ToxTracker® Assay

The ToxTracker assay is a state-of-the-art stem cell-based reporter assay that provides mechanistic insight into genotoxic properties of compounds. ToxTracker is a flow cytometry-based assay that identifies various genotoxic and non-genotoxic properties of chemicals that are associated with increased cancer risk. ToxTracker displays high sensitivity and specificity and is particularly useful in Mode-of-Action (MoA) and Adverse-Outcome-Pathway (AOP) approaches.

Insight into Mode-of-Action

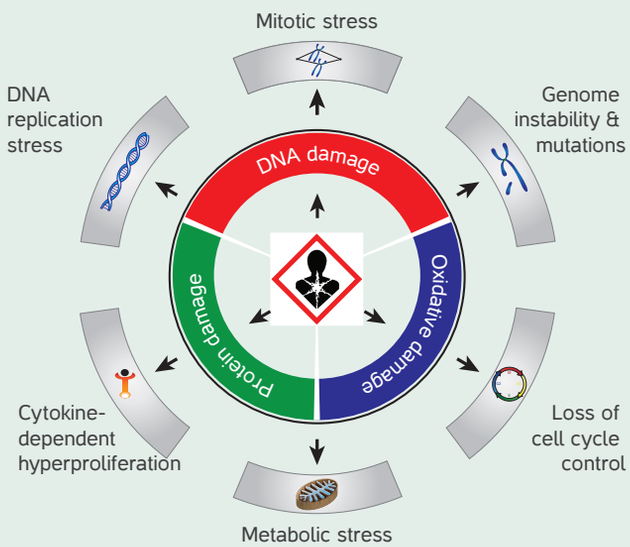
A panel of 6 reporter cell lines reveals activation of specific signalling pathways upon exposure to a test compound. ToxTracker discriminates between induction of direct DNA damage, oxidative stress and protein damage.

Highly Sensitive and Specific

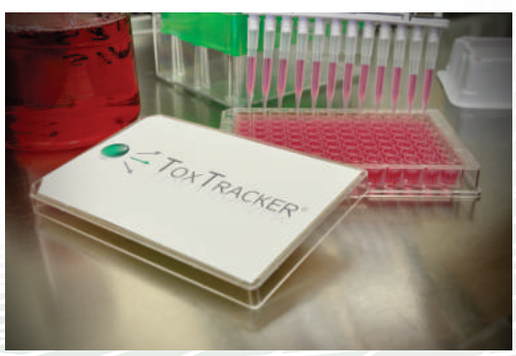
The unique combination of fluorescent reporter genes allows for accurate identification of genotoxic carcinogens.

Rapid and Reliable

Induction of GFP reporters by test compounds is efficiently measured across a broad concentration range using flow cytometry. Resulting data provide quantitative information on dose-response relationships.



Test name	Sensitivity (%)	Specificity (%)
ToxTracker	94	95
Chromosome aberrations	79	55
Mammalian mutation	81	48
Bacterial reversion (Ames)	60	77
Micronucleus test	79	54



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ToxTracker Assay Reporters

ToxTracker is a stem cell-based assay that combines 6 fluorescent reporter cell lines to discriminate between induction of DNA damage, activation of p53, induction of oxidative stress and protein damage. Their collective induction profile provides mechanistic insight into specific genotoxic properties of compounds.

Hendriks G, et al. (2016) - Toxicol Sci. 150, 190–203

How To Access ToxTracker

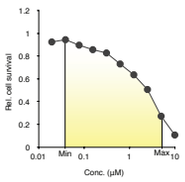
- Standard full ToxTracker service
- Rapid turnaround service ToxTrackerExpress - to receive your data within 3 days
- Extended gentoxicity testing service ToxTrackerPlus - to further investigate MoA
- Single order, multiple projects ToxTracker Service Plan - to purchase multiple services in 1 package
- In-licensing option for in-house operations - to run the ToxTracker assay in your facility

ToxTracker Protocol

I. Sample preparation

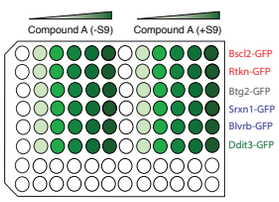
- Test compound (15/150 mg)
- Dissolve in DMSO or water
- Prepare 20 dilutions in 2-fold dilution steps

II. Dose finding



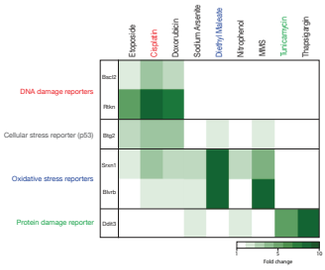
- Dose finding in wt mES cells
- Cytotoxicity based on relative cell count

III. ToxTracker assay



- 6 ToxTracker reporter cell lines
- 5 compound concentrations in 2-fold dilution steps
- In absence and presence of S9
- 24 hour exposure
- Quality controls for DNA damage (cisplatin), oxidative stress (diethyl maleate), protein unfolding (tunicamycin) and metabolism (aflatoxin B1)

IV. Data acquisition & analysis



- GFP reporter induction by flow cytometry
- Cytotoxicity determined
- Data analysis using Toxplot software

V. ToxTracker report & discussion

- Extensive cytotoxicity profile
- Assessment of mechanism of toxicity
- EC 10/25/50 and LC 10/25/50
- Toxicity profile ± metabolising system
- Comparison of ToxTracker profile to reference compounds