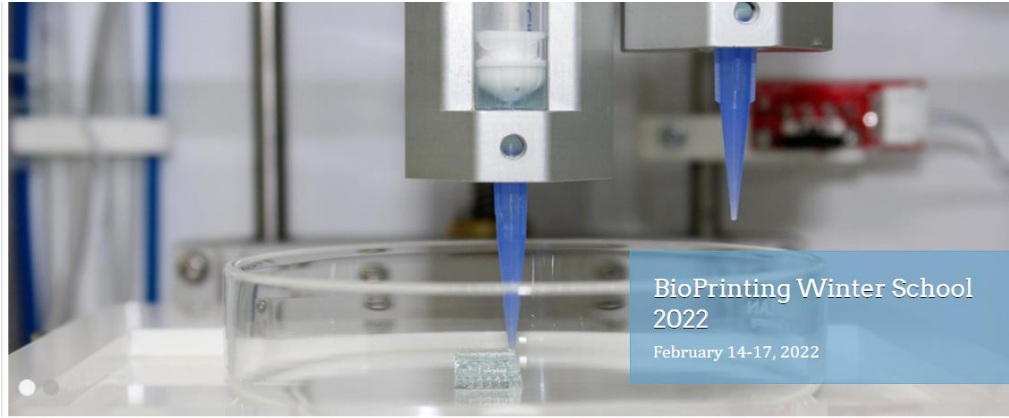
Extra University- Courses: pioneering examples



- Introductory report to the "**Introductory Course on Animal Experimentation**", 17, 18, 19 December **2018**, Mario Negri Institute for Pharmacological Research IRCCS, Aula Guasti, Milan, Lecturer Anna Maria Bassi.
- Lectures module "**21st CENTURY TOXICOLOGY: Innovative models for risk prediction**", 14-15 June **2018**, theoretical and practical lessons in the laboratory, for the **II Level University Master's Degree Management of Chemicals Integrated approach to the REACH regulation and other regulations European Union on Chemicals**. Lecturer Anna Maria Bassi.
- Course organized by the 3R Center for permanent training and updating of health service personnel (CEFPAS of Caltanissetta, Lecturer Anna Maria Bassi): "**PROTECTION OF ANIMALS USED FOR SCIENTIFIC PURPOSES. RESEARCH AND INNOVATION IN THE FIELD OF SUBSTITUTE METHODS** ", Caltanissetta 7 - 8 February **2019** - 2 hours.
- European Master on Translational Cosmetic and Dermatological Sciences, UPO Nanoformulated cosmeceuticals: skin permeability and toxicity (Lecturer: Luisa Fiandra): "**Alternative methods for the validation of skin cosmetics, data obtained on 3D skin models**", **2022**

Summer Schools/ Theoretical-Practical Courses/Workshops

More recent courses/events:



Pavia - February 14-17, 2022

BioPrinting Winter School 2022 - From printing set-up to laboratory analysis



Workshop
"Il Principio delle 3R per una visione comune"

31 ottobre 2019
MINISTERO DELLA SALUTE
Viale Giorgio Ribotta, 5 - Roma
Auditorium Biagio d'Alba

REGOLATORIO JRC
IPAM PARERE RICERCA
IZLER DIDATTICA IN SILICO OPBA
ECVAM CNPA
CENTRO 3R FORMAZIONE

ISTITUTO SUPERIORE DI SANITA'



Centro 3R
LAM
Laboratorio di Analisi e Ricerca in Fisiopatologia
Dipartimento Medicina Sperimentale (DIMEC)
Soc. Patologia Generale
Università degli Studi di Genova

4 Edizione
Corso Teorico Pratico Avanzato
**DARE UN SENSO AI METODI
SOSTITUTIVI ALLA
SPERIMENTAZIONE ANIMALE**



Genova, 29-30 Novembre 2018

**Corso di aggiornamento aperto a
24 partecipanti**

Accreditamento: 20,3 ECM

Per i profili professionali:

Medico chirurgo, Veterinario, Biologi,
Biotecnologo, Chimico, Farmacista e
Tecnico di laboratorio Biomedico

Centro 3R training

Others in 2022:

Summer Schools/ Theoretical-Practical Courses/Workshops



CORSO TEORICO - PRATICO

Approcci innovativi in ambito cosmetico, in ottemperanza con la regolamentazione europea.

Centro 3R symposium Biofabrication:



EuroClone
serving science through innovation



MATTEK
A BICO COMPANY

Master/Bachelor Degree Courses



- **MANAGEMENT OF ANIMALS USED FOR EXPERIMENTAL PURPOSES (3 ECTS; 33 hours; Prof. Angelo Gazzano) since 2019**

Course: Animal breeding techniques and cinophilic education

Aim: acquire skills as an animal care and experiment manager.

- **ANIMAL EXPERIMENTS AND ALTERNATIVE SYSTEMS (3 ECTS; 24 hours; Prof. Michela Ori) since 2020**

Course: Elective

Aim: 3Rs Principles: legislation, alternative methods, statistical tools

- **ALTERNATIVE METHODS FOR PRECLINICAL TESTING (3 ECTS; Prof. Daniela Monti, Prof. Simone Brogi) since 2020**

Course: Pharmacy

Aim: Technical and regulatory/law training on 3Rs Principles

- **IN SILICO METHODS AS ALTERNATIVES TO IN VIVO ANIMAL EXPERIMENTS (3 ECTS; Prof. Gabriella Ortore) since 2019**

Course: Chemistry and Pharmaceutical Technologies

Aim: Alternative methods in toxicology (QSAR/QSPR approaches)

- **SPECIAL EDUCATION PROJECT ON BIOENGINEERING FOR THE 3RS (integration of additional activities in MSc programme; Prof. Arti Ahluwalia and Maria G Cascone) 2023**

Course: Biomedical Engineering

Aim: Provide knowledge on 3Rs Principles and EU/national regulations: in vitro and in silico models; practical training and expert seminars

Master/Bachelor Degree Courses

➤ LABORATORY OF TISSUES AND PHYSIOLOGICAL PROCESSES' MODELS (6 ECTS; 60 hours; Prof. Valeria Chiono) (since 2020)

Course: Biomedical Engineering

Aim: Provide knowledge on 3Rs Principles: in vitro and in silico models; practical training and final group project

1) 3R Principle and Directive 2010 / 63; methods of refinement and reduction in the planning of animal studies; replacement methods for safety and biocompatibility assessments: potentialities and limitations. 2) Preclinical experimental models in vivo (animal trials) and their integration with in vitro cell trials with examples of mouse models of human diseases 3) Protection of animal welfare in European legislation, according to the animal species and their native social organization. 4) Experimental in vitro models and their most recent applications: 2D cultures and 3D models with practical laboratories 5) Basic elements on in silico models in preclinical experimentation and their main applications. 7) Ability to perform project activity in group: interaction with other students for getting information, project writing and its oral presentation.



**Politecnico
di Torino**

PhD Courses

- **ETHICS IN RESEARCH (1 ECTS; Prof. Gabriella Nicolini) 2019**
PhD/Faculty: PhD in Neuroscience; Converging Technologies for Biomolecular Systems;
Elective course for degree in Medicine and Surgery
Aim: 3Rs in biomedical studies, providing basic knowledge on experimental models and tools
- **3RS PRINCIPLES FOR BIOMEDICAL ENGINEERING (3 ECTS Prof. Laura Pastorino), 2020**
PhD: PhD in Bioengineering and Biorobotics
Aim: 3Rs principle for basic research, toxicological applications, method development and validation, regulatory aspects; case studies and ethics
- **ETHICS IN RESEARCH (5 ECTS Prof. Andrea Aliverti), 2017**
PhD: For different PhD Courses, particularly PhD in Bioengineering
Aim: Ethical aspects, complicity, standards and quality in research and technology; case studies.
- **ETHICS IN RESEARCH (4 ECTS; Prof. G. Cusella De Angelis, A. Ferrigno, C. Lanni, M. Paolillo, M. Torre, L. Visai) , 2021**
PhD: PhD in Translational Medicine; Health Technologies, Bioengineering and Bioinformatics; Chemical and pharmaceutical sciences; Industrial innovation
Aim: Knowledge on 3Rs Principles: moral basis of animal experimentation; reduction; in vitro and in silico models in regenerative medicine and cancer



UNIVERSITÀ DEGLI STUDI
DI GENOVA



POLITECNICO
MILANO 1863



UNIVERSITÀ DI PAVIA

Refresher and Extra University-Courses

Mandatory training for staff involved in animal procedures

April-July 2023

Training of staff involved in animal procedures (necessary for researchers and staff who perform the four functions, as stated in article 23 of the Directive 2010/63/EU and the Italian Decreto Formazione, 2021): Function A: perform procedures. Function B: design procedures and projects; Function C: take care of animals; Function D: euthanize animals.

University of Pisa, University of Siena, University of Perugia, National Council of Research (CNR) and Centro 3R

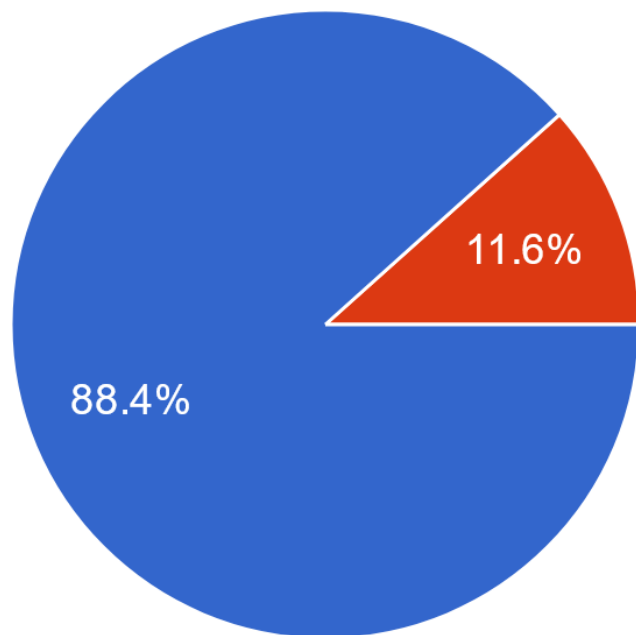
Centro 3R was in charge of courses on the 3Rs, Animal Rehabilitation and Ethics.



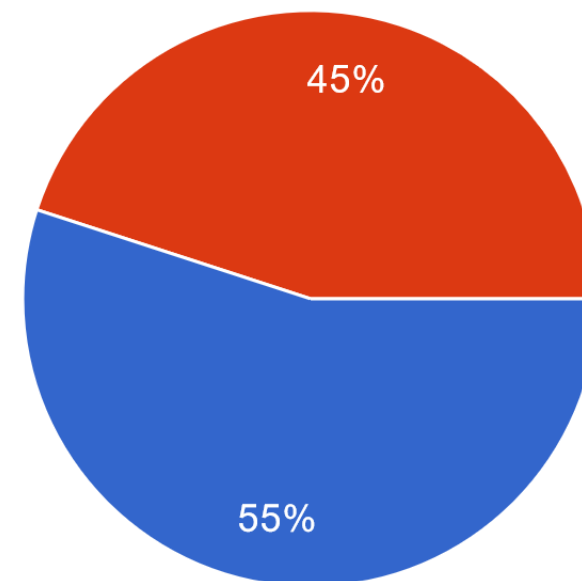
2023

Do you know of the 3Rs?

2019



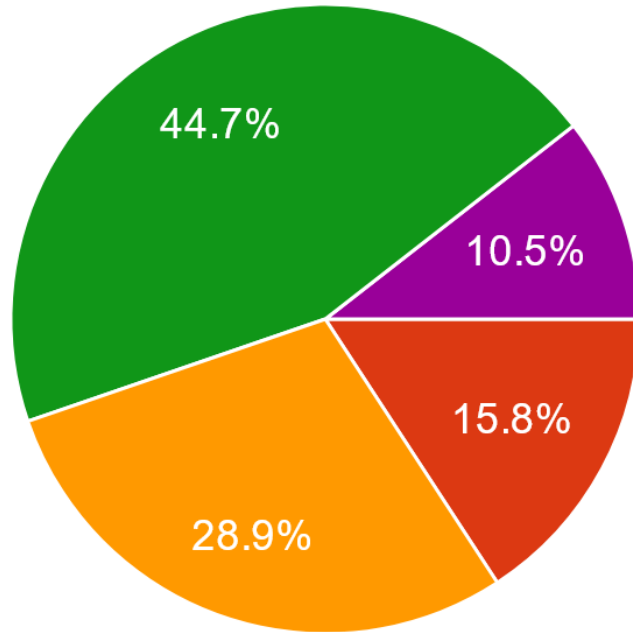
● Yes
● No



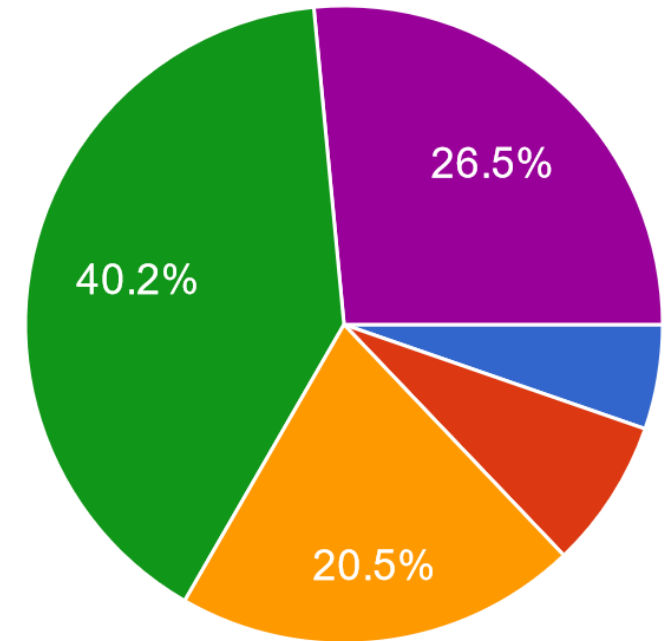


2023

When you first hear of the 3Rs?



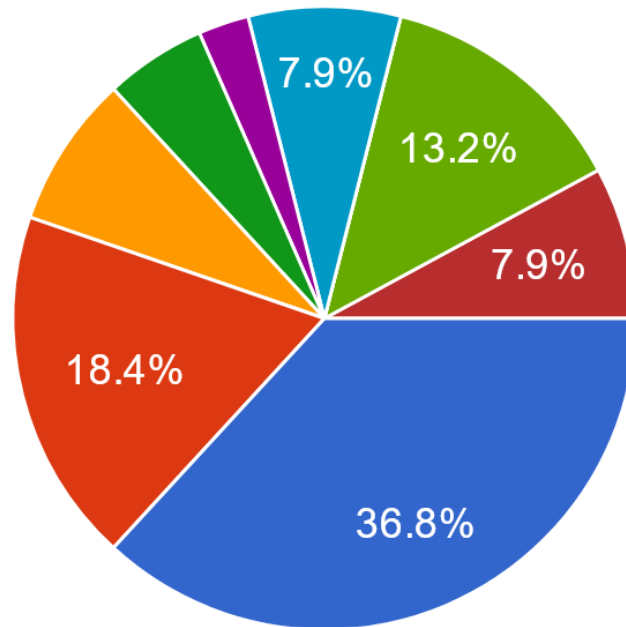
2019



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2023

Where did hear about the 3Rs?



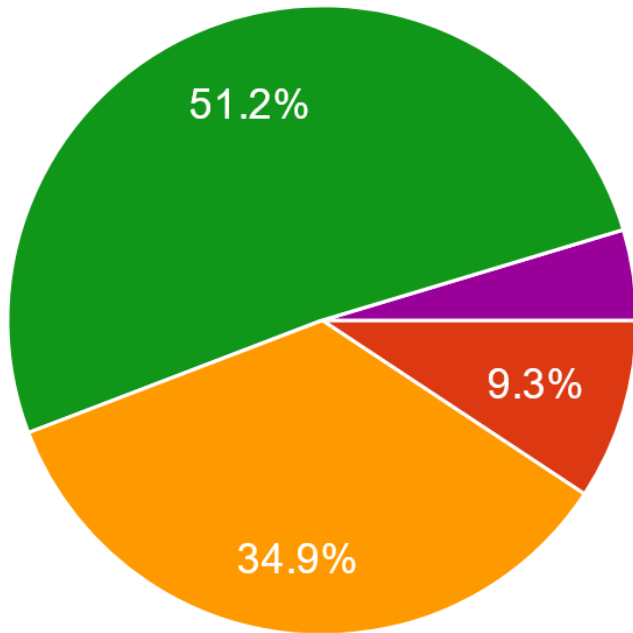
- **During my education**
- From colleagues
- Grant applications
- Scientific literature
- Online
- **Centro 3R**
- Elsewhere
- **Courses/seminars**
- Don't know



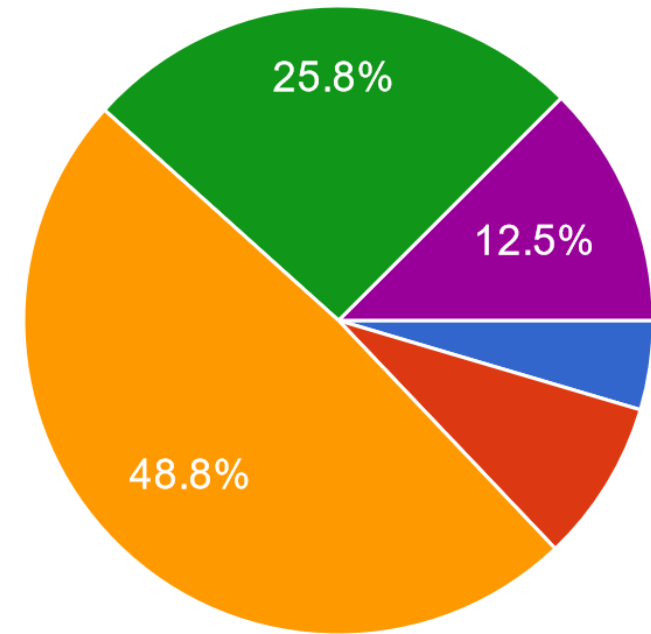
2023

2019

Italian law safeguards lab animal welfare sufficiently



- Strongly disagree
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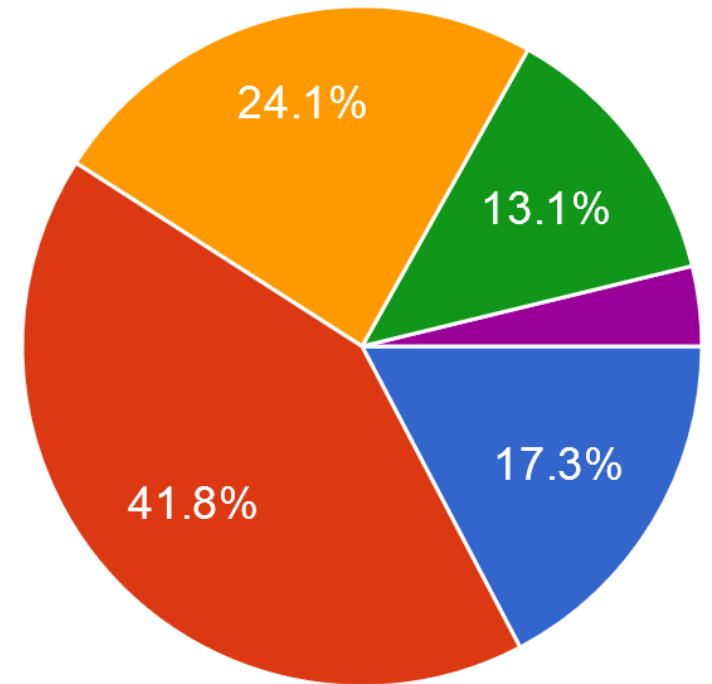
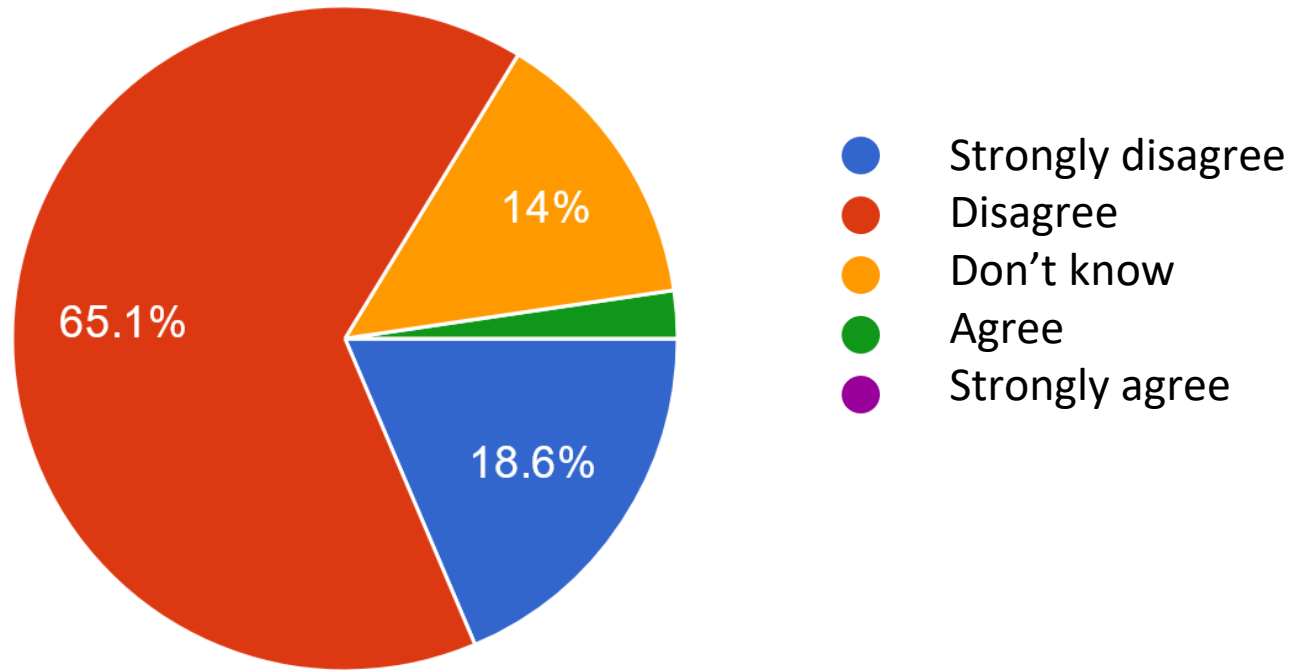


2023



2019

The use of alternative methods (to animals) will damage the quality of science



Thank you for your attention!

Feel free to contact me:

 arti.ahluwalia@unipi.it



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Twitter: [#centro3R](https://twitter.com/centro3R)



The role of 3Rs in the age of One Health: *where we are and where we're going.*

September 13-15, 2023

To get further details visit www.centro3r.it or



Università degli Studi di Milano-Bicocca
Aula Sironi U4-08, Piazza della Scienza 4, 20126 Milano
Abstract deadline: July 15, 2023

