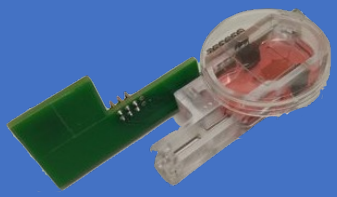
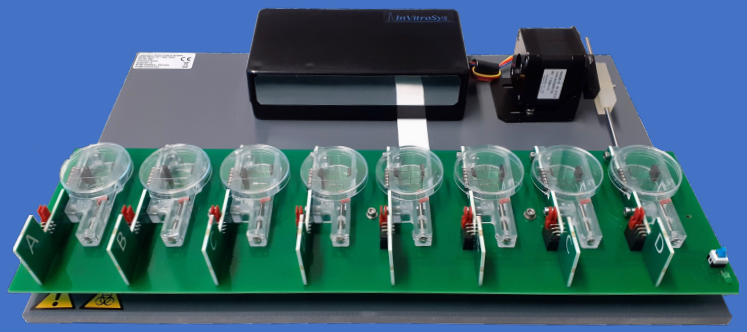
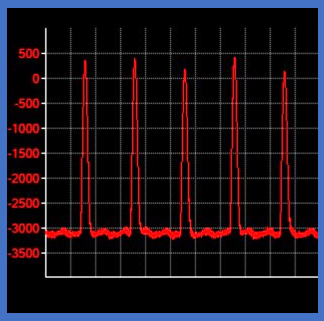
InVitroSys

MyoDish

Myocardial Tissue Culture System

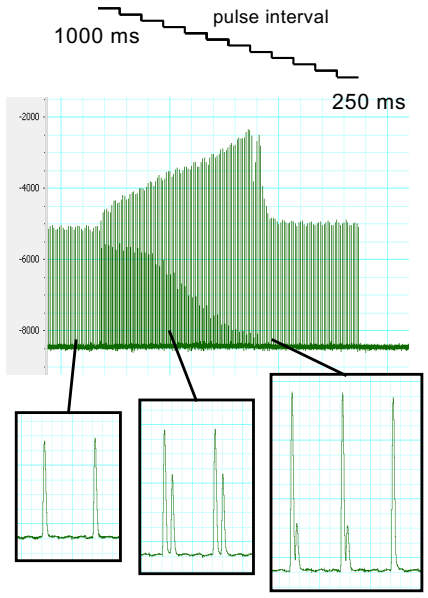




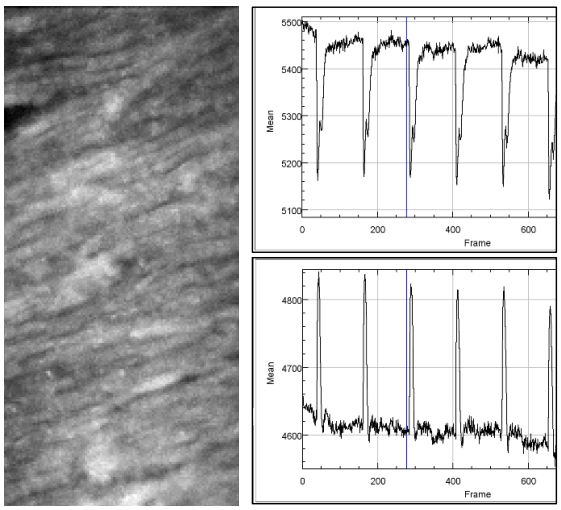


- Stable cultivation of human and animal myocardium for up to 3 months
- Continuous beat-to-beat magnetic force measurement
- Programmable stimulation protocols
- Adjustable pre- and afterload

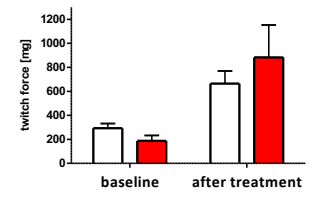
Programmable stimulation

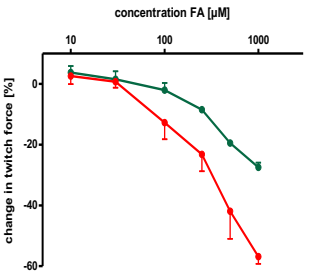


Repeated Ca^{2+} imaging with simultaneous force recording



Acute and chronic drug screening





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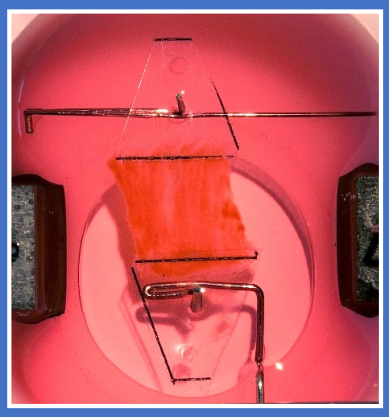
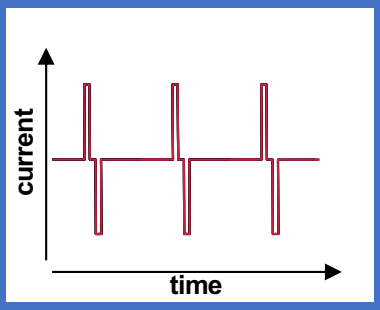
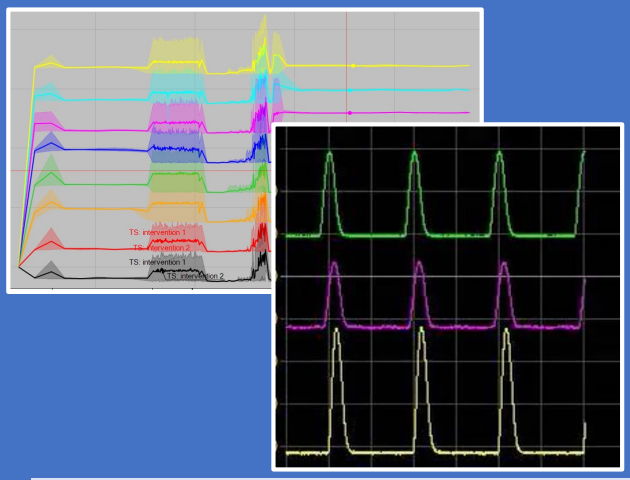


- Myocardial slices are glued to laser-cut plastic triangles which are attached to a spring wire (top) and an adjusting wire (bottom)
- Stiffness of the spring wire sets the afterload
- Positioning the adjusting wire sets the preload
- Patented technology allowing for high dynamic range force measurements from 10 µN – 50 mN



- Bipolar, charge-balanced stimulation impulses avoid electrochemical reactions in the culture medium
- Stimulation pulses can be freely programmed for 8 chambers per culture system



- An easy-to-use, intuitive software allows real-time observation of contractions as well as analysis and visualization on larger time scales
- Data is streamed continuously to the hard disk and can be downsampled and converted for later analysis with standard software

Selected references and use cases

Fischer et al., 2019, Nature Comm – *Original description of the method*

Sun et al., 2025, Bioengineering – Shows the importance of balanced impulses for tissue viability

Moretti et al., 2020, Nature Medicine – *Gene therapy of Duchenne cardiomyopathy*

Abu-Khousa et al., 2020, Front Physiol – *Functional significance of t-system remodelling*

Poch et al., 2022, Nature Cell Biol – *Regenerative potential of human cardiac progenitors*

Krane et al., 2021, Circulation - *Phenotyping of HLHS patient-derived iPSCMs*

Esfandyari et al., 2022, Nature Comm – *MicroRNA regulation of human cardiac APD*

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