Mission and ambition of TPI, Transition Programme for Innovation without the use of animals

Mission: Better prediction without laboratory animals

Ambition: The Netherlands (TPI) as the catalyst in the (inter)national transition to animal-free innovation

Explanatory notes to the mission and ambition of the TPI partner programme

Pioneer in the approach to acceleration

The Netherlands can be described as a pioneer in our approach to accelerating the transition to animal-free innovations. It is also remarkable that the government, in this case the Minister of Agriculture, Nature and Food Quality, has taken on the role of director of an acceleration programme. To date, a similar approach has not been adopted in any other country. The TPI partner programme brings together ten partners who are developing the practical elaboration of the TPI programme. In collaboration, these partners have now formulated a new ambition and mission. The ten partners are also in direct contact with a broader network to involve the entire chain of society, science, government and business in accelerating the transition. This network approach creates opportunities for dialogue with the various stakeholders from different sectors and countries. As well as creating space for dialogue, the partners and the network are working to fulfil this ambition and mission by:

- Financing animal-free test methods and humane measurement models;
- Designing a knowledge agenda for animal-free innovations;
- Encouraging a shift in thinking: 'Place the focus on the best method for each research question';
- Drawing attention to new developments;
- Training young professionals and students in new research methods;
- Encouraging across-the-board cooperation and the early involvement of knowledge users to maximise the application of the methods;
- Ensuring a prominent role in the transition for young professionals and students by facilitating the establishment of Young TPI;
- Designing a new frame of reference for reliable safety assessment without the use of laboratory animals (VHP4Safety).

Partly thanks to this TPI network, we can ensure that the knowledge and experience accrued by the network members is shared nationally, with a view to creating a snowball effect in all these different fields. The sharing of knowledge and experience is a vital factor in accelerating the acceptance and application of animal-free innovations.

Motivation

The transition to animal-free innovations is complex, time consuming and uncertain. However, there is light at the end of the tunnel. Scientists, entrepreneurs and civil society organisations are increasingly aware of the opportunities for research and testing without the need for laboratory animals. One key motivation is the ethical position on the use of laboratory animals, but other motivations such as better predictive models for

humans and better science also play an important role. Based on these motivations, laboratory animal-free and human-based methods are being developed in a variety of fields. This work is being conducted for application within fundamental and translational research but also for innovations within education. Work is also being carried out on laboratory animal-free methods that (in the future) will be usable within a new frame of reference for current international safety assessments and efficacy and screening studies, for which laboratory animal testing is still often needed. These studies and assessments are important for testing for example the efficacy and safety of medicines and the safety of humans, animals and the environment in the event of exposure to (chemical) substances. This information is often subject to statutory requirements that demand laboratory animal testing.

In other words, there are a number of possible motivations behind the (necessary) development of animal-free innovations. What they all have in common is the need to maintain focus on what is best for both humans and animals.

New frames of reference

Laboratory animal testing can generally not be replaced like-for-like by a method without laboratory animal testing. Generally speaking, a battery of human-based *in vitro* and *in silico* models is required, in combination with knowledge of human biology and physiology (for example obtained using data from the clinic) to increase predictability for humans. For a true transition to animal-free innovations, merely thinking in terms of replacing animal experiments is therefore insufficient. What is needed is a new frame of reference, for which the target organisms, for example humans, form the starting point. By basing models and tests on the target organisms, and focusing development on the research question to be answered, it is not only possible to reduce the level of laboratory animal testing but also to improve the predictability of the models and tests. Models and tests that do not use laboratory animals clearly offer those opportunities, although there are still restrictions to be overcome. Current developments are already working towards a human-based frame of reference, to meet the demand for better predictive models for example for the safety of substances but also for the safety, efficacy and personalised administration of medicines for human use. The mission of the TPI partners is therefore: Better prediction without laboratory animals.

Trust and integration

There is still a clear need to develop animal-free innovations but the integration of the newly developed ideas and methods in education is also important. The process of validation, acceptance and application of animal-free innovations is also not self-evident, even though regulations do offer clear opportunities for animal-free innovations, for example in safety studies. It remains a tailor-made process and is often an international affair. A lack of trust in the new models or tests (acceptance) and time and money are other contributing factors. The validation (or qualification) and application of animal-free innovations still has a long way to go within fundamental and translational research. The partners in the TPI programme have therefore made this the central question in their activities:

Why are animal-free innovations insufficiently accepted in the practices of scientific research, translational research (efficacy studies, safety studies, screening studies) and safety assessment?

Sub-questions based on this initial question relate to the potential role of science, business, (research) funders, policymakers and administrators in increasing the acceptance of animal-free models and tests.

From pioneer to catalyst

The ambition of the TPI partners is to share the experiences gained in the Dutch TPI programme with other countries and parties. In the judgement of the TPI partners, European collaboration and a European approach are crucial to any further advances. Both safety assessors and researchers, entrepreneurs and educational institutions are often European and/or internationally oriented. It is therefore important that the transition be placed broadly and solidly on the EU agenda. The Netherlands cannot succeed on its own, but we can use our experience to serve as a catalyst in the (inter)national transition. We can achieve more through collaboration and together we can ensure that on a European level, developing the answers to research questions and assessments without animal experiments acquires a more central focus. To make that possible, however, widely supported new approaches and frames of reference will be needed.

Work is already underway in the Netherlands on developing an example of such a new approach, in the establishment of a frame of reference based on knowledge of human biology and physiology, instead of experiments on live animals. The consortium 'Virtual Human Platform for Safety' (VHP4Safety) is working on a human computer model which could replace the use of laboratory animals as a new frame of reference for the safety assessment of medicines and chemical substances.

A European approach to accelerating the transition could ensure that innovations in a whole variety of fields are more successfully introduced across national boundaries, while at the same time encouraging more international cooperation. These developments offer Europe opportunities to acquire a pioneering position in a still developing market, for the development, production and marketing of animal-free innovations for the European and global marketplace.