



The UK's National Supercomputing Service

Silico Model for Assessing Individual Responses to Irregular Heart Rhythm Treatments

This still from the video demonstrates the creation of a personalized in silico model for assessing individual responses to irregular heart rhythm treatments. These customized computational models can predict how a patient will react to therapy and facilitate virtual trials. The process starts with a point cloud extracted from a segmented MRI scan, providing a spatial representation of the atrium. These points are interconnected to form a 3D finite element mesh that reflects the patient's unique anatomy. The cardiac tissue's directional properties, influenced by atrial fiber orientation, are incorporated from a DT-MRI atlas. The model then simulates electrical activity and electrograms using the openCARP solver to explore irregular heart rhythms like atrial fibrillation. Post-simulation analysis identifies critical atrial fibrillation regions. Procedures like radiofrequency catheter ablation or anti-arrhythmic drug administration can be virtually tested to predict the patient's individualized response, as demonstrated in this case with pulmonary vein isolation ablation therapy.

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