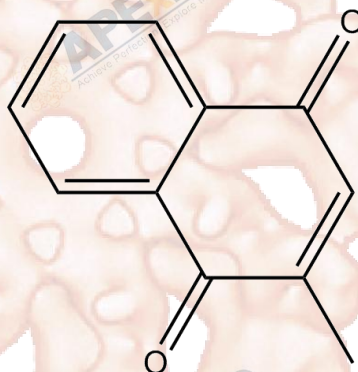


Product Data Sheet

Menadione

Cat. No.:	B1966
CAS No.:	58-27-5
Formula:	C ₁₁ H ₈ O ₂
M.Wt:	172.18
Synonyms:	Vitamin K ₃
Target:	Mitochondrial DNA polymerase γ
Pathway:	Metabolism
Storage:	Store at -20° C



Solvent & Solubility

insoluble in H₂O; ≥ 5.15 mg/mL in DMSO; ≥ 9.86 mg/mL in EtOH with ultrasonic

In Vitro

Preparing Stock Solutions	Mass		1mg	5mg	10mg
	Solvent	Concentration			
	1 mM	5.8079 mL	29.0394 mL	58.0788 mL	
	5 mM	1.1616 mL	5.8079 mL	11.6158 mL	
	10 mM	0.5808 mL	2.9039 mL	5.8079 mL	

Please refer to the solubility information to select the appropriate solvent.

Biological Activity

Shortsummary

Menadione (CAS 58-27-5), also known as vitamin K₃, is a mitochondria-targeting small molecule inhibitor of DNA polymerase γ (pol γ), a key enzyme involved in mitochondrial DNA replication and repair processes. Menadione inhibits pol γ with an IC₅₀ of approximately 6 μ M. In HCT116 cancer cell lines, menadione (30 μ M) significantly reduces mitochondrial DNA synthesis and repair, elevates reactive oxygen species (ROS), and induces apoptosis, while at lower levels (~3 μ M), it suppresses proliferation independent of marked ROS increase. Menadione is employed broadly in research into mitochondrial dysfunction, tumor biology, and oxidative stress.

IC₅₀ & Target

In Vitro

Cell Viability Assay

	Cell Line:	HCT116 p53+/+ and p53 - / - cells
	Preparation method:	Both HCT116 p53+/+ and HCT116 p53 -/- cells were treated with 0, 3, and 30 μ M of VK3 for 24 h and then stored at -80° C. Using the isolated mitochondrial fraction, the pol γ activity of 2 μ g of the extract from the mitochondrial fraction was assayed.
	Reacting conditions:	3 or 30 μ M menadione for 24 h incubation
	Applications:	Menadione at 30 μ M inhibited DNA polymerase γ by more than 80%, caused impairment of mitochondrial DNA replication and repair, and induced a significant increase in reactive oxygen species (ROS), leading to apoptosis. At a lower concentration (3 μ M), menadione did not cause a significant increase in ROS, but was able to effectively inhibit cell proliferation, which could be reversed by supplementing glycolytic substrates.
In Vivo	Animal experiment	
	Animal models:	Four-week-old Emory mice
	Dosage form:	0.04%, 0.12% and 0.4% (w/w) menadione mixed with freshly ground Purina Rodent Lab Chow 5001. By oral route for 10 to 12 weeks
	Applications:	In Emory mice, menadione at a low non-toxic dose (0.12%, w/w), used as a dietary supplement for 10 to 12 weeks, caused early signs of cataract, such as prominent anterior suture, in 68% of the Emory mice.
	Preparation method:	Dosage of 0.04%, 0.12% and 0.4% (w/w) menadione mixed with freshly ground Purina Rodent Lab Chow 5001 (regular diet from Ralston Purina, St. Louis, MO) were administered to three groups of 20 four-week-old mouse pups each, which were equivalent to 0.08 g, 0.24 g and 0.8 g/kg body weight respectively.
	Other notes:	The technical data provided above is for reference only.

Product Citations

See more customer validations on www.apexbt.com.

References

1. Sasaki R, Suzuki Y, Yonezawa Y, et al. DNA polymerase gamma inhibition by vitamin K3 induces mitochondria-mediated cytotoxicity in human cancer cells. Cancer Science, 2008, 99(5): 1040-1048.
2. Bhuyan DK, Huang X, Kuriakose G, et al. Menadione-induced oxidative stress accelerates onset of Emory mouse cataract in vivo. Current eye research, 1997, 16(6): 519-526.

Caution

FOR RESEARCH PURPOSES ONLY.

NOT FOR HUMAN, VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

Specific storage and handling information for each product is indicated on the product datasheet. Most APExBIO products are stable under the recommended conditions. Products are sometimes shipped at a temperature that differs from the recommended storage temperature. Shortterm storage of many products are stable in the short-term at temperatures that differ from that required for long-term storage. We ensure that the product is shipped under conditions that will maintain the quality of the reagents. Upon receipt of the product, follow the storage recommendations on the product data sheet.

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