Computational and Mathematical Methods in Medicine

Special Issue on

Computational Methods and Models in Thrombosis and Haemostasis

CALL FOR PAPERS

Hemostasis is a complex physiological system that functions to maintain blood in a fluid state under normal conditions and immediately turn it into a nonflowing state upon trauma, injury, inflammation, or infection. It comprises a number of biochemical reaction networks in plasma and additionally involves all types of blood, vascular, and extravascular cells. It plays fundamental roles not only in stopping bleeding, but also in angiogenesis, immunity, wound healing, and other critically important processes.

In line with this importance, disorders of the hemostatic system are innumerable; some of them are inherited, but the vast majority of them arise because of other diseases, conditions, or interventions: atherosclerosis, sepsis, trauma, surgery, cancer, pregnancy, and so forth. Despite the great diagnostic and pharmacological successes of the last two decades, disorders of the hemostatic system remain the main immediate cause of mortality and morbidity in the world.

Development of computational and mathematical methods seems to be the most promising way to deal with the complexity of these problems. The last two decades witnessed an explosion of the theoretical studies in the field that were stimulated by the accumulation of biochemical and genetic knowledge, as well as the development of new numerical methods and computational power.

This special issue is intended to present and discuss the state of the art in this field. We invite investigators to contribute review and original papers describing recent findings in all areas of the application of computational and mathematical methods to the problems of thrombosis and hemostasis.

Potential topics include, but are not limited to:

- Computational modelling of arterial, venous, and microvascular thrombosis
- Computational modelling of in vitro assays (thrombin generation, aggregation, etc.)
- Models of thrombolysis
- Systems biology of blood, vascular, and hepatic cell signalling and metabolism relevant for thrombosis and hemostasis
- Mathematical and computational methods of experimental data analysis
- Computer-assisted clinical decision-making
- Models and methods for investigation of disease basis and mechanisms of drug action
- Pharmacodynamic and pharmacokinetic modelling
- Bioinformatics in hemostasis (structural biology, sequence analysis, databases, etc.)
- Computer-assisted identification of therapeutic targets and rational drug design
- Modelling of individual reactions and modules of blood coagulation and fibrinolysis
- Whole blood haemodynamics and mechanical properties of red blood cells relevant for thrombosis and hemostasis
- Development of advanced computational methods and algorithms for application in the field (sensitivity analysis, multiscale models, particle hydrodynamics, coupling hydrodynamics with chemistry, stochastic methods, neural networks, parallel computing and use of graphical processors, etc.)
- Modelling of other physiological systems with regard to their interaction with hemostasis (immunity, angiogenesis, vascular pressure distribution, etc.)

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/cmmm/cmmth/.

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