

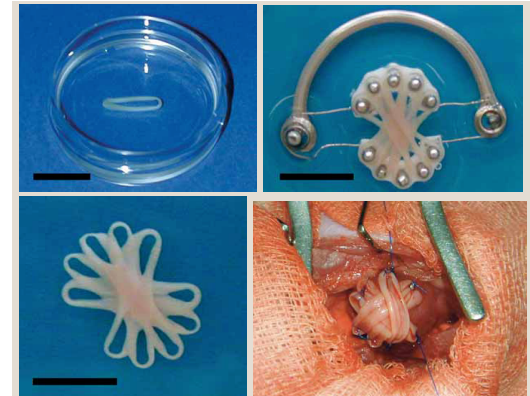
# Engineered Heart Tissue (EHT)

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## Challenge

Myocardial infarction and heart failure represent the main cause of death in industrialized countries. Current pharmacotherapy can delay, but not reverse the natural course of the disease. Apart from cardiac implantation, the activation of endogenous cardiac regeneration by pharmacological means or the implementation of preformed, engineered cardiac tissues are promising therapeutic approaches. Disadvantages of existing engineered heart tissue both for pharmacological development and tissue augmentation therapy comprise the limited size and weak contractile strength. Therefore, the need exists for the generation of bioartificial myocardium for *in vitro* substance screening applications and target validation as well as myocardial



EHT in different geometries: Circular for screening applications and multi-loop geometry for cardiac repair.

From Zimmermann et al. 2006 Nat Med

repair *in vivo* that overcomes the above shortcomings.

## Technology

Our proprietary technology provides an *ex vivo* method for the preparation of Engineered Heart Tissue (EHT) in different geometries need for different applications: Primary and embryonic stem cell derived myocytes supplemented with collagen and culture medium generate spontaneously contracting muscle constructs. Employing different reconstitution technologies, we were able to generate EHT with different size (down-scaling for substance screening vs. up-scaling for cardiac repair applications) and geometry (adjusted to the respective cardiac repair application: patch vs. pouch [BioVAD]).

## Commercial Opportunity

The technology is offered for co-development or licensing.

## Developmental Status

EHT -technology has been developed in the rat and shall be further advanced to a human model. The latter requires the use of human embryonic stem cell-derived myocytes. Proof-of-principle for the respective *in vitro* (substance screening and target validation) and *in vivo* (cardiac repair) applications is available. We do not foresee major obstacles in commercializing our product.

## Patent Situation

A priority establishing European patent application was filed in 2005; a PCT patent application was filed in 2006.

## Further Reading

Zimmermann WH et al. (2006) Engineered heart tissue grafts improve systolic and diastolic function in infarcted rat hearts. Nat Med 12:452-458.



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