

Monosodium Urate Crystals

NLRP3 inflammasome Inducer
Catalog code: tlr1-msu, tlr1-msu-25
<https://www.invivogen.com/msu-crystals>

For research use only
Version 20K18-MM

PRODUCT INFORMATION

Contents

- Monosodium urate (MSU) crystals are available in two quantities:
 - 5 mg: tlr1-msu
 - 25 mg: tlr1-msu-25

Storage and stability

- MSU crystals are shipped at room temperature. Store at 4°C for 1 year.
- Upon resuspension, MSU crystals should be stored at 4°C for 6 months or -20°C for 1 year. Avoid repeated freeze-thaw cycles.

Quality control

- The biological activity has been confirmed using cellular assays.
- The absence of bacterial contamination (e.g. lipoproteins and endotoxins) has been confirmed using HEK-Blue™ TLR2 and HEK-Blue™ TLR4 cells.

DESCRIPTION

Monosodium urate (MSU) or uric acid is the aetiological agent of the acute inflammatory condition gout. MSU crystals induce inflammation by triggering the production of the highly inflammatory cytokine interleukin (IL)-1 β . Indeed, cells from the human monocytic cell line THP-1 or primary monocytes secrete IL-1 β after stimulation with MSU crystals¹. MSU-induced IL-1 β production was recently shown to require the NLRP3 (also known as NALP3 or cryopyrin) inflammasome. The NLRP3 inflammasome is a caspase-1-activating complex comprising the NLR protein NLRP3 and the adaptor ASC required for the maturation and secretion of IL-1 β ². Involvement of the inflammasome is suggested by the finding that macrophages from mice deficient in various components of the inflammasome are defective in crystal-induced IL-1 β induction¹.

1. Martinon F. *et al.*, 2006. Gout-associated uric acid crystals activate the NALP3 inflammasome. *Nature*. 440(7081):237-41. 2. Martinon F. & Tschopp J., 2004. Inflammatory caspases: linking an intracellular innate immune system to autoinflammatory diseases. *Cell*. 117(5):561-74.

CHEMICAL PROPERTIES

Structure: Triclinic crystals characterized by X-ray diffraction

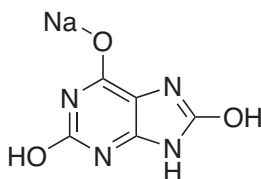
CAS Number: 1198-77-2

Linear formula: C₅H₃N₄NaO₃

Molecular weight: 190.1 g/mol

Solubility: Not soluble

Structure:



METHODS

Preparation of MSU stock solution (5 mg/ml)

- Resuspend MSU crystals with sterile phosphate buffered saline (PBS).
 - Add 1 ml of PBS to the 5 mg MSU vial.
 - Add 5 ml of PBS to the 25 mg MSU vial.

Note: MSU is not soluble. Vortex or sonicate (for 5 minutes) prior to each use to obtain a homogenous suspension.

- Prepare further dilutions by adding the appropriate amount of PBS.

Detection of NLRP3 inflammasome induction

Secretion of IL-1 β is an indicator of the NLRP3 inflammasome induction. The activation and release of IL-1 β requires two distinct signals: the first signal leads to the transcriptional upregulation and synthesis of pro-IL-1 β ; the second signal leads to IL-1 β maturation and secretion through the activation of NLRP3 inflammasome.

The synthesis of pro-IL-1 β can be induced by priming human monocytic THP-1 cells for 3 h with PMA (phorbol 12-myristate 13-acetate; 20-50 ng/ml) or LPS (lipopolysaccharide, 1 μ g/ml). Subsequent stimulation with 100-200 μ g/ml of MSU leads to the formation of NLRP3 inflammasome resulting in IL-1 β maturation and secretion.

Secreted IL-1 β can be detected by Western blot or by ELISA. Alternatively, InvivoGen recommends the use of HEK-Blue™ IL-1 β cells, a reporter cell line that specifically detects bioactive IL-1 β . These cells express an NF- κ B and AP-1-inducible SEAP (secreted alkaline phosphatase) reporter gene. The presence of IL-1 β leads to NF- κ B and AP-1 activation and the subsequent secretion of SEAP. Levels of SEAP can be easily determined with QUANTI-Blue™ Solution, a detection reagent that turn purple/blue in the presence of alkaline phosphatase.

RELATED PRODUCTS

| Product | Description | Cat. Code |
|------------------------------|-----------------------------|------------|
| Alum Hydroxide | Inflammasome inducer | tlr1-aloh |
| ATP | Inflammasome inducer | tlr1-atp |
| CPPD crystals | Inflammasome inducer | tlr1-cppd |
| HEK-Blue™ IL-1 β Cells | IL-1 β reporter cells | hkb-il1b |
| Hemozoin | Inflammasome inducer | tlr1-hz |
| LPS-EK | LPS from <i>E. coli</i> K12 | tlr1-eklps |
| Nigericin | Inflammasome inducer | tlr1-nig |
| QUANTI-Blue™ Solution | SEAP detection reagent | rep-qbs |
| THP1-Null cells | THP-1-derived monocytes | thp-null |

TECHNICAL SUPPORT

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