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# PRODUCT INFORMATION



## 4-oxo Retinoic Acid

Item No. 35819

CAS Registry No.: 38030-57-8

Synonyms: all-*trans*-4-keto Retinoic Acid,  
all-*trans*-4-oxo RA,  
all-*trans*-4-oxo Retinoic Acid,  
4-keto atRA, 4-oxo RA

MF: C<sub>20</sub>H<sub>26</sub>O<sub>3</sub>

FW: 314.4

Purity: ≥98%

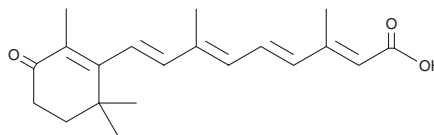
UV/Vis.: λ<sub>max</sub>: 280, 360 nm

Supplied as: A solid

Storage: -20°C

Stability: ≥4 years

Item Origin: Synthetic



Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

### Laboratory Procedures

4-oxo Retinoic acid is supplied as a solid. A stock solution may be made by dissolving the 4-oxo retinoic acid in the solvent of choice, which should be purged with an inert gas. 4-oxo Retinoic acid is slightly soluble in chloroform and methanol.

### Description

4-oxo Retinoic acid is an active metabolite of the vitamin A metabolite and retinoic acid receptor (RAR) ligand all-*trans* retinoic acid (Item No. 11017).<sup>1</sup> It is formed from all-*trans* retinoic acid by several cytochrome P450 (CYP) isoforms, including CYP1A1, CYP3A7, and CYP26A1.<sup>2,3</sup> 4-oxo Retinoic acid binds to RAR $\alpha$ , RAR $\beta$ , and RAR $\gamma$  (IC<sub>50</sub>s = 59, 50, and 142 nM, respectively, in radioligand binding assays) and induces expression of a luciferase reporter in COS-7 cells expressing RAR $\alpha$ , RAR $\beta$ , or RAR $\gamma$  (EC<sub>50</sub>s = 33, 8, and 89 nM, respectively).<sup>1</sup> It increases protein levels of cytokeratin 7 (CK-7) and CK-19 in human epidermal keratinocytes when used at a concentration of 1  $\mu$ M.<sup>4</sup> 4-oxo Retinoic acid (10-1,000 nM) inhibits the proliferation of MCF-7 breast cancer cells.<sup>5</sup> It is teratogenic to zebrafish embryos (EC<sub>50</sub> = 8.1 nM).<sup>6</sup>

### References

1. Idrest, N., Marill, J., Flexor, M.A., *et al.* Activation of retinoic acid receptor-dependent transcription by all-*trans*-retinoic acid metabolites and isomers. *J. Biol. Chem.* **277**(25), 31491-31498 (2002).
2. Marill, J., Cresteil, T., Lanotte, M., *et al.* Identification of human cytochrome P450s involved in the formation of all-*trans*-retinoic acid principal metabolites. *Mol. Pharmacol.* **58**(6), 1341-1348 (2000).
3. Thatcher, J.E., Buttrick, B., Shaffer, S.A., *et al.* Substrate specificity and ligand interactions of CYP26A1, the human liver retinoic acid hydroxylase. *Mol. Pharmacol.* **80**(2), 228-239 (2011).
4. Baron, J.M., Heise, R., Blaner, W.S., *et al.* Retinoic acid and its 4-oxo metabolites are functionally active in human skin cells *in vitro*. *J. Invest. Dermatol.* **125**(1), 143-153 (2005).
5. Van heusden, J., Wouters, W., Ramaekers, F.C.S., *et al.* All-*trans*-retinoic acid metabolites significantly inhibit the proliferation of MCF-7 human breast cancer cells *in vitro*. *Br. J. Cancer* **77**(1), 26-32 (1998).
6. Pápal, M., Novák, J., Rafajová, A., *et al.* Teratogenicity of retinoids detected in surface waters in zebrafish embryos and its predictability by *in vitro* assays. *Aquat. Toxicol.* **246**, 106151 (2022).

#### WARNING

THIS PRODUCT IS FOR RESEARCH ONLY - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

#### SAFETY DATA

This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the complete Safety Data Sheet, which has been sent via email to your institution.

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