

# Opportunities for dynamic acoustic fields in organoid automation and patterning

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## Overview

Reconfigurable acoustic fields enable flexible movement of organoids inside a cell culture dish. This could be applied to automating spheroid culture processes or creating new patterns or combinations. Previous work has shown that static acoustic fields are biocompatible with organoids but no previous work has tested the effect of dynamic fields. We tested dynamic acoustic fields on SK-OV-3 spheroids and found no negative effects on their viability or structure over a 24-hour period.

## Introduction

Dynamic acoustic fields are a promising new, non-contact tool for the manipulation of organoids inside standard cell culture containers. They could be used to streamline culture processes or unlock new capabilities by placing multiple organoids into patterns or easily combining different types. While previous studies have found static acoustic fields to be compatible with organoids dynamic fields have not been previously studied.

## Methods

We cultured SK-OV-3 cells in ULAP plates for 7 days and then transferred them to a standard cell culture container (24-well plate). We exposed them to a sweeping dynamic acoustic field which moved them across the container lasting approximately 2 minutes at three different levels of acoustic intensity. We then cultured for a further 24 hours and performed a live-dead stain. We compared this to control spheroids.

## Results

We performed a live dead stain of all conditions and found that the dynamic acoustic field did not produce any significant changes to the viability or structure of the spheroids compared to the controls.

## **Conclusions**

This is a promising first step towards the use of dynamic acoustic fields with organoids and spheroids. It shows basic biocompatibility of the fundamental processes in line with the established work on static fields. It opens the door to future work including implementing more complex patterning and manipulation of organoids using dynamic acoustic fields.