

## Viability – MTT Assay

### Application:

Assess the cytotoxicity of compounds and changes in culture environments. MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium) conversion can be used to monitor the viability of three-dimensional (3D) tissue constructs exposed to chemical compounds and environmental stress (e.g., radiation and hypoxia).

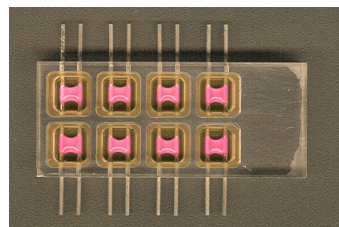
### Introduction:

A wide range of biomedical research laboratories use assays to determine and study the viability and growth of cells. Among many assays used for cell viability assessment, the MTT assay is widely implemented as a useful tool for high-throughput measurements.

In viable cells, the yellow MTT compound is reduced to a purple formazan by intracellular reductase enzymes. The extent of formazan production is monitored by the absorption of spectra between 500 and 600 nm. Cells exposed to toxic compounds or environmental stress show reduced viability. The reduced cell viability, in turn, results in lowered formazan production by the reduced activities of reductase enzymes and thus lowered absorbance values.

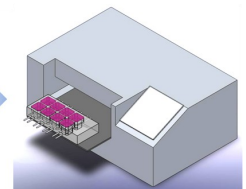
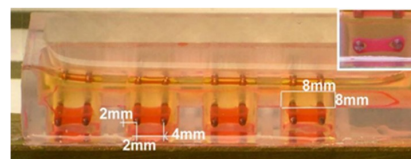
### Technical Advantages:

- ◆ Rapidly assess the viability of cells grown in a more natural three-dimensional (3D) microenvironment
- ◆ Significantly improve signal detection sensitivity for cell- and tissue-based assays
- ◆ Correlate cell viability with multiple parameters of cell physiology including cellular contractility and viability
- ◆ Culture and re-asses 3D tissue constructs for days and weeks to prolong experiments and achieve accurate results



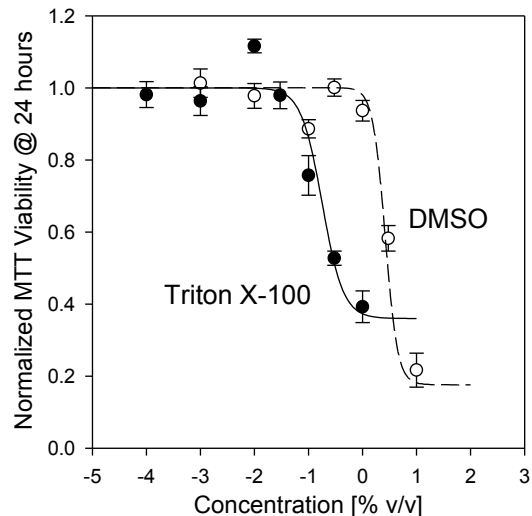
### Results:

Three-dimensional (3D) tissue constructs were treated with rotenone and dimethylsulfoxide (DMSO) for 24 hours. MTT was added to the incubating media (0.5 mg/ml) for 2 hours. The media was then removed and 500  $\mu$ l of isopropanol (with 0.1 N HCl) was used to quench, solubilize, and extract the formazan for absorbance spectroscopy with a plate reader.



- Indicator staining
- Drug treatment

Signal reading



DMSO and Triton X-100 dose-dependently reduced cell viability. The results demonstrate that 3D tissue constructs can precisely quantify the toxicity of DMSO and Triton X-100 over a wide range of concentration.

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