LL-37

Human antimicrobial peptide with immunomodulatory properties - InvitroFit™

Catalog code: tlrl-ll37-5

https://www.invivogen.com/ll-37

For research use only

Version 24A11-MM

PRODUCT INFORMATION

Contents

- 5 x 1 mg synthetic LL-37 - InvitroFit™
- 10 ml endotoxin-free water

Storage and stability

- LL-37 is provided as a solid and shipped at room temperature. Upon receipt, store at -20°C.
- Upon resuspension, prepare aliquots of LL-37 and store at -20°C or -80°C. Avoid repeated freeze-thaw cycles. Resuspended product is stable for 1 month at -20°C when properly stored.

Quality control

- Purity ≥ 96% (UHPLC)
- The inhibitory activity has been validated 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

LL-37, also known as hCAP18, is a synthetic peptide derived from the C-terminal region of the human cationic antimicrobial protein (hCAP). LL-37 exhibits a variety of immunomodulatory functions[1,2]. Of note, it suppresses the inflammatory response induced by the activation of TLR2 and TLR4, which recognize different bacterial cell wall components[3]. Due to its positive charge, LL-37 interacts with negatively charged cellular targets such as the bacterial lipids lipoteichoic acid (LTA) and lipopolysaccharide (LPS), hence, preventing these agonists from binding to their respective TLR receptors. In this way, LL-37 inhibits the activation of lipid-sensing TLRs[1]. LL-37 also targets DNA, RNA, and polyribosomes. Conversely, LL-37 enhances the activation of nucleic acid-sensing TLRs[1]. Specifically, LL-37 interacts directly with the negatively charged nucleic acids and protects them from degradation by DNases and RNases. Notably, LL-37 can enhance TLR3 signaling by interacting directly with double-stranded RNA (dsRNA), such as poly(I:C)[4]. Furthermore, LL-37 can form a complex with single-stranded RNA (ssRNA)[5] and with ssDNA[6] enhancing TLR7/TLR8 and TLR9 signaling, respectively. In contrast, AIM2 inflammasome formation is inhibited by the LL-37:DNA complex through steric hindrance[7].

1. Scheenstra M.R. *et al.*, 2020. Cathelicidins modulate TLR-activation and inflammation. Front Immunol. 11:1137. **2. Scott A. *et al.*, 2011.** Evaluation of the ability of LL-37 to neutralise LPS in vitro and ex vivo. PLoS One. 6(10): e26525. **3. Di Nardo A. *et al.*, 2007.** Cathelicidin Antimicrobial Peptides Block Dendritic Cell TLR4 Activation and Allergic Contact Sensitization. J. Immunol.178: 1829 - 1834. **4. Lai Y. *et al.*, 2011.** LL37 and cationic peptides enhance TLR3 signaling by viral double-stranded RNAs. PLoS One. 6(10):e26632. **5. Lande R. *et al.*, 2007.** Plasmacytoid dendritic cells sense self-DNA coupled with antimicrobial peptide. Nature. 449(7162):564-9. **6. Ganguly D. *et al.*, 2009.** Self-RNA antimicrobial peptide complexes activate human dendritic cells through TLR7 and TLR8. J Exp Med. 206(9):1983-94. **7. Dombrowski Y. *et al.*, 2011.** Cytosolic DNA triggers inflammasome activation in keratinocytes in psoriatic lesions. Sci Transl Med. 3(82):82ra38.

CHEMICAL PROPERTIES

CAS number: 154947-66-7
Working concentration: 1 -50 µg/ml
Solubility: Water (1 mg/ml)
Amino acid sequence:
LLGDFFRKSKEKIGKEFKRIVQRIKDFLRNLVPRTES
Molecular formula: $C_{205}H_{340}N_{60}O_{53}$
Molecular weight: 4493.37 g/mol

METHODS

Preparation of LL-37 stock solution (1 mg/ml)

1. Add 1 ml endotoxin-free water to 1 mg LL-37 vial.
2. Vortex until completely dissolved.
3. Prepare aliquots and store stock solution at -20°C.

Inhibition of LPS-induced TLR4 activation in THP1-Dual™ cells

THP1-Dual™ cells derive from the human monocytic cell line THP-1, by stable integration of two inducible reporters allowing the simultaneous study of the IRF pathway, by assessing the activity of the secreted luciferase Lucia, and the NF-κB pathway, by monitoring the activity of SEAP.
For more information, visit https://www.invivogen.com/thp1-dual.

1. Add 20 µl of LL-37 (50 nM- 5 µM final concentration) in a well of a 96-well plate.
2. Prepare a THP1-Dual™ cell suspension and add 160 µl of the cell suspension (~100,000 cells) per well.
3. Add 20 µl of LPS-EB Ultrapure (10 ng/ml final concentration) per well.
4. Incubate the plate for 16-24 h at 37 °C, 5% CO_2.
5. Monitor SEAP production using a SEAP detection assay such as QUANTI-Blue™ Solution.

RELATED PRODUCTS

Product	Description	Cat.Code
THP1-Dual™ Cells	Reporter monocytes	thpd-nfis
QUANTI-Blue™ Solution	SEAP detection reagent	rep-qbs
LPS-EB Ultrapure	TLR4 agonist	tlrl-3pelps

TECHNICAL SUPPORT
InvivoGen USA (Toll-Free): 888-457-5873
InvivoGen USA (International): +1 (858) 457-5873
InvivoGen Europe: +33 (0) 5-62-71-69-39
InvivoGen Asia: +852 3622-3480
E-mail: info@invivogen.com