

P21 CALUX®

The p21 gene activating pathway responsive (p21) CALUX consists of the human osteosarcoma cell line U2OS, incorporating the firefly luciferase gene coupled to the promoter of the p21 gene. This gene is associated with DNA damage induced cell cycle arrest. Following activation by compounds of the p21 inducing pathway this will lead to cell cycle arrest, but also luciferase expression. After addition of the appropriate substrate for luciferase, light is emitted. The amount of light produced is proportional to the amount of ligand-specific pathway activation, which is benchmarked against the relevant reference compound, the pathway agonist actinomycin D and expressed as toxic equivalents (TEQs), or bioanalytical equivalents (BEQs).

Specification	P21 CALUX
Basal cell line	U2OS
Species	human
Tissue	bone
Positive control	actinomycin D
Endpoint (pure compounds)	EC or PC concentration, lowest effect concentration (e.g. PC10)
Endpoint (mixtures)	Toxic equivalents in pg TEQ/g sample processed
Test duration	24hr (incubation time)
Specificity	Activation of p21 promoter. Ligand selections can be made through compound class selective workup methods and/or metabolic modules.
Assay interferences	Relatively broad because of use of a p21 promoter construct. Extensive QA/QC. Cytotoxicity and non-specific luciferase interferences experienced with certain ligands and samples can be assessed with the cytotox CALUX assay.
Sensitivity (LOD/Q)	Typically in high pg range (matrix- and sample size-dependent)
Matrices	Any type of sample
Sample volume/mass	Matrix- and desired limit of quantification (LOQ)-dependent
Amount of compound	Typically 10 mg. Lower for high potency compound provided in DMSO
Assessment criteria	In house methods, compliant with relevant application/regulations.
SOPs and Guidelines	BDS internal, similar to ER-, and AR CALUX assays
HTS protocol	BDS; see EURL-ECVAM DB-ALM Protocol n° 197 : Automated CALUX reporter gene assay procedure
Key reference	Piersma AH, Schulpen SHW, Uibel F, Van Vugt-Lussenburg, B, Bosgra S, Hermsen SAB, Roelofs MJE, Man, H., Jonker, L., Van der Linden, S, Van Duursen MBM, Wolterbeek APM, Schwarz M, Kroese ED, Van der Burg B. (2013) Evaluation of an alternative in vitro test battery for detecting reproductive toxicants. <i>Reprod. Toxicol.</i> 38,53-64.