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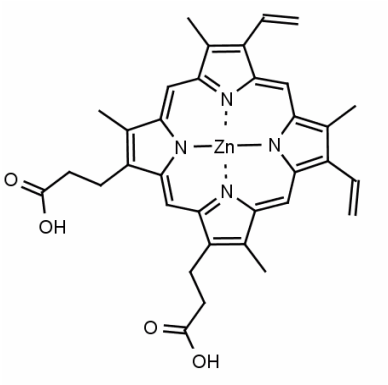
Technical Data Sheet

For research use only

Product Name: Zn (II) Protoporphyrin IX



Catalog Number	CAS Registry No.	MW (g/mol)	Chemical Formula	Solubility
F-H060	15442-64-5	626.03	$C_{34}H_{32}N_4O_4Zn$	Pyridine, DMF or DMSO

Storage: Zn (II) Protoporphyrin IX is stable for at least one year when stored as a solid, protected from moisture, at -20°C. Protect from light.

Field of Use: Zn (II) Protoporphyrin IX is an inhibitor of heme oxygenase[1] (the enzyme that catalyzes the conversion of heme to biliverdin in the heme degradation pathway) and guanylyl cyclase[2]. Heme oxygenase has been implicated in tumor cell resistance to chemotherapy[3], reduction of free radical formation[4] and inflammation[5] and associated with vascular repair[5].

References:

1. Maines, M. D. Zinc . protoporphyrin is a selective inhibitor of heme oxygenase activity in the neonatal rat. *Biochim Biophys Acta* **1981,** 673, 339-50.
2. Gupta, G.; Kim, J.; Yang, L.; Sturley, S. L.; Danziger, R. S. Expression and purification of soluble, active heterodimeric guanylyl cyclase from baculovirus. *Protein Expr Purif* **1997,** 10, 325-30.
3. Jozkowicz, A.; Was, H.; Dulak, J. Heme oxygenase-1 in tumors: is it a false friend? *Antioxid Redox Signal* **2007,** 9,2099-117.
4. Abraham, N. G.; Kappas, A. Heme oxygenase and the cardiovascular-renal system. *Free Radic Biol Med* **2005,** 39, 1-25.
5. Kim, D. H.; Burgess, A. P.; Li, M.; Tsenovoy, P. L.; Addabbo, F.; McClung, J. A.; Puri, N.; Abraham, N. G. Heme oxygenase-mediated increases in adiponectin decrease fat content and inflammatory cytokines, TNF and IL-6, in Zucker rats and reduce adipogenesis in human mesenchymal stem cells. *J Pharmacol Exp Ther* **2008**.

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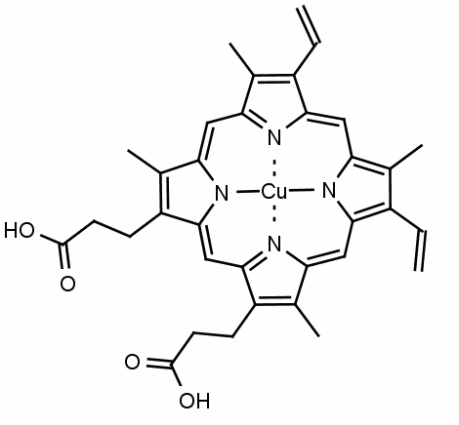
For research use only

Product Name: Cu (II) Protoporphyrin IX



Catalog Number	MW (g/mol)	Chemical Formula	Solubility
F-H070	624.19	$C_{34}H_{32}CuN_4O_4$	Pyridine, DMF or DMSO

Storage: Cu (II) Protoporphyrin IX is stable for at least one year when stored as a solid, protected from moisture, at -20°C. Protect from light.

Field of Use: Cu (II) Protoporphyrin IX does not inhibit heme oxygenase (the enzyme that catalyzes the conversion of heme to biliverdin in the heme degradation pathway) and is used as a negative control for Zn (II) Protoporphyrin (an inihibitor of heme oxygenase). Heme oxygenase has been implicated in tumor cell resistance to chemotherapy[1], reduction of free radical formation[2] and inflammation[3] and associated with vascular repair[3].

References:

1. Jozkowicz, A.; Was, H.; Dulak, J. Heme oxygenase-1 in tumors: is it a false friend? *Antioxid Redox Signal* **2007,** 9,2099-117.
2. Abraham, N. G.; Kappas, A. Heme oxygenase and the cardiovascular-renal system. *Free Radic Biol Med* **2005,** 39, 1-25.
3. Kim, D. H.; Burgess, A. P.; Li, M.; Tsenovoy, P. L.; Addabbo, F.; McClung, J. A.; Puri, N.; Abraham, N. G. Heme oxygenase-mediated increases in adiponectin decrease fat content and inflammatory cytokines, TNF and IL-6, in Zucker rats and reduce adipogenesis in human mesenchymal stem cells. *J Pharmacol Exp Ther* **2008**.

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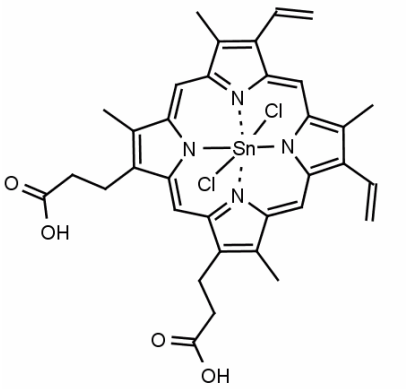
Product Name: Sn (IV) Protoporphyrin IX Dichloride



Catalog Number	MW (g/mol)	Chemical Formula
F-H080	750.26	$C_{34}H_{32}N_4O_4SnCl_2$

Storage: Sn (IV) Protoporphyrin IX is stable for at least one year when stored as a solid, protected from moisture, at -20°C. Protect from light.

Field of Use: Sn (IV) Protoporphyrin IX is an inhibitor heme oxygenase (the enzyme that catalyzes the conversion of heme to biliverdin in the heme degradation pathway) but has also been found to stimulate production of the heme oxygenase protein[1]. Contrast the activity of Co (III) Protoporphyrin which has been found to have similar activities to Sn (IV) Protoporphyrin but with a greater enhancement of heme oxygenase synthesis activity such that heme oxygenase activity is actually increase when administered in vivo while in vitro administration inhibits heme oxygenase activity[1]. Heme oxygenase has been implicated in tumor cell resistance to chemotherapy[2], reduction of free radical formation[3] and inflammation[4] and associated with vascular repair[4].

References:

1. Sardana, M. K.; Kappas, A. Dual control mechanism for heme oxygenase: tin(IV)-protoporphyrin potently inhibits enzyme activity while markedly increasing content of enzyme protein in liver. *Proc Natl Acad Sci U S A* **1987,** 84, 2464-8.
2. Jozkowicz, A.; Was, H.; Dulak, J. Heme oxygenase-1 in tumors: is it a false friend? *Antioxid Redox Signal* **2007,** 9,2099-117.
3. Abraham, N. G.; Kappas, A. Heme oxygenase and the cardiovascular-renal system. *Free Radic Biol Med* **2005,** 39, 1-25.
4. Kim, D. H.; Burgess, A. P.; Li, M.; Tsenovoy, P. L.; Addabbo, F.; McClung, J. A.; Puri, N.; Abraham, N. G. Heme oxygenase-mediated increases in adiponectin decrease fat content and inflammatory cytokines, TNF and IL-6, in Zucker rats and reduce adipogenesis in human mesenchymal stem cells. *J Pharmacol Exp Ther* **2008**.

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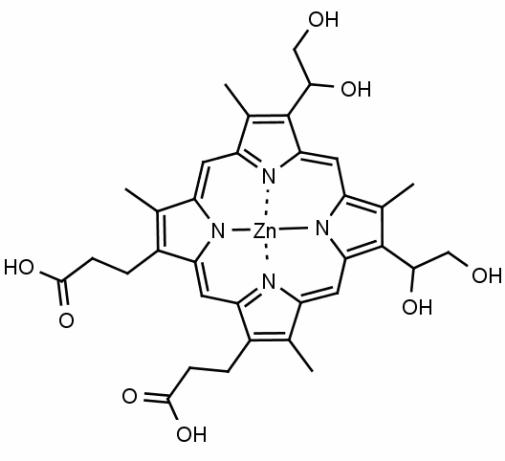
Product Name: Zn (II) Deuteroporphyrin IX 2,4 bis ethyleneglycol



Catalog Number	MW (g/mol)	Chemical Formula	Solubility
F-H090	694.04	$C_{34}H_{36}N_4O_8Zn$	DMSO

Storage: Zn (II) Deuteroporphyrin IX 2,4 bis ethyleneglycol is stable for at least one year when stored as a solid, protected from moisture, at -20 °C. Protect from light.

Field of Use: Zn (II) Deuteroporphyrin IX 2,4 bis ethyleneglycol is an inhibitor of heme oxygenase (the enzyme that catalyzes the conversion of heme to biliverdin in the heme degradation pathway) at concentrations as low at 0.5 μM[1]. Heme oxygenase has been implicated in tumor cell resistance to chemotherapy[2], reduction of free radical formation[3] and inflammation[4] and associated with vascular repair[4].

Warranty and Disclaimer: Echelon warrants the product conforms to the specifications stated herein. In the event of nonconformity, Echelon will replace products or refund purchase price, at its sole option, and Echelon shall not be responsible for any other loss or damage, whether known or foreseeable to Echelon. No other warranties apply, express or implied, including but not limited to warranty of fitness for any purpose or implied warranty of merchantability. Purchaser is solely responsible for all consequences of its use of the product and Echelon assumes no responsibility therefore, including success of purchaser's research and development, or health or safety of any uses of the product.

References:

1. Chernick, R. J.; Martasek, P.; Levere, R. D.; Margreiter, R.; Abraham, N. G. Sensitivity of human tissue heme oxygenase to a new synthetic metalloporphyrin. *Hepatology* **1989,** 10, 365-9.
2. Jozkowicz, A.; Was, H.; Dulak, J. Heme oxygenase-1 in tumors: is it a false friend? *Antioxid Redox Signal* **2007,** 9,2099-117.
3. Abraham, N. G.; Kappas, A. Heme oxygenase and the cardiovascular-renal system. *Free Radic Biol Med* **2005,** 39, 1-25.
4. Kim, D. H.; Burgess, A. P.; Li, M.; Tsenovoy, P. L.; Addabbo, F.; McClung, J. A.; Puri, N.; Abraham, N. G. Heme oxygenase-mediated increases in adiponectin decrease fat content and inflammatory cytokines, TNF and IL-6, in Zucker rats and reduce adipogenesis in human mesenchymal stem cells. *J Pharmacol Exp Ther* **2008**.