Aldehyde Dehydrogenase (ALDH)

Aldehyde Dehydrogenases (ALDHs) are a superfamily of $NADP^+$-dependent enzymes that metabolize endogenous and exogenous aldehydes to corresponding carboxylic acids. This superfamily of proteins is comprised of 19 isozymes, with constitutive activity of at least one isozyme observed in a majority of mammalian tissues. The ALDHs play important roles, among other things, in cellular detoxification, the protection against ultraviolet radiation-induced damage, and amino acid metabolism.

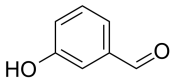
The ALDH1A subfamily plays a pivotal role in embryogenesis and development by mediating retinoic acid signaling. ALDH2, as a key enzyme that oxidizes acetaldehyde, is crucial for alcohol metabolism. ALDH1A1 and ALDH3A1 are lens and corneal crystallins, which are essential elements of the cellular defense mechanism against ultraviolet radiation-induced damage in ocular tissues. Many ALDH isozymes are important in oxidizing reactive aldehydes derived from lipid peroxidation and thereby help maintain cellular homeostasis. Increased expression and activity of ALDH isozymes have been reported in various human cancers and are associated with cancer relapse. As a direct consequence of their significant physiological and toxicological roles, inhibitors of the ALDH enzymes have been developed to treat human diseases.

Aldehyde Dehydrogenase (ALDH) Inhibitors, Agonists & Antagonists

3-Hydroxybenzaldehyde

Cat. No.: HY-76006

3-Hydroxybenzaldehyde is a **precursor** compound for phenolic compounds, such as Protocatechualdehyde (HY-N0295).
3-Hydroxybenzaldehyde is a **substrate** of **aldehyde dehydrogenase (ALDH)** in rats and humans (ALDH2).

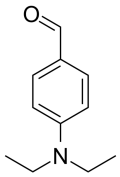


Purity: ≥98.0%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 100 mg

4-Diethylaminobenzaldehyde

Cat. No.: HY-W016645

4-Diethylaminobenzaldehyde is a reversible **aldehyde dehydrogenases (ALDHs)** inhibitor, with a K_i of 4 nM for ALDH1. 4-Diethylaminobenzaldehyde displays potent anti-androgenic effect (IC_{50}= 1.71μM).



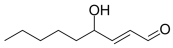
Purity: 98.82%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 100 mg

4-Hydroxynonenal

(4-HNE)

Cat. No.: HY-113466

4-Hydroxynonenal (4-HNE) is an α,β unsaturated hydroxyalkenal and an oxidative/nitrosative stress biomarker. 4-Hydroxynonenal is a substrate and an inhibitor of **acetaldehyde dehydrogenase 2 (ALDH2)**.



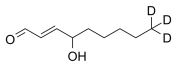
Purity: ≥99.0%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg, 25 mg, 50 mg

4-Hydroxynonenal-d3

(4-HNE-d3)

Cat. No.: HY-113466S

4-Hydroxynonenal-d3 (4-HNE-d3) is the deuterium labeled 4-Hydroxynonenal. 4-Hydroxynonenal (4-HNE) is an α,β unsaturated hydroxyalkenal and an oxidative/nitrosative stress biomarker.

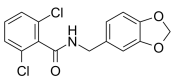


Purity: >98%
Clinical Data:
Size: 1 mg, 5 mg

Alda-1

Cat. No.: HY-18936

Alda-1 is a potent and selective **ALDH2** agonist, which activates wild-type ALDH2 and restores near wild-type activity to ALDH2*2.

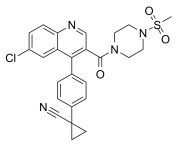


Purity: 99.99%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 10 mg, 50 mg, 100 mg, 500 mg

ALDH1A1-IN-2

Cat. No.: HY-126003

ALDH1A1-IN-2 is a potent inhibitor of aldehyde dehydrogenase 1a1 (**aldh1a1**). Aldehyde dehydrogenases (ALDH) constitute a family of enzymes that play a critical role in oxidizing various cytotoxic xenogenic and biogenic aldehydes.

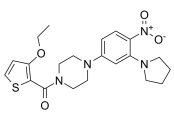


Purity: >98%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg, 25 mg, 50 mg, 100 mg

ALDH1A2-IN-1

Cat. No.: HY-139031

ALDH1A2-IN-1 is an active site-directed reversible **ALDH1A2** inhibitor (IC_{50}=0.91 μM; **Kd**=0.26 μM) with several hydrophobic interactions.

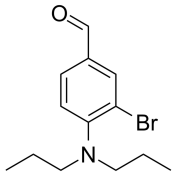


Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

ALDH1A3-IN-1

Cat. No.: HY-144667

ALDH1A3-IN-1 (Compound 14) is a potent **ALDH1A3** inhibitor, with an IC_{50} of 0.63 μM and a K_i of 0.46 μM. ALDH1A3-IN-1 can be studied in **prostate cancer**.

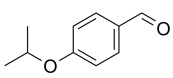


Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

ALDH1A3-IN-3

Cat. No.: HY-W017186

ALDH1A3-IN-3 (compound 16) is a potent inhibitor of **ALDH1A3**, with an IC_{50} of 0.26 μM. ALDH1A3-IN-3 is also a good ALDH3A1 substrate. ALDH1A3-IN-3 can be used for the research of prostate cancer.



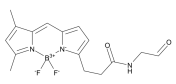
Purity: 98.87%
Clinical Data: No Development Reported
Size: 1 g

BODIPY aminoacetaldehyde

(BAAA)

Cat. No.: HY-136594

BODIPY aminoacetaldehyde (BAAA) is a fluorescent substrate for both murine and human aldehyde dehydrogenase (ALDH). BODIPY aminoacetaldehyde consists of an aminoacetaldehyde moiety bonded to the BODIPY fluorochrome and can be used to label stem cells.



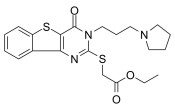
Purity: >98%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg

CM037

(A37)

Cat. No.: HY-110294

CM037 is a selective inhibitor of **ALDH1A1** (aldehyde dehydrogenase 1A1) with an IC_{50} of 4.6 μM.

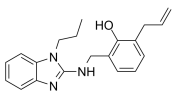


Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

CM10

Cat. No.: HY-135841

CM10 is a potent and selective **aldehyde dehydrogenase 1A (ALDH1A) family** inhibitor, with IC_{50}s of 1700, 740, and 640 nM for ALDH1A1, ALDH1A2, and ALDH1A3, respectively. CM10 does not inhibit any of the other ALDH family members.

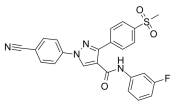


Purity: 99.53%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 5 mg, 10 mg, 25 mg, 50 mg, 100 mg

CM121

Cat. No.: HY-139032

CM121 is an active site-directed reversible **ALDH1A2** inhibitor (IC_{50}=0.54 μM**Kd**=1.1 μM) with a variety of hydrophobic interactions.

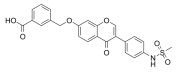


Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

CVT-10216

Cat. No.: HY-19801

CVT-10216 is a highly selective, reversible **aldehyde dehydrogenase-2 (ALDH-2)** inhibitor with an IC_{50} of 29 nM. CVT-10216 also has inhibitory effect of ALDH-1 with an IC_{50} of 1.3 μM.



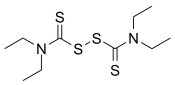
Purity: ≥99.0%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 5 mg, 10 mg, 25 mg, 50 mg

Disulfiram

(Tetraethylthiuram disulfide; TETD)

Cat. No.: HY-B0240

Disulfiram (Tetraethylthiuram disulfide) is a specific inhibitor of **aldehyde-dehydrogenase (ALDH1)**, used for the treatment of chronic alcoholism by producing an acute sensitivity to alcohol.

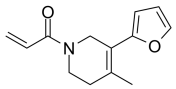


Purity: 99.77%
Clinical Data: Launched
Size: 10 mM × 1 mL, 500 mg, 1 g, 5 g

EN40

Cat. No.: HY-122577

EN40 is a potent, selective **aldehyde dehydrogenase 3A1 (ALDH3A1)** inhibitor as a covalent ligand, exhibits an IC_{50} value of 2 uM.

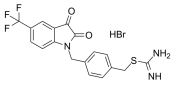


Purity: 95.15%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg, 25 mg, 50 mg, 100 mg

KS106

Cat. No.: HY-146683

KS106 is a potent **ALDH** inhibitor with IC_{50}s of 334, 2137, 360 nM for ALDH1A1, ALDH2, and ALDH3A1, respectively. KS106 shows antiproliferative and anticancer effects with low low toxic.



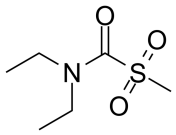
Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

MeDTC

(S-Methyl-N,N-diethylthiocarbamate Sulfone)

Cat. No.: HY-115757

MeDTC (S-Methyl-N,N-diethylthiocarbamate Sulfone), a Disulfiram metabolite, is a potent, irreversible **aldehyde dehydrogenase (ALDH)** inhibitor.

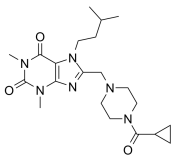


Purity: >98%
Clinical Data: No Development Reported
Size: 5 mg

NCT-501

Cat. No.: HY-18768

NCT-501 is a potent and selective theophylline-based inhibitor of **aldehyde dehydrogenase 1A1 (ALDH1A1)**, inhibits hALDH1A1 with IC_{50} of 40 nM, typically shows better selectivity over other ALDH isozymes and other dehydrogenases (hALDH1B1, hALDH3A1, and...

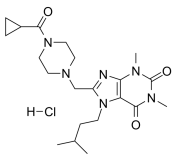


Purity: 99.84%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 5 mg, 10 mg, 50 mg, 100 mg

NCT-501 hydrochloride

Cat. No.: HY-18768A

NCT-501 hydrochloride is a potent and selective theophylline-based inhibitor of **aldehyde dehydrogenase 1A1 (ALDH1A1)**, inhibits hALDH1A1 with IC_{50} of 40 nM, typically shows better selectivity over other ALDH isozymes and other dehydrogenases (hALDH1B1, hALDH3A1, and...

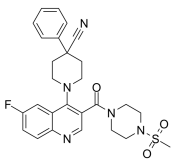


Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

NCT-505

Cat. No.: HY-112277

NCT-505 is a potent and selective **aldehyde dehydrogenase (ALDH1A1)** inhibitor, with an IC_{50} of 7 nM, and weakly inhibits hALDH1A2, hALDH1A3, hALDH2, hALDH3A1 (IC_{50}s, >57, 22.8, 20.1, >57 μM).

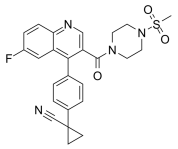


Purity: 98.41%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg, 25 mg

NCT-506

Cat. No.: HY-112278

NCT-506 is an orally bioavailable aldehyde dehydrogenase 1A1 (**ALDH1A1**) inhibitors with an IC_{50} of 7 nM.



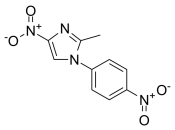
Purity: >98%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg, 25 mg, 50 mg, 100 mg

Nitrefazole

(EMD-15700)

Cat. No.: HY-107030

Nitrefazole is a 4-nitroimidazole derivative with strong and long lasting inhibition of **aldehyde dehydrogenase (ALDH)**, an enzyme involved in the metabolism of alcohol.

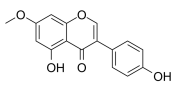


Purity: >98%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

Prunetin

Cat. No.: HY-N2597

Prunetin, an O-methylated isoflavone, possesses anti-inflammatory activity. Prunetin is a potent human aldehyde dehydrogenases inhibitor.

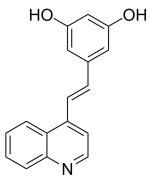


Purity: 99.01%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg, 10 mg

RV01

Cat. No.: HY-126241

RV01 is an analogue of resveratrol, inhibits DNA damage, reduces **acetaldehyde dehydrogenase 2 (ALDH2)** mRNA expression induced by ethanol, and exhibits hydroxyl radical scavenging activity. RV01 decreases **iNOS** expression, with anti-neuroinflammatory activity.

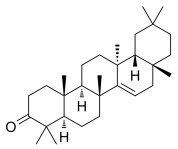


Purity: 98.0%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 5 mg, 10 mg, 50 mg, 100 mg

Taraxerone

Cat. No.: HY-N1177

Taraxerone is isolated from Sedum sarmentosum. Taraxerone enhances effects on alcohol dehydrogenase (**ADH**) and acetaldehyde dehydrogenase (**ALDH**) activities with EC_{50} values of 512.42 and 500.16 μM, respectively.

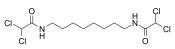


Purity: ≥98.0%
Clinical Data: No Development Reported
Size: 1 mg, 5 mg

Win 18446

Cat. No.: HY-W011094

Win 18446 is an orally active **testes-specific enzyme ALDH1a2** inhibitor, with an IC_{50} of 0.3 μM. Win 18446 reversibly inhibits spermatogenesis in many species and inhibits Retinoic acid (HY-14649) biosynthesis from Retinol (HY-B1342) within the testes.

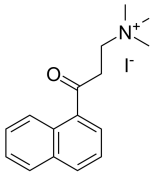


Purity: ≥95.0%
Clinical Data: No Development Reported
Size: 10 mM × 1 mL, 50 mg

α-NETA

Cat. No.: HY-138097

α-NETA is a potent and noncompetitive **choline acetyltransferase (ChA)** inhibitor with an IC_{50} of 9 μM. α-NETA is a potent ALDH1A1 (IC_{50}=0.04 μM) and **chemokine-like receptor-1 (CMKLR1)** antagonist.



Purity: ≥98.0%
Clinical Data: No Development Reported
Size: 5 mg, 10 mg, 25 mg, 50 mg, 100 mg