INTRODUCTION

The virtual physiological human: computer simulation for integrative biomedicine II

This second Theme Issue of ‘The virtual physiological human: computer simulation for integrative biomedicine’ continues to explore in detail the potential of the virtual physiological human (VPH) approach (Fenner et al. 2008). The initial editorial communication on the VPH training challenges (Lawford et al. 2010) illustrates some of the tasks and solutions for an integrated (across Europe) approach towards a key requirement for sustainability of VPH efforts: the training of current and future ‘specialists’ in what could be regarded as a ‘generalist’ research direction. ‘Squaring this circle’ will continue to remain a core challenge for the VPH. A second editorial communication highlights the roles that new digital libraries will have to play in the context of VPH research and development (Testi et al. 2010).

The remaining 10 papers address a range of organ system-specific examples, as well as cross-cutting issues of relevance for integrative study. Biomathematical modelling examples range from transport in the gastrointestinal tract (Wang et al. 2010) to patient-specific modelling of medical interventions for the respiratory system (Pérez del Palomar et al. 2010), and from blood cell distribution (Obrist et al. 2010) and tissue remodelling in the vasculature (Boyle et al. 2010) to the prediction of angiogenesis (Das et al. 2010) and of consequences when vessel wall mechanics ‘go wrong’ (Villa-Uriol et al. 2010).

As has been a hallmark of previous Theme Issues, cardiac modelling remains a strong contributor to the VPH initiative. Papers in this Theme Issue range from the development of novel models of individual ion channel function in cardiac myocytes (Murakami et al. 2010) to the identification of biomarkers to aid early identification of cardiac side-effects associated with pharmacological interventions (Corrias et al. 2010), and to patient-specific medical device interventions (Capelli et al. 2010). Of major ‘cross-cutting’ relevance, in this context, are access and (re-)use of data and related models (Gianni et al. 2010).

We are looking forward to the continuation of VPH-related publications by the Royal Society, to keep track of achievements and limitations in this field, over the years (Kohl et al. 2000; Hunter et al. 2001, 2010; Gavaghan et al. 2006; Fenner et al. 2008). A new development may further broaden the scope of this beneficial interrelation. The Royal Society will be launching a new journal, the Journal of the Royal Society Interface, with the aim of publishing cross-disciplinary articles that range from ‘traditional’ subjects such as biology, chemistry, physics or...
mathematics to modern disciplines such as engineering and materials science, all the way through to medicine. It highlights how ‘physical sciences’ benefit biomedical research, and—in turn—how discoveries in the life sciences further advance technology and applications elsewhere. Today, we thank the Philosophical Transactions of the Royal Society A—the longest running scientific journal in the world—for its support of this novel scientific field.

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Peter Kohl1,* and Marco Viceconti2

1 Department of Physiology, Anatomy and Genetics, University of Oxford, Oxford, UK
E-mail address: peter.kohl@dpag.ox.ac.uk
2Laboratorio di Tecnologia Medica, Istituto Ortopedico Rizzoli, Bologna, Italy
*Author for correspondence.

References


