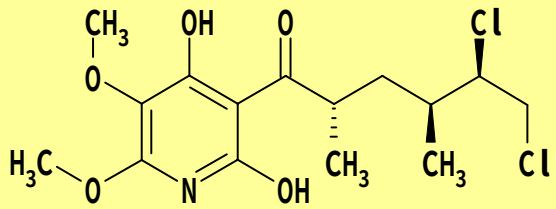
# Atpenin A5

Cat.# BLS0330

## Structure



**Origin:** synthetic originally from fungal strain FO-125

**CAS Registry Number:** 119509-24-9

**CA Index Name:** 3-[(2S,4S,5R)-5,6-Dichloro-2,4-dimethyl-1-oxohexyl]-4-hydroxy-5,6-dimethoxy-(9CI), 2(1*H*)-Pyridinone

**Appearance:** white powder

**Molecular Formula/ Weight:** $C_{15}H_{21}Cl_2NO_5$=366.24

**Melting Point:** 83-86℃ | **Purity:** >95% by HPLC

**Solubility:** Sol. in in Chloroform, Methanol, Acetone, EtOAc, Acetonitrile
Insoluble in water, Hexane

**pKa:** 4.50±1.00 (most acidic)
0.98±0.50 (most basic) | **log P:** 3.53

### Background Information:

Atpenin A5 is the most potent complex II (succinate:ubiquinone oxidoreductase) inhibitor ever known. It inhibits complex II specifically, and the $IC_{50}$ value against bovine heart complex II is 3.6 nM, which is 300-fold lower than that for carboxin ($IC_{50}$ = 1.1 microM). Atpenin A5 also inhibits fumarate reductase of Ascaris suum ($IC_{50}$ = 12 nM). Its inhibition against *E. coli* succinate dehydrogenase is not potent ($IC_{50}$ = 5 microM). The binding site of atpenin A5 was clarified as the quinone-binding site of complex II by co-crystallization study of atpenin A5 and the enzyme.

The complex II inhibitor atpenin A5 protects against cardiac ischemia-reperfusion injury via activation of mitochondrial $K_{ATP}$ channels.

### Handling and Storage:

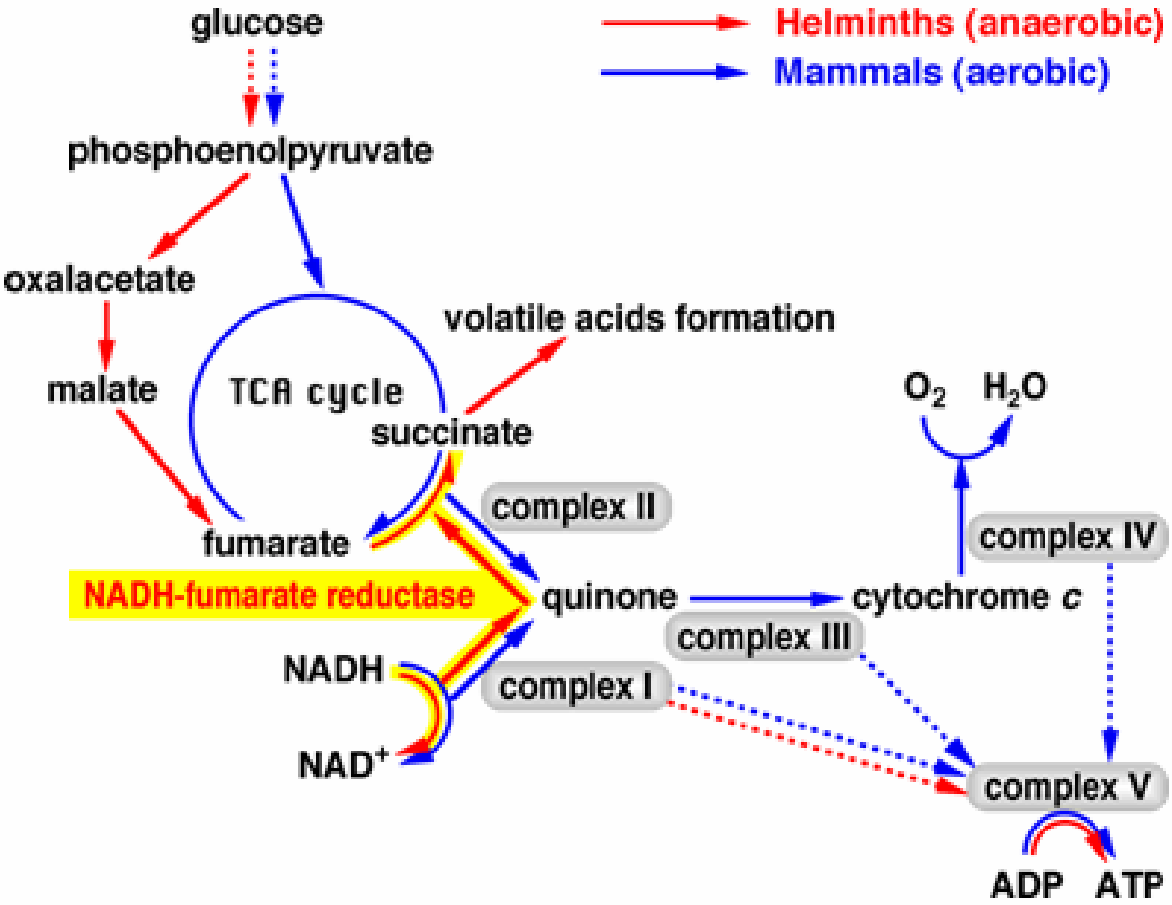
Store at -20℃.

### References:


1. S. Ōmura et al., J. Antibiot., **41**, 1769 (1988).
2. K. Oshino et al., **43**, 1064 (1990).
3. H. Kumagai et al., J. Antibiot., **43**, 1553 (1990).
4. F. Trecourt et al., J. Org. Chem., **59**, 6173 (1994).
5. H. Miyadera et al., Proc. Natl. Acad. Sci. USA, **100**, 473 (2003).
6. R. Horsefield et al., J. Biol. Chem, **281**, in press (2006).
7. A. P. Wojtovich & P. S. Brookes; Basic Res. Cardiol. **104**, 121 (2009).
8. M. Ohtawa, et al.; J. Antibiot. **62**, 289 (2009).


*Synthesized by Organic Chemistry Group, Pharmaceutical Science, Kitasato University*

Mechanism




Energy metabolism in helminths and mammals

K. Shiomi & S. Ōmura, *Proc. Jpn. Acad. Ser. B* 80, 245 (2004)