NON-LINEAR WAVES AND CARDIAC ARRHYTHMIAS

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Sudden cardiac death as a result of cardiac arrhythmias is the leading cause of death in the industrialized countries. Although cardiac arrhythmias has been studied well over a century, their underlying mechanisms remain largely unknown. One of the main problems is that cardiac arrhythmias occur at the level of the whole organ only, while in most of the cases only single cell experiments can be performed. Due to these limitations alternative approaches, such as multiscale computer modelling of the heart, are currently of great interest.

In my talk I will explain the mechanisms of cardiac arrhythmias from the point of view of basic scientist and present the main ideas behind the multi-scale computer modelling of the heart [1]. Then, I will report on the research directions of my group, specifically on development of virtual human heart model and its application to studies the mechanisms of sudden cardiac death [2]. I will also report on how modelling can be used in combination with new experimental technologies in the field, such as cardiac cell cultures and optogenetics and discuss their possible application for treatment of cardiac arrhythmias [3,4].

Reference

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