

# Triggered Heart

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## Technology description

Computer Model of the Heart with all Electric Signals for Diagnosis and Treatment of Cardiac Diseases. Atrial fibrillation, cardiac infarction, cardiac arrhythmia, coronary cardiac diseases – cardiac diseases and their consequences are among the most frequent causes of death in Germany and other industrialized nations. Today, heart cases are operated or treated with standard methods, with the relapse rate in case of atrial defibrillation ranging between 20 and 30 %. Many cardiac diseases cannot be detected reliably with conventional ECG analysis methods.

A cardiac model developed by the Institute of Biomedical Engineering can improve success. With the help of MRT or CT data, the scientists simulate a patient-specific model that represents all electric signals of the heart and can be applied for diagnosis and therapy and operation planning in clinical practice. Therapy methods, such as radio frequency ablation for the treatment of atrial fibrillation, can be planned much better by prior simulations of the patient' s heart. Prior to the intervention, the physician can place the ablation lines required in the computer model and test their long-term effect. Apart from the increased success rate, duration of the operation is reduced by the method. Simulation of the electric signals of the heart is also used for the early diagnosis of cardiac infarction and cardiac arrhythmia.

As an alternative to the usually applied 12-channel ECG, the scientists of the Institute of Biomedical Engineering develop an 80-channel ECG, by means of which cardiac infarctions can be detected much more reliably. Based on individual patient data, a body surface potential map, i.e. the representation of the potential distribution of electric signals on the body surface of patients, is generated and may be used as an advanced standard in hospitals.

The model may also be applied to patients with the risk of cardiac arrhythmia in order to test whether the implantation of a defibrillator is required or not.

## Institution

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