

IN-SILICO MODELING OF CARDIOVASCULAR DISEASE

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ABSTRACT

In silico clinical trial represents a new paradigm for development of new drug and medical device. In SILICOFCM project [1] Familial Cardiomyopathy disease was modelled with comprehensive list of patient specific features such as genetic, biological, pharmacologic, clinical, imaging. Transport through biological barriers as vessel walls, or cell and organelle membranes, depends on the transport properties of these barriers, as hydraulic or diffusion coefficients, and also on the size of the surface which separates the continuum domains. In electrophysiology, the goal is to determine the electrophysiological properties of all compartments and signal propagation characteristics within the body. A coupled model which includes multiscale modelling of realistic sarcomeric system, genetics patient profile, electrophysiology, realistic directions of muscle fibers, solid-fluid interaction coupled to electrophysiology of the heart was implemented. Initial results give influence of left ventricle deformations on deformations of mitral valve, and on general blood flow in heart. Also drug distribution in the heart and effects of different drugs are tested for cardiomyopathy disease. SILICOFCM project will connect basic experimental research with clinical study and bioinformatics, data mining and image processing tools using very advanced computer models drug, and patient database and regulative in order to reduce animal and clinical studies.

REFERENCES

- [1] www.silicofcm.eu