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VPH INSTITUTE: RESPONSE TO PETITION REQUESTING BAN ON ALL ANIMAL EXPERIMENTS IN EUROPE

With great interest the VPH institute has followed the European Citizen's initiative calling for a ban on all animal experimentation¹. The mission of the VPH institute is to support the development of *in silico* medicine by ensuring that the Virtual Physiological Human (VPH) is fully realised, universally adopted, and effectively used both in research and clinic. Though we agree with the moral motivation of the initiative, we, as scientists, cannot support a call that would remove a fundamental instrument of scientific investigation and of improvement of human health.

For basic safety reasons, it is not conceivable at the time of writing, to directly transfer to humans new concepts tested only through lab experiments based on synthetic or cell-scale materials. Living organisms are extremely complex and still poorly understood. Accordingly, animal experimentations remains the most reliable instrument to translate progressively the application of new scientific findings from lower to higher biological complexity, until the impact on humans can be properly anticipated. Nevertheless, this situation can evolve, and we fully subscribe the call for additional investments in alternatives to animal experimentation.

In an earlier position paper published on 22/01/2012², the VPH institute elaborated on the advantages of the VPH concept and computer simulations of animal experiments in terms of reducing, refining and partially replacing animal experiments. Additionally we have argued that these same models could be of use when translating findings from the animal to the human context.

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 coupling modelling to imaging and sensing, we can in many cases follow the same animal over time, reducing the number of animal killing at different time points in a given experimental group.
2. **Refinement:** computer simulations can make animal experiments more humane. By modelling the running animal experiment, we can use computer models to quantify variable of interest, therefore reducing the level of discomfort imposed to the animal if these variables would be measured directly and experimentally.
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 computer

¹ For more information visit the petition website: <http://www.stopvivisection.eu/>

² The document is available on the VPH Institute website: http://www.vph-institute.org/upload/vphinst-position-statement-on-animal-experim-v3-1_519242a3cafd9.pdf

models sufficiently accurate to predict specific experiments, replacing a large part of the animal experimentations 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, which can then be used for translating results of animal experimentation much more safely and effectively into human health.

All over the world, scientists are working very hard to establish reliable *in vitro* and *in silico* tools to minimize animal experimentation where possible. During the development of these tools, animal experimentation will remain necessary for validation. Even after initial validation, the usefulness of these tools will need to be evaluated continuously for new situations and contexts. Iterative refinements (developments) of *in vitro* and *in silico* tools are expected to largely reduce the amount of animal experiments currently required to eventually grasp the complexity of the human body.

In silico research, as developed within the VPH community, provides enormous potential advantages for reducing, refining and replacing animal testing as well as translating the results of animal experimentation to humans. Although the VPH institute welcomes any call for additional support for the development of *in silico* medicine, it cannot support the call for total abolishment of all animal experimentation, but looks actively for a future use of *in silico* models to progressively make animal experiments less necessary.

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