BOTM: July 2011

Lysostaphin

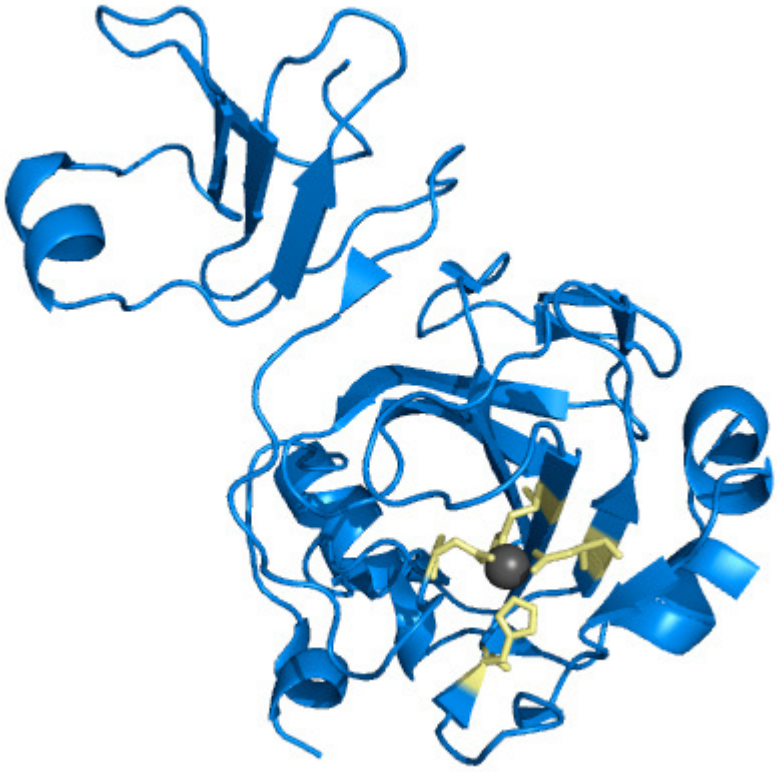
Lysostaphin is a 27 KDa glycylglycine endopeptidase, an antibacterial enzyme which is capable of cleaving the crosslinking pentaglycin bridges in the cell wall of staphylococci. Lysotaphin was first isolated from a culture of *Staphylococcus Simulans* by Schindler and Schuhardt in 1964 **[1]**. *S. Aureus* cell walls contain high proportions of pentaglycin, making lysostaphin a highly effective agent against both actively growing and quiescent bacteria **[2]**.

Staphylococcal infections of both *Staphylococcus aureus* and *Staphylococcus epidermidis* continue to be a major issue in clinical settings, particularly those with implantable devices. Staphylococci cause a significant percentage of device infections, and like many other pathogens, rather than living as free planktonic cells within the host they have the ability to form a multilayered community of sessile bacteria cells known as a biofilm on implantable devices. Once a staphylococcal biofilm has formed on an implanted medical device, it is difficult to disrupt due to its antibiotic resistance and protection against bacterial action.

Many studies have been previously published on Lypsotaphin since its isolation, both *in vitro* and *in vivo*. Lypsostaphin has been shown to eradicate susceptible *S. Aureus* biofilms. It has also been reported to be effective in disrupting *S. Epidermidis* biofilms *in vitro*, albeit at higher concentrations of the enzyme **[2]**. Compared to commonly used antibiotics such as vancomycin, Lysotaphin has been shown to demonstrate greater antibacterial activity *in vitro* **[3]**. The enzyme has demonstrated effectiveness against methicillin susceptible *S. Aureus* (MSSA) and methicillin resistant *S. Aureus* mediated keratitis *in vivo* in a rabbit model **[4]**. Additionally, it has been shown that Lysostaphin combined antimicrobials such as cefazolin, clarithromycin, doxycycline, levofloxacin, linezolid and quinuprisitin/dalfopristin has a synergistic effect for MMSA strains of the bacteria **[5]**. Recently, a study published by Belyansky et al. illustrated that a Lysostaphin bound mesh demonstrated dramatic preservation results in a rat model **[6]**.

Using lyosptaphin to treat staphylococcal biofilm associated infections may prove to be preferable to using antibiotics as it may be possible to administer the enzyme at relatively low doses and disrupt a staphylococcal bioflim, therefore eliminating the need for surgical removal of the infected device **[2]**.

Figure



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