# Product Data Sheet

Product Name: CDDO-Im (RTA-403)
Cat. No.: GC32723

## Chemical Properties

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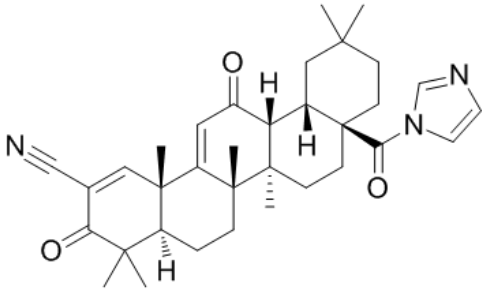
|---|---|---|---|
| Cas. No. | 443104-02-7 | | |
| SMILES | CC(C)([C@]1([H])CC[C@@]([C@@]2(CC[C@]3(CCC(C)(C[C@@]3([H])[C@]24[H])C)C(N5C=CN=C5)=O)C)6C)C(C(C#N)=C[C@]1(C)C6=CC4=O)=O | | |
| Formula | $C_{34}H_{43}N_3O_3$ | M.Wt | 541.72 |
| Solubility | DMSO : 50 mg/mL (92.30 mM);Water : < 0.1 mg/mL (insoluble) | Storage | Store at -20°C |
| General tips | For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months. | | |
| Shipping Condition | Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request. | | |
| Structure | | | |




## Protocol

### Cell experiment [1]:

Cell lines SUM159 and MDA-MB-231 cells

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| Preparation Method | SUM159 and MDA-MB-231 cells were seeded into each well of 96-well plates (1000 cell/well) and treated the next day with vehicle control or CDDO-Im (1, 10, 50, 100 and 200nM). Cell proliferation was measured by an MTT assay at 0, 24, 48 and 72h time points. |
| Reaction Conditions | 1, 10, 50, 100 or 200nM; 0-72h |
| Applications | CDDO-Im treatment at 50, 100 and 200nM for 72h significantly inhibited the growth of both SUM159 and MDA-MB-231 cells. |

**Animal experiment [2]:**

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| Animal models | Male CD-1 mice |
| Preparation Method | Male CD-1 mice were gavaged with 2μmol CDDO-Im dissolved in DMSO or with vehicle alone. After 6 hours, various organs were harvested and Heme Oxygenase-1 (HO-1) induction was analyzed by Western blotting. |
| Dosage form | 2μmol; once; p.o. |
| Applications | HO-1 protein levels increased in the stomach, small intestine, colon, liver, lung, kidney, and heart of CD-1 mice gavaged with 2μmol CDDO-Im; highest induction of HO-1 was observed in the stomach, liver, and small intestine. |

References:

[1] So JY, Lin JJ, Wahler J, Liby KT, Sporn MB, Suh N. A synthetic triterpenoid CDDO-Im inhibits tumorsphere formation by regulating stem cell signaling pathways in triple-negative breast cancer. PLoS One. 2014;9(9):e107616.
[2] Liby, K., Hock, T., Yore, M.M., et al.The synthetic triterpenoids, CDDO and CDDO-imidazolide, are potent inducers of heme oxygenase-1 and Nrf2/ARE signalingCancer Res.65(11)4789-4798(2005).

***Caution: Product has not been fully validated for medical applications. For research use only.***
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## Background

CDDO-Im (RTA-403) is a synthetic triterpenoid that activates Nuclear factor erythroid 2–related factor 2 (Nrf2) signaling by binding to Kelch-like ECH-associated protein 1 (Keap1), thereby inhibiting Nrf2 degradation and increasing its protein levels[1]. CDDO-Im is a multifunctional molecule with potent antiproliferative, differentiating, and anti-inflammatory activities[2].

In vitro, CDDO-Im is highly active in suppressing cellular proliferation of human leukemia and breast cancer cell lines, with an $IC_{50}$ of approximately 10-30nM[3]. CDDO-Im treatment at 50, 100 and 200nM for 72h significantly inhibited the growth of both SUM159 and MDA-MB-231 cells[4]. CDDO-Im treatment at 200nM for 24h markedly induced cell cycle arrest at G2/M-phase and late cell apoptosis in both SUM159 cells and MDA-MB-231 cells[4]. After 7 days of treatment with 100nM CDDO-Im, the $CD24^{-}/EpCAM^{+}$ cancer stem cell subpopulation in SUM159 sphere cultures decreased by 81.2%[4]. Treatment with 3-300mM CDDO-Im for 3 days inhibited the proliferation of MCF-7 cells in a dose-dependent manner[3].

In vivo, oral gavage of 2μmol of CDDO-Im increased Heme Oxygenase-1 (HO-1) protein levels in the stomach, small intestine, colon, liver, lung, kidney, and heart at 6h in male CD-1 mice[2]. Intraperitoneal injection of 10nmol (5.4μg) CDDO-Im in mice nearly completely blocked interferon-induced Inducible Nitric Oxide Synthase (iNOS) at 10h, while 1nmol (0.54μg) produced a partial effect[3]. In the murine leukemia model (L1210 cells i.p. in BDF-1 mice), twice-daily intraperitoneal injection of CDDO-Im at 50μg per dose (100μg/d) for 8 days reduced leukemia cell numbers by 91%[3]. In the murine melanoma model, twice-daily intraperitoneal injection of CDDO-Im at 50μg per dose (100μg/d) for 5 days reduced tumor burden by 75%[3].

References:
[1] Meng, X., Waddington, J.C., Tailor, A., et al.CDDO-imidazolide targets multiple amino acid residues on the Nrf2 adaptor, Keap1J. Med. Chem.63(17)9965-9976(2020).
[2] Liby, K., Hock, T., Yore, M.M., et al.The synthetic triterpenoids, CDDO and CDDO-imidazolide, are potent inducers of heme oxygenase-1 and Nrf2/ARE signalingCancer Res.65(11)4789-4798(2005).
[3] Place AE, Suh N, Williams CR, et al. The novel synthetic triterpenoid, CDDO-imidazolide, inhibits inflammatory response and tumor growth in vivo. *Clin Cancer Res*. 2003;9(7):2798-2806.

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[4] So JY, Lin JJ, Wahler J, Liby KT, Sporn MB, Suh N. A synthetic triterpenoid CDDO-Im inhibits tumorsphere formation by regulating stem cell signaling pathways in triple-negative breast cancer. *PLoS One*. 2014;9(9):e107616.