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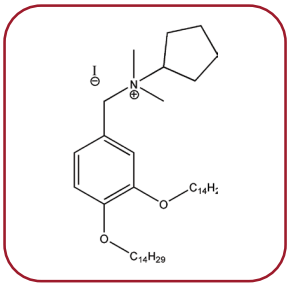



**PRODUCT DATA SHEET** 

# IAXO-103 (CD14/TLR4 Antagonist) (synthetic)

**Cat. No.:** IAX-600-003 **Lot. No.:**

| | |
|---|---|
| **Synonyms** | N-(3,4-Bis-tetradecyloxy-benzyl)-N-cyclopentyl-N,N-dimethylammonium iodide.<br>Small molecule CD14/TLR4 ligand/modulator. Benzylammonium lipid. Lipid A analogue. |
| **Formula** | $C_{42}H_{78}INO_2$ |
| **MW** | 755.98 g/mol (iodide salt) |
| **CAS Number** | 1202208-36-3 |
| **Purity** | ≥98% according to TLC, NMR, MS analysis |
| **Appearance** | White solid |
| **Solubility** | Soluble in Methanol, DMSO and Ethanol 1:1 (vol:vol): >10mM |
| **Handling** | Reconstitution: For a 2mM stock solution, dissolve total vial content in 661µl (1mg size) in DMSO/Ethanol (1:1) (vol:vol). |
| **Activity** | Described to interfere with human, rat and mouse TLR4/CD14 signaling, other species not tested. Optimal working concentration depends upon the type, purity and concentration of TLR4 ligand, carrier protein such as LPS-binding protein (LBP), soluble and membrane-bound CD14, the presence of TLR4 co-receptors (e.g. CD36) as well on type and time of read-out (e.g. cytokine measurement in cell culture supernatant) or the biological outcome of *in vivo* experiments and therefore needs to be determined for each application. Recommended starting concentration: *in vitro*: 5µM, *in vivo* (rodent): 3mg/kg. |
| **Shipping** | Ambient |
| **Storage** | 2-8°C |
| **Stability** | 12 months after receipt (unopened and as supplied) |
| **MSDS** | Available on request |

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## Product Information

- The novel IAXO classes of glycolipid and benzylammonium lipids are synthetic TLR4/CD14 ligands with TLR4 modulating activities in vitro, and conferring protection against TLR4/CD14-mediated tissue damage and inflammation in vivo.
- As research tools IAXOs are useful to explore CD14-dependent and TLR4-independent pathways and TLR4 activation by endogenous ligands (e.g. hyaluronic acid oligosaccharides, oxLDL, HMGB1) in sterile inflammation. In pre-clinical models IAXO compounds have been shown to inhibit neuropathic pain; secondary necrosis of acute drug-induced liver failure and vascular inflammation and abdominal aortic aneurysm by blocking non-hematopoietic TLR4 signaling.
- IAXO compounds hold considerable promise in pharmacological settings, where inhibition of sterile (auto-) inflammation is desired, without compromising TLR4's key role in the defense of pathogens. CD14-dependent and independent TLR4 activation in the central nervous system by endogenous factors has been recently related to a wide array of inflammatory neurological diseases such as amyotrophic lateral sclerosis and Alzheimer's disease.

## Product Specific References

[1] *TLR4 Antagonism Reduces Movement-Induced Nociception and ATF-3 Expression in Experimental Osteoarthritis*. Ferreira-Gomes J, et al. Journal of Pain Research (2021); 14:2615

[2] *APOE-modulated Aβ-induced neuroinflammation in Alzheimer's disease: current landscape, novel data, and future perspective*. Tai LM, et al. J. Neurochem. (2015); 133:465

[3] *Soluble apoE/Aβ complex: mechanism and therapeutic target for APOE4-induced AD risk.* Tai LM, et al. Mol. Neurodegener. (2014); 9:2

[4] *Structural insights into pharmacophore-assisted in silico identification of protein-protein interaction inhibitors for inhibition of human toll-like receptor 4 - myeloid differentiation factor-2 (hTLR4-MD-2) complex*. Mishra V, Pathak C. J. Biomol. Struct. Dyn. (2019); 37:196

## General Information

- Persistent inflammation has been implicated in the pathogenesis not only of diverse chronic diseases such as neuropathic pain, atherosclerosis, chronic hepatitis, and abdominal aortic aneurysm, but also acute organ failure, cardiac infarct and stroke.
- The Toll-like receptor (TLR) family members are key contributors to these pro-inflammatory conditions. These pattern recognition receptors respond to molecular patterns in components of bacteria and viruses. In addition to their role in detecting pathogen associated molecular patterns (PAMPs), TLRs can also sense endogenous danger (or tissue damage) associated molecular patterns (DAMPs) and have been implicated in perpetuating inflammatory cascades in the absence of invading microbes or other pathogens.
- TLR4's well-known key role in orchestrating innate and adaptive immune response to Gram-negative bacteria now extends into the area of mediating auto-inflammation and tissue repair and remodelling.

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## References

[1] *Glycolipids and benzylammonium lipids as novel antisepsis agents: synthesis and biological characterization.* Piazza M, et al. J. Med. Chem. (2009); 52:1209

[2] *TLR4 receptor as new target to treat neuropathic pain: efficacy of a new receptor antagonist in a model of peripheral nerve injury in mice.* Bettoni I, et al. Glia (2008); 56:1312

[3] *Inhibition of lipid a stimulated activation of human dendritic cells and macrophages by amino and hydroxylamino monosaccharides.* Peri F, et al. Angew. Chem. (2007); 46:3308

[4] *Evidence of a specific interaction between new synthetic antisepsis agents and CD14.* Piazza M, et al. Biochemistry (2009); 48:12337

[5] *Therapeutic targeting of innate immunity with Toll-like receptor 4 (TLR4) antagonists.* Peri F, Piazza M. Biotechnol. Adv. (2012); 30:251

[6] *Exploring the LPS/TLR4 signal pathway with small molecules.* Peri F, et al. Biochem. Soc. Trans. (2010); 38:1390

[7] *Multivalent glycoconjugates as anti-pathogenic agents.* Bernardi A, et al. Chem. Soc. Rev. (2013); 42:4709

[8] *Toll-like receptor 4 (TLR4) modulation by synthetic and natural compounds: an update.* Peri F, Calabrese V. Med. Chem. (2014); 57:3612

[9] *TLR4 Signaling Pathway Modulators as Potential Therapeutics in Inflammation and Sepsis.* Kuzmich NN, et al. Vaccines (2017); 5:34