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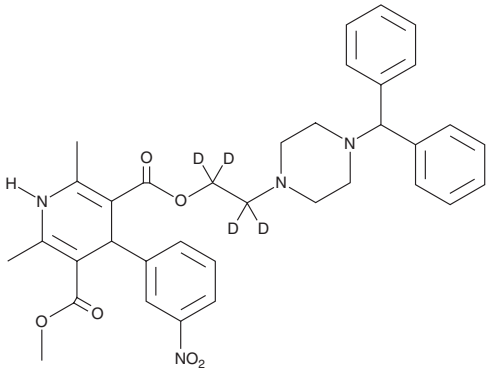
# PRODUCT INFORMATION

## Manidipine-$d_4$

*Item No. 30768*

**CAS Registry No.:** 1189656-59-4
**Formal Name:** 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)-3,5-pyridinedicarboxylic acid, 3-[2-[4-(diphenylmethyl)-1-piperazinyl] ethyl-$d_4$] 5-methyl ester
**Synonyms:** Franidipine-$d_4$, (±)-Manidipine-$d_4$
**MF:** $C_{35}H_{34}D_4N_4O_6$
**FW:** 614.7
**Chemical Purity:** ≥98% (Manidipine)
**Deuterium Incorporation:** ≥99% deuterated forms ($d_1$-$d_4$); ≤1% $d_0$
**Supplied as:** A solid
**Storage:** -20°C
**Stability:** ≥2 years



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

### Laboratory Procedures

Manidipine-$d_4$ is intended for use as an internal standard for the quantification of manidipine (Item No. 23614) by GC- or LC-MS. The accuracy of the sample weight in this vial is between 5% over and 2% under the amount shown on the vial. If better precision is required, the deuterated standard should be quantitated against a more precisely weighed unlabeled standard by constructing a standard curve of peak intensity ratios (deuterated *versus* unlabeled).

Manidipine-$d_4$ is supplied as a solid. A stock solution may be made by dissolving the manidipine-$d_4$ in the solvent of choice, which should be purged with an inert gas. Manidipine-$d_4$ is soluble in methanol.

### Description

Manidipine is a dihydropyridine L- and T-type calcium channel blocker.[1,2,3] It inhibits recombinant rabbit L-type ($\alpha_{1C}\alpha_2/\delta\beta_{1a}$) and human T-type ($\alpha_{1H}$) calcium channels expressed in *Xenopus* oocytes and native L-type channels in dissociated guinea pig cardiac ventricular cells ($IC_{50}$ = 2.6 nM). Manidipine inhibits intracellular calcium increases induced by endothelin-1 (ET-1; Item No. 24127) in $A_7r_5$ rat vascular smooth muscle cells ($ED_{50}$ = 1 nM) and potassium-induced contraction of isolated dog femoral and portal veins ($IC_{50}$s = 24 and 2.1 nM, respectively).[4,5] *In vivo*, it lowers blood pressure in spontaneously hypertensive rats (SHRs) when administered at a dose of 10 mg/kg and inhibits left ventricular hypertrophy in rats induced by isoproterenol (Item No. 15592) when administered at a dose of 3 mg/kg.[6,7] Formulations containing manidipine have been used in the treatment of hypertension.

### References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2. Furukawa, T., Nukada, T., Namiki, Y., *et al. Eur. J. Pharmacol.* **613(1-3)**, 100-107 (2009).
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4. Huang, S., Simonson, M.S., and Dunn, M.J. *Am. Heart J.* **125(2 Pt 2)**, 589-597 (1993).
5. Shibouta, Y., Kitayoshi, T., Kitoh, G., *et al. Jpn. J. Pharmacol.* **48(4)**, 463-472 (1988).
6. Meguro, K., Aizawa, M., Sohda, T., *et al. Chem. Pharm. Bull. (Tokyo)* **33(9)**, 3787-3797 (1985).
7. Yoshiyama, M., Takeuchi, K., Kim, S., *et al. Jpn. Circ. J.* **62(1)**, 47-52 (1998).





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