Mantarray™
Platform for Human-Relevant 3D Engineered Muscle Tissue Analysis
The Mantarray™ platform enables the discovery, safety, and efficacy testing of new therapeutics by providing parallel analysis of 3D engineered muscle tissues with adult-like functional profiles. The Mantarray system features a novel magnetic sensing technique that can detect the contraction of Engineered Muscle Tissues (EMTs). This enables the user to measure the contractility of 24 tissues in parallel, and in real time. The system features user-friendly software that takes away the requirement for manual calculations of contractility, delivering contractility data at the click of a mouse.

Mantarray tissues are formed between a rigid post and a flexible post. When the tissue contracts, it deflects the flexible post. Mantarray leverages a proprietary, label-free, non-optical magnetic measurement system for direct contractility assessment of up to 24 parallel 3D engineered muscle tissues simultaneously.

With the Mantarray platform, scientists can achieve clinically-relevant functional measurements of human iPSC-derived engineered muscle tissue contractility, with a throughput and reproducibility compatible with higher-throughput screening workflows.

Mantarray Key Characteristics

**Workflow Simplicity**
Easy tissue casting, measurement, and data analysis. No matlab needed, all GUI.

**Electromechanical Stimulation**
Mantarray is compatible with electromechanical stimulation methods for advanced tissue maturation.

**Improve Structure and Function**
Mantarray aids in providing structurally and functionally mature 3D engineered muscle tissues.

**High-throughput Measurement**
The 24-well format enables high-throughput compatible, label-free, non-optical measurements.

**Clinically-relevant Contractility**
Advancing data using clinically-relevant functional measurements of contractility.
Applications

Disease Modeling and Therapeutic Discovery

Magnetic Detection of Drug-induced Contractile Changes

The magnetic detection approach can measure both acute (minutes) and chronic (days) drug responses. Drugs such as isoproterenol (left) can be measured on the order of seconds to minutes, with enough sensitivity to measure dose response-like behavior. Additionally, longer-term chronic experiments such as doxorubicin (right) can be performed over the course of days.

Safety Screening

Complex diseases require complex models. EMTs can be made from cells sourced from patients and used to test whether a new therapy will improve or recover healthy contraction. Isogenic controls or corrected cell lines can be used to provide clear stratification between healthy and diseased phenotypes. Validate new therapies using human models of muscle contractility.

Modeling Duchenne Muscular Dystrophy (DMD) with iPSC-derived 3D Engineered Heart Tissues

3D Engineered Heart Tissues (EHTs) can be generated from human iPSC-derived cells with healthy and diseased phenotypes.

Multi-modal Mantarray Data Exhibit Disease Stratification

Stratifying differences between healthy disease model EHTs provides a platform for discovery and validation of new therapeutics.