

# Non Animal Methodologies (NAMs): research, testing, assessment and applications

NAMs: INvest IN education.

## Integrated Approach for Teaching Alternative

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### INTRODUCTION

The role of Academia to train new generation of scientists and future researchers on Non Animal Methodologies (NAMs) is crucial.

Professor/student community from the Università degli Studi di Milano, Module Toxicology and *in vitro* models II year Master Degree, Veterinary Biotechnological Sciences Curriculum, worked together through a didactic integrated approach, in order to define Educational impact of NAMs.

### MATERIALS AND METHODS

#### Questionnaire:

- 1- Which is your vision on NAMs and Science?
- 2- How is important Education on NAMs?
- 3- How do you think is possible to improve the Education on NAMs?
- 4- Do you think that NAMs could replace *in vivo* studies in toxicology in the future?
- 5- Do you consider this topic important for your working career? Why?

### RESULTS

#### 1- Which is your vision on NAMs and Science?

In the next few years, through the concept of the 3Rs, it will be possible to considerably reduce the use of animals thanks to methods that could more accurately mimic what happens *in vivo*. Unfortunately no standardized tests are available in all areas of the research.

#### 2- How is important Education on NAMs?

In order to be capable of facing today and tomorrow challenges, education is fundamental. A solid knowledge of the reasons that led us to 3Rs principles, a complete vision on our past and on the questions that need to be answered in future will enhance a progress better shaped on reality.

#### 3- How do you think is possible to improve the Education on NAMs?

Improvements of the education on NAMs at all levels, in order to shape the attitude of the students teaching them the basis of this innovative concept. Moreover NAMs can gain a considerable help from the universities which are institutional places for efficient collaboration and communication in order to fulfill progress in this field.

#### 4- Do you think that NAMs could replace *in vivo* studies in toxicology in the future?

Our point of view is that the possibility that NAMs replace *in vivo* studies in toxicology is real: the crucial point is when it would happen. The need is to create the conditions to obtain models that are completely autonomous in reproducing what happens *in vivo*. However not all the results obtained through animal studies can be extrapolated directly into humans.

#### 5- Do you consider this topic important for your working career? Why?

We consider it as a starting point and not as a goal. The major challenges from modern biomedical research concern complex and multifactorial diseases, for which all experimental approaches are indispensable because of their complementarity. NAMs must be constantly improved to be more reliable and predictive and this involves a great deal of work, excellent for those interested in contributing to the research and reduction of the use of Non-NAMs in laboratories.

### CONCLUSIONS

- Education on NAMs is fundamental
- Improvement of Educational «Pathway» is required
- Collaboration with stakeholders is necessary
- Career opportunities seem promising
- Too speed up research on NAMs is crucial

### REFERENCES

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