

VPH NoE

Virtual Physiological Human Network of Excellence

The Virtual Physiological Human Network of Excellence (VPH NoE) has been designed with 'service to the community' of VPH researchers as its primary purpose. The aims of the network range from the continued development of a VPH ToolKit and associated infrastructural resources, to integration of models and data across the various relevant levels of physiological structure and functional organisation, through to VPH community building, training activities and support.

Objectives of the Project

- Inter-institution and interdisciplinary research projects
- Development of the VPH ToolKit: shared and mutually accessible resource of data
- Facilitation of development of horizontal and vertical model/data integration
- Development of interdisciplinary training activities and VPH careers
- Establishing a core set of VPH-related dissemination and networking activities
- Implementation of key working groups to pursue integration of VPH research worldwide
- Creation of Industrial, Clinical and Scientific Advisory Boards for consultation.

By involving clinical and industrial stakeholders, the VPH Network of Excellence also plans to create a reliable foundation to support sustainable interactions and collaboration between research and healthcare communities.

The Challenge

One of the key challenges in the development of quantitative, integrative and predictive models that describe human physiology is the provision of a necessary research infrastructure. This includes methodologies, databases and computational tools, that will allow scientists working in different scientific fields (at various physiological levels and scales) to communicate, exchanging data and technologies in a standardised manner. The scale of data to be generated, processed and exchanged requires software tools and massive computer storage and that are currently not widely available. Dissemination is another key challenge as the VPH NoE scope is by definition multidisciplinary and only a very limited number of journals currently accept physiology-related papers. Scientists able to deal with multidisciplinary topics are

required, necessitating a need for training of multidisciplinary individuals and VPH specialists.

The Way Forward

The VPH NoE objectives outlined reflect the above challenges, and are being addressed by a core group of project members: 14 institutions fully committed at the highest institutional level to the concept of the VPH NoE. They represent centres of excellence in physiological modelling, data processing and analysis, high performance computing, genomics, bioinformatics and medical informatics. Many Partners have shown prior commitment to integration within the European Research Area through leadership of, or involvement in, European Commission Sixth Framework Networks of Excellence and Collaborative Projects. The 14 organisations have clinical and industrial associations crucial for the creation of a VPH research environment with active end-user involvement. The core membership is augmented by a large and growing general/associate membership, comprised of institutions, organisation and commercial enterprise interested in VPH activities.

Project Description

This leading group of universities, institutes and organisations promotes the creation of a virtual environment that actively supports and nurtures interdisciplinary research, education, training and strategic development. In keeping with the general ethos of the VPH NoE, Exemplar Projects (EPs) will continue to be developed throughout project duration (see box on page 1). EPs work towards integration amongst VPH researchers, in order to address specific research problems or challenges. The aim is to provide solid examples of horizontal and vertical model/data integration, which may only be achieved through the integration of disparate knowledge and research infrastructure.

VPH NOE EXEMPLAR PROJECTS: SUPPORTING INTEGRATIVE, INTERDISCIPLINARY RESEARCH

VPH NoE Exemplar Project (EP) support will be awarded through an annual competitive grant mechanism open to all VPH NoE member organisations. Individual EP support will be manifest as a grant of 6-12 months' duration, to fund personnel strictly focussed on integration of VPH-related research already underway and which addresses an area of need. The EPs will foster new collaborative links, benefiting from transfer of skills from related VPH activities, with the mandate to make output (models, data repositories, etc.) available to the VPH community via the VPH ToolKit, and with the expectation that such support will contribute to the ability of the recipients to obtain follow-on funding.

The VPH ToolKit aims to provide the technical and methodological framework to support and enable VPH research. The ToolKit portal is a shared and mutually accessible source of research equipment, managerial and research infrastructures, facilities and services. Other VPH projects, including the Exemplar Projects (EPs) are able to add and draw capacity from it. In pooling these activities within the VPH research area, issues of interoperability, standards and – more broadly – integrative VPH research are being addressed.

The VPH NoE recognises a necessity for scientists able to deal with multidisciplinary topics. The VPH NoE will create a framework to support and facilitate this training. We are addressing training and career development for both early and in-career VPH researchers and training activities will pay special attention to the outcomes generated from other VPH-related projects and existing European Commission initiatives.

Through dissemination, the impact of VPH NoE initiatives relating to VPH EPs, the VPH ToolKit, and interdisciplinary training will be maximised. In addition, emphasis is placed on the development of clear and consistent lines of communication and information dissemination within and beyond the VPH NoE itself – crucial to the ongoing success of the VPH initiative as a whole.

Expected Results & Impacts

The VPH NoE, within the broader VPH Initiative, should be responsible for:

- Strengthening the leadership role and increased interdisciplinarity of European research in biomedical research by fostering cooperation between disciplines and institutions;
- Creating a more cohesive VPH research community, both within and beyond the EU;
- Improving semantic interoperability of biomedical information and contribution to a common EU health information infrastructure;
- Creating new environments for predictive, individualised, evidence-based healthcare to improve efficacy and safety;
- Accelerating device and drug intervention development through predictive *in silico* modelling;
- Enhancing recognition on a national level of the importance of modelling and simulation in biomedicine;
- Increased emphasis on interdisciplinary training in biological and biomedical-engineering/physics curricula with a contribution to the establishment of a formal system of training on VPH.



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- The University of Nottingham (United Kingdom)
- Universitat Pompeu Fabra (Spain)
- The University of Auckland (New Zealand)
- European Molecular Biology Laboratory (Germany)
- The University of Sheffield (United Kingdom)
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KEYWORDS

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