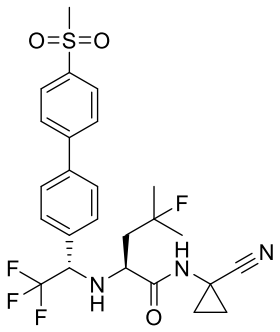
Product data sheet

MedKoo Cat#: 202062 Name: Odanacatib (MK0822) CAS#: 603139-19-1 Chemical Formula: $C_{25}H_{27}F_4N_3O_3S$ Exact Mass: 525.17093 Molecular Weight: 525.56	
Product supplied as:	Powder
Purity (by HPLC):	≥ 98%
Shipping conditions	Ambient temperature
Storage conditions:	Powder: -20°C 3 years; 4°C 2 years.
	In solvent: -80°C 3 months; -20°C 2 weeks.

1. Product description:
Odanacatib, also known as MK-0822, is an inhibitor of cathepsin K with potential anti-osteoporotic activity. Odanacatib selectively binds to and inhibits the activity of cathepsin K, which may result in a reduction in bone resorption, improvement of bone mineral density, and a reversal in osteoporotic changes. Cathepsin K, a tissue-specific cysteine protease that catalyzes degradation of bone matrix proteins such as collagen I/II, elastin, and osteonectin plays an important role in osteoclast function and bone resorption. Check for active clinical trials or closed clinical trials using this agent. (NCI Thesaurus).

2. CoA, QC data, SDS, and handling instruction
SDS and handling instruction, CoA with copies of QC data (NMR, HPLC and MS analytical spectra) can be downloaded from the product web page under "QC And Documents" section. Note: copies of analytical spectra may not be available if the product is being supplied by MedKoo partners. Whether the product was made by MedKoo or provided by its partners, the quality is 100% guaranteed.

3. Solubility data

Solvent	Max Conc. mg/mL	Max Conc. mM
DMSO	15	28.5

4. Stock solution preparation table:

Concentration / Solvent Volume / Mass	**1 mg**	**5 mg**	**10 mg**
1 mM	1.90 mL	9.51 mL	19.03 mL
5 mM	0.38 mL	1.90 mL	3.81 mL
10 mM	0.19 mL	0.95 mL	1.90 mL
50 mM	0.04 mL	0.19 mL	0.38 mL

5. Molarity Calculator, Reconstitution Calculator, Dilution Calculator
Please refer the product web page under section of "Calculator"

6. Recommended literature which reported protocols for in vitro and in vivo study
In vitro study

1. Leung P, Pickarski M, Zhuo Y, Masarachia PJ, Duong LT. The effects of the cathepsin K inhibitor odanacatib on osteoclastic bone resorption and vesicular trafficking. Bone. 2011 Oct;49(4):623-35. doi: 10.1016/j.bone.2011.06.014. Epub 2011 Jun 22. PMID: 21718816.

2. Vashum Y, Premsingh R, Kottaiswamy A, Soma M, Padmanaban A, Kalaiselvan P, Samuel S. Inhibitory effect of cathepsin K inhibitor (ODN-MK-0822) on invasion, migration and adhesion of human breast cancer cells in vitro. Mol Biol Rep. 2021 Jan;48(1):105-116. doi: 10.1007/s11033-020-05951-0. Epub 2020 Dec 8. PMID: 33294960.

In vivo study

1. Ng KW. Potential role of odanacatib in the treatment of osteoporosis. Clin Interv Aging. 2012;7:235-47. doi: 10.2147/CIA.S26729. Epub 2012 Jul 12. PMID: 22866001; PMCID: PMC3410681.

7. Bioactivity
Biological target:

Product data sheet

Odanacatib (MK-0822) is a potent and selective inhibitor of cathepsin K, with an IC50 of 0.2 nM for human cathepsin K.

In vitro activity

Human breast cancer cell lines MDA-MB-231 were treated with different concentrations of ODN and performed invasion, adhesion and migration assays and, RT-PCR and western blot to evaluate the effect of ODN on the metastatic potential of breast cancer cells. ODN markedly decreased wound healing cell migration, invasion and adhesion at a dose dependent manner. ODN inhibits cell invasion by decreasing the matrix metalloproteinase (MMP-9) with the upregulation of TIMP-1 expression. ODN effectively inhibited the phosphorylation of extracellular signal-regulated kinase (ERK), p38, and c-Jun N-terminal Kinase (JNK), and blocked the expression of β-integrins and FAK proteins. ODN also significantly inhibited PI3K downstream targets Rac1, Cdc42, paxillin and Src which are critical for cell adhesion, migration and cytoskeletal reorganization. ODN exerts anti-metastatic action through inhibition of signaling pathway for MMP-9, PI3K and MAPK. This indicates potential therapeutic effects of ODN in the treatment of metastatic breast cancer.

Reference: Mol Biol Rep. 2021 Jan;48(1):105-116. https://doi.org/10.1007/s11033-020-05951-0

In vivo activity

Two related studies in OVX monkeys that evaluated the effects of ODN on bone turnover, BMD, and bone strength had findings that were common with conventional antiresorptives and other findings that were different. OVX monkeys were treated for 21 months with either vehicle, ODN 6 mg/kg, or ODN 30 mg/kg (orally, once daily), and compared with intact animals. ODN treatment persistently suppressed bone resorption markers (urinary NTX by 75% to 90% and serum CTX by 40% to 55%) and serum bone formation markers (BSAP by 30% to 35% and P1NP by 60% to 70%) versus vehicle-treated OVX monkeys. In the lumbar vertebrae and iliac crest, both doses of ODN prevented bone loss and maintained bone mass at a level comparable to intact animals. BFRs in trabecular bone at the iliac crest and lumbar vertebrae decreased by comparable amounts. However, in the femoral neck and proximal femur, there was no effect on endocortical BFR, while trabecular and intracortical BFR were reduced. Furthermore, ODN stimulated long-term femoral neck and proximal femur periosteal BFR by 3.5-fold and 6-fold, respectively, with the 30 mg/kg dose versus vehicle, resulting in a 21% and 19% increase in cortical thickness in the femoral neck and proximal femur, respectively. Thus, unlike conventional antiresorptives, ODN displayed compartment-specific effects on trabecular versus cortical bone formation, with treatment resulting in marked increases in periosteal bone formation and cortical thickness in OVX monkeys, whereas trabecular bone formation was reduced. This compartment-specific effect of ODN in OVX monkeys is similar to that previously reported for balicatib and relacatib. Another point of difference from current antiresorptives is the maintenance of osteoclast numbers in the ODN-treated groups compared with the vehicle controls. If the osteoclasts remain viable, they could still be functional, even though they could no longer resorb bone. Serum level of TRAP5b, an indicator of osteoclast cell number and biomarker of osteoclast viability was maintained, providing support for the distinct mechanism of cathepsin K inhibition in effectively suppressing bone resorption without reducing osteoclast numbers.

Reference: Clin Interv Aging. 2012;7:235-47. https://www.ncbi.nlm.nih.gov/pmc/articles/pmid/22866001/