

Computational Physiology: An overview of the VPH/Physiome project

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Abstract

Multi-scale models of organs and organ systems, based on model encoding standards, are being developed under the umbrella of the IUPS Physiome Project and the Virtual Physiological Human (VPH) project funded by the European Commission. These computational physiology models deal with multiple physical processes (coupled tissue mechanics, electrical activity, fluid flow, etc) and multiple spatial and temporal scales. They are intended both to help understand physiological function and to provide a basis for diagnosing and treating pathologies in a clinical setting. A long term goal of the project is to use computational modelling to analyze integrative biological function in terms of underlying structure and molecular mechanisms. Web-accessible databases, based on the standards (which include SBML, CellML and FieldML), have been established for models and model-related data at the cell, tissue, organ and organ system levels. This talk will discuss recent developments in the VPH/Physiome Project and the application of these multi-scale modelling approaches to several physiological systems including the cardiovascular system, the respiratory system, the musculo-skeletal system and the digestive system.