SILICOFCM: In Silico trials for drug tracing the effects of sarcomeric protein mutations leading to familial cardiomyopathy

Description

According to the 2014 European Society of Cardiology Guidelines, cardiomyopathies are defined as structural and functional abnormalities of the ventricular myocardium that are unexplained by flow limiting coronary artery disease or abnormalloading conditions. There are four major classifications of cardiomyopathy:

- hypertrophic (HCM),
- dilated (DCM),
- restrictive(RCM), and
- arrhythmogenic right ventricular (ARVC).

Familial cardiomyopathies (FCM) are most commonly diagnosed, or progress of the disease is monitored, through in vivo imaging, with either echo cardiography or, increasingly, cardiac magnetic resonance imaging (MRI). The treatment of symptoms of FCM by established therapies could only in part improve the outcome, but novel therapies need to be developed to affect the disease process and time course more fundamentally. SILICOFCM project will develop in silico computational cloud platform which will integrate from stopped-flow molecularkinetic assays to magnetic resonance imaging of the whole heart, bioinformatics and image processing tools with state of theart computer models with the aim to reduce animal and clinical studies for a new drug development and optimized clinical therapy of FCM. The developed system will be distributed on the cloud platforms in order to achieve efficient data storage and high performance computing, that can offer end users results in reasonably short time. Academic technical partners IIT, UOI, UL and BSC will be responsible for developing and integration of in silico cloud computational platform with multi-scale cardiac muscle modelling which include experiments on protein mutation in vitro from UNIKENT, UNIFI and UW. Bioinformatics tools will be integrated by US company SBG. Clinical partners UNEW, ICVDV, UPMC and UHREG will do retrospective andprospective studies. SME partner R-Tech will be in charge of regulatory issues and reports and BIOIRC will do the exploitation of the project.

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