

Brussels, 22 January 2012

## **VPH INSTITUTE: POSITION STATEMENT ON ANIMAL EXPERIMENTATION**

In a context of ageing societies, the general public demands better treatments targeting the most common but also the most rare diseases, chronic and curable conditions, without compromising public health protection and ensuring the efficacy of the new treatments. European and national regulators have been working in the area of safety, quality and efficacy of the new medicinal products. This was reflected in European legislation requiring the conduction of toxicity tests on animals.

It is hard to imagine biomedical research without animal experimentation but European society is growing increasingly concerned by the ethics of imposing discomfort and death to another living creature. The human quest for well-being and health will not stop, we, as scientists, have the obligation to explore other means to contribute to human health and well-being. International and European policy makers, researchers, industry and stakeholders are increasingly supporting the 3Rs principles (replacement, reduction and refinement) for experimenting with animals.

The main question would be: can we use computer simulations to replace (at least partially) animal experiments? Computational biomedical research has greatly advanced in the past decade and the methods and technologies developed by the “**Virtual Physiological Human**” research can be in principle adapted to this purpose. We believe that the principles of virtual modelling technologies provided by the VPH can be applied to animal experimentation and help reducing the number of animals used.

The approach we propose is similar to the one used in VPH technologies for humans. The animal is examined with **imaging and sensing instrumentation**, generating data that would be collected in digital form and processed to generate a **large-scale computer simulation** of the animal, capable of predicting how the animal experiment will evolve. We can then compare the prediction of the actual experiments, and refine our models until they are sufficiently accurate in their prediction. From then on, we can do simulated experiments of the same kind without involving additional animals, or involving only a much smaller number in order to confirm the predictions made.

There are **four potential advantages** in the use of computer simulation of animal experiments:

1. **Reduction:** in silico modelling facilitates a considerable reduction in the number of animals involved in each study, with the same level of efficacy. By using imaging, sensing and modelling, we can in many cases follow the same animal over time, instead of killing a group of animals at each time point.
2. **Refinement:** computer simulations can make animal experiments more humane. By modelling the running animal experiment we can use computer models to quantify things that, in order to be measured directly and experimentally would impose a considerable level of discomfort to the animal.
3. **Replacement:** in silico research can help replacing those experimentations on animals that can be avoided. Currently, researchers use animals on studies that are very similar but only focus on a

very specific aspect. Through virtual modelling and simulations, researchers can develop a sufficiently accurate computer model, capable of predicting the experiment that would replace a large part of the animal experiments with computer simulations. .

4. **Translation:** Computer simulations to translate results of animal experimentations to human are becoming a tangible and a powerful tool for increased safety and efficiency. We believe that computer simulation can allow for the modelling of biological process in the mouse that can then be used for translating results of animal experimentation much more safely and effectively into human health.

In silico research provides enormous potential advantages for reducing, refining and replacing animal testing as well as translating the results of animal experimentation to humans. The existing and future benefits that will be brought by the VPH require a long-term support from European and national institutions so as to generate coherent and coordinated scientific progress in this area. The European Union should continue supporting the VPH in order to respond to the growing societal requests to reduce animal experimentation and to boost European competitiveness and growth.

Signed on behalf of and approved by all members of  
the Board of Directors of the VPH Institute for biomedical integrative research.