

Ferroptosis

Tools to detect a new form of cell death



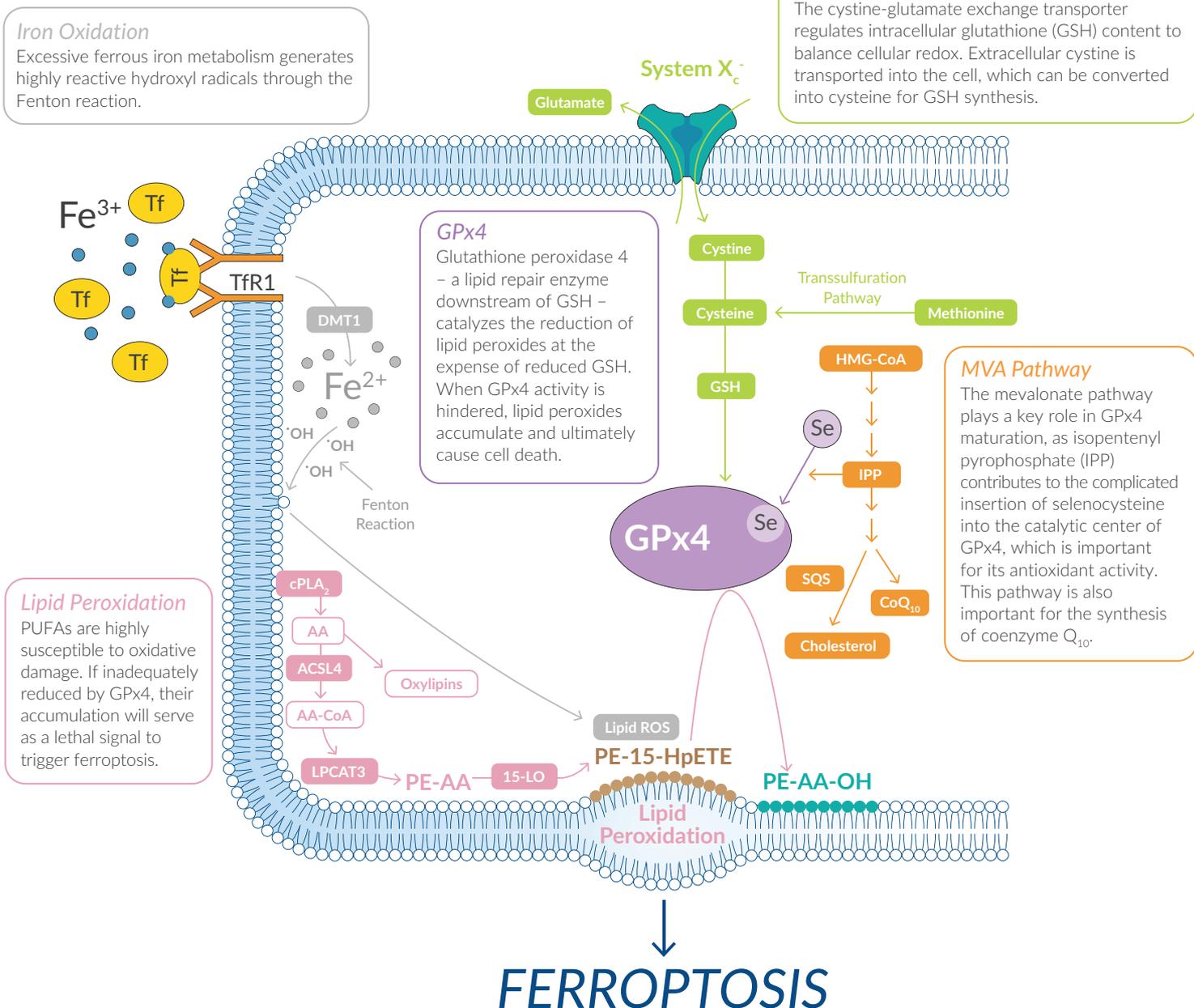
Ferroptosis is an iron-dependent cell death that is triggered when oxidized polyunsaturated fatty acids (PUFAs) stored in lipid membranes are not repaired by glutathione peroxidase activity. Cayman offers several key inducers and inhibitors to study this process. Reagents and assay kits are available to measure both glutathione and the activity of glutathione peroxidase in cells. Oxidized lipid standards and lipid peroxidation assays and probes are also available.

Iron Oxidation

Excessive ferrous iron metabolism generates highly reactive hydroxyl radicals through the Fenton reaction.

System X_c⁻

The cystine-glutamate exchange transporter regulates intracellular glutathione (GSH) content to balance cellular redox. Extracellular cystine is transported into the cell, which can be converted into cysteine for GSH synthesis.



Lipid Peroxidation

PUFAs are highly susceptible to oxidative damage. If inadequately reduced by GPx4, their accumulation will serve as a lethal signal to trigger ferroptosis.

GPx4

Glutathione peroxidase 4 – a lipid repair enzyme downstream of GSH – catalyzes the reduction of lipid peroxides at the expense of reduced GSH. When GPx4 activity is hindered, lipid peroxides accumulate and ultimately cause cell death.

MVA Pathway

The mevalonate pathway plays a key role in GPx4 maturation, as isopentenyl pyrophosphate (IPP) contributes to the complicated insertion of selenocysteine into the catalytic center of GPx4, which is important for its antioxidant activity. This pathway is also important for the synthesis of coenzyme Q₁₀.

Distributed by:



Tel: +33 (0)139 306 036

Email: tech@bertin-bioreagent.com

Web: www.bertin-bioreagent.com

Monitor GSH/GPx Activity and Detect Lipid Peroxidation

Item No.	Product Name	Description
501140	DHN-MA EIA Kit	Measures a metabolite of 4-HNE, a byproduct of lipid peroxidation
703002	Glutathione Assay Kit	Measures both GSH and GSSG with the use of glutathione reductase
600360	Glutathione Cell-Based Detection Kit (Blue Fluorescence)	Utilizes MCB, a highly fluorescent GSH probe, to quantify GSH levels in whole cells
703102	Glutathione Peroxidase Assay Kit	Measures GPx activity indirectly by a coupled reaction with glutathione reductase
703202	Glutathione Reductase Assay Kit	Measures GR activity by measuring the rate of NADPH oxidation
703302	Glutathione S-Transferase Assay Kit	Measures total GST activity (cytosolic and microsomal)
705003	Lipid Hydroperoxide (LPO) Assay Kit (96 well)	Measures hydroperoxides directly using the redox reactions with ferrous ions
10009055	TBARS Assay Kit	Measures malondialdehyde, a byproduct of lipid peroxidation

Induce Ferroptosis

Item No.	Product Name	Description
11816	Artemisinin	Iron(II) oxide-reactive endoperoxide that generates ROS
11817	Artesunate	Iron(II) oxide-reactive endoperoxide that generates ROS
19287	CIL56	Novel scaffold that led to discovery of FIN56; induces iron-dependent ROS at low concentrations
17754	Erastin	Inhibits uptake of cysteine through system X _c ⁻
14484	L-Buthionine-(S,R)-Sulfoximine	Depletes GSH by inhibiting γ -glutamylcysteine synthetase, the rate-limiting enzyme for GSH synthesis
20455	ML-162	Inhibits GPx4; more potent and selective than (1S,3R)-RSL3
16115	N-Acetyl-4-benzoquinone imine	Metabolite of acetaminophen that depletes GSH during an inactivation process that involves its conjugation with glutathione
19288	(1S,3R)-RSL3	Directly binds the selenocysteine active site of GPx4

Inhibit Ferroptosis

Item No.	Product Name	Description
70610	Baicalein	A flavonoid with 12-LO inhibitory activity
16021	Ciclopirox	A cell-permeable iron-chelating agent
11506	Coenzyme Q ₁₀	A cofactor in the electron-transport chain whose reduced form acts as an antioxidant
14126	Cycloheximide	A protein synthesis inhibitor
14595	Deferoxamine (mesylate)	An iron chelator and inhibitor of prolyl hydroxylases
70530	Ebselen	A glutathione peroxidase mimetic
17729	Ferrostatin-1	Inhibits ferroptosis likely through lipid peroxide scavenging activity
17730	Liproxstatin-1	Inhibits ferroptosis possibly by reducing free radicals
10010518	PD 146176	A selective 15-lipoxygenase-1 inhibitor
10005263	TOFA	An acetyl-CoA carboxylase inhibitor that blocks fatty acid synthesis
18113	YM-53601	A squalene synthase inhibitor that prevents cholesterol synthesis, which promotes the formation of non-sterol products in the MVA pathway



Find more Ferroptosis information and research tools online at www.caymanchem.com