Fluorescence-based mitochondrial function analysis

MitoXpress™ phosphorescent probes measure mitochondrial oxygen consumption

MitoXpress™ the ideal plate-based assay for:
- Mitochondrial (dys)function
- Mitochondrial Toxicity
- Metabolism

MitoXpress™ allows early identification of mitochondrial liabilities and is therefore a powerful tool for reducing late stage attrition rates
Overview:
Mitochondrial dysfunction is implicated in numerous disease states and is also a major mechanism of drug-induced toxicity. Oxygen consumption is one of the most informative and direct measures of mitochondrial function. Traditional methods of measuring oxygen are hampered by the limitations of low throughput and high complexity. MitoXpress™, a family of phosphorescent oxygen sensing probes, solves these limitations by allowing simple, plate-based analysis of mitochondrial oxygen consumption and thereby, mitochondrial function. Increased oxygen consumption, reflecting increased mitochondrial activity, is seen as an increase in MitoXpress probe signal over time.

Features:
- Measure isolated mitochondria, cells and invertebrate animal models
- Reversible response – measures both increase/decrease in oxygen consumption
- Use standard plates and fluorescence readers
- Simple ‘mix and measure’ procedure
- Water-soluble probes allow easy dispensing and enhanced assay flexibility: 96 and 384 formats
- Probes allow prompt and T-RF analysis
- Spectral characteristics facilitate multiplexing

Benefits:
- Direct analysis of mitochondrial (dys) function
- Real-time measurement, easy data analysis
- Provides the same information as the standard Clarke-type oxygen electrode, yet is faster, simpler, has higher throughput, and is more cost effective
- Ideal for early screening of NCE’s:
  - Fast response, short drug exposure times
  - High throughput -200 compounds per day
  - Allows IC_{50} generation
  - Reduced late stage attrition rates

Assay Set-Up: Simple ‘mix and measure’
- Standard 96-/384- well plates
- Sample, probe and effectors are added to wells
- Mineral oil seal applied to reduce effect of ambient oxygen
- Real-time kinetic analysis performed on Molecular Devices SpectraMax M5e (Ex/Em 380/650nm)
- SoftMaxPro software allows easy data analysis

Real-time data analysis
SoftMaxPro software allows easy viewing of oxygen consumption profiles in all wells (Fig. 1, left panel) and individual wells (Fig. 1, right panel), for rapid, real-time high throughput screening of mitochondrial (dys) function.

Fig 1. Real time analysis of mitochondrial function using Molecular Devices SoftProMax software

Available products:
MitoXpress A65N oxygen probe: Optimal for measuring oxygen consumption of populations of eukaryotic cells, isolated mitochondria, oxygen dependent enzymes and animal models.

MitoXpress G20N oxygen probe: Optimal for measuring oxygen consumption of rapidly growing/respiring microorganisms in complex samples such as food and environmental samples.

References: