Peptidoglycans (PGN)

69554	Peptidoglycan from Bacillus subtilis
78721	Peptidoglycan from Methanobacterium sp.
53243	Peptidoglycan from Micrococcus luteus
72789	Peptidoglycan from Saccharomyces cerevisiae
77140	Peptidoglycan from Staphylococcus aureus
79682	Peptidoglycan from Streptomyces sp.

Product Description:
Most bacteria have a cell wall containing a special polymer called peptidoglycan. Over the cell membrane is a shift of peptidoglycan and other polymers including teichoic and teichuronic acids. This peptidoglycan gives a certain rigidity to the cell wall and gives the cell mechanical strength.
The bacterial cell wall is a unique biopolymer, it contains both D- and L-amino acids. Its basic structure is a carbohydrate backbone of alternating units of N-acetyl glucosamine and N-acetyl muramic acid. The N-acetyl muramic acid residues are cross-linked with oligopeptides. The terminal peptide is D-alanine although other amino acids are present as D- isomers. This is the only known biological molecule that contains D-amino acids and it is the target of numerous antibacterial antibiotics e.g. pencillin. Penicicllin inhibits the enzymes transpeptidase and carboxypeptidase, which are responsible for the building of peptidoglycan. Lysozyme, present in the tears liquid, is able to split the peptidoglycan between the N-acetyl glucosamine and N-acetyl muramic. The cell wall of Gram-positive bacteria is largely made up of pepidoglycan. There may be up to 40 layers of this polymer, conferring enormous mechanical strength on the cell wall. [3]
The primary immune recognition is based on structures common among invading pathogens. Surface molecules, such as lipopolysaccharide (LPS), peptidoglycan and peptidoglycan recognition protein (PGRP), are known to elicit immune reactions ranging from cytokine release to fever. [4-6]

Applications:
All peptidoglycan can be used for the activity estimation of lytical enzymes (e.g. Lyticase).[1] It is recommended to use a peptidoglycan concentration of 0.15 – 3mg/l in water or buffer and measuring at 450 nm. The peptidoglycan cannot be solubilized but it is possible to make a suspension. For the stimulation of lymphocytes: Peptidoglycan activates the Toll-like receptor 2 (TLR2), present in mammalian cells. Work as an antagonist of Poly (I:C).[2]

References:

1. R. Zhou, et al., Substrate for the determination of lysostaphin activity, Anal. Biochem., 171, 141 (1988)
2. L. Alexopoulou, et al. Recognition of double-stranded RNA and activation of NF-κB by Toll-like receptor 3, Nature, Vol 413, 732 (2001)
3. D.E. Stewart-Tull, Major component of the cell wall in gram positive organisms. Consists of a glycan backbone with alternating β 1-4 linked residues of N-acetyl-D-glucosamine and muramic acid. The immunological activities of bacterial peptidoglycans, Ann. Rev. Microbiol. 34, 311 (1980)
4. K.H. Schleifer, O. Kandler, Peptidoglycan types of bacterial cell walls and their taxonomic implications, Bact. Rev. 36, 407 (1972)
5. L.J. Wheat, et al., Antibody response to peptidoglycan during staphylococcal infections, J. Inf. Dis. 147, 16 (1983)
6. Doyle R.J., Dziarski R., in Molecular Medical Microbiology (Susmsman M., ed.) p137-153, Academic Press (2001).

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.