administration, and their action mechanism is associated with the interaction between the drug and ribosome, which lead to inhibition of protein synthesis (Nandi et al., 2016; Kaur et al., 2014; Locke et al., 2010; Moellering, 2014; Rybak et al., 2014; Múnera et al., 2017).

Besides the treatment of bone infection, bone regeneration also has to be taken into consideration during the treatment of osteomyelitis, because sometimes bone necrosis and/or debridement lead to bone loss, which has to be regenerated, and because bacteria may colonize the bone cavity. The larger the bone loss, the harder is the reestablishment of its biofunctionality (Winkler and Haiden, 2016). Then, along with the selection of a biomaterial to be used as a carrier for drug delivery, it should be considered a possibility of choosing a material that could induce bone regeneration (Nandi et al., 2016; Inzana et al., 2016; Dion et al., 2005; Tobin, 2017; Wentao et al., 2017).

Since 1970, drug delivery systems have been used for treatment of osteomyelitis based on bone cements containing antibiotics (Nandi et al., 2016), of which those based on poly(methylmethacrylate)—PMMA—are currently the most widely used system for delivery of gentamicin (Chen et al., 2007). As bone cement, PMMA has an in situ polymerization which allows it to completely fill the bone cavity. However, PMMA polymerization is an exothermic process, and heat is released along the reaction, and it is a disadvantage as long as it results in damage of the surrounding tissues (Nandi et al., 2009; Gilchrist et al., 2013). In addition, the drug is not efficiently delivered, because a large amount of the drug is kept within the PMMA structure. Then only the drugs remaining near the surface are released to the infected site and, consequently, the MIC is not reached. If the drug effectiveness is not achieved, bacteria can reoccur in the same site, and osteomyelitis may persist. Another problem related to PMMA is its low biocompatibility and reabsorption. Owing to PMMA being not absorbed in the organism, a second surgery is needed to remove it from the patient; otherwise, the PMMA per se can work as a substrate for growth of new bacteria colonies (Nandi et al., 2016; Sun et al., 2017; Ter Boo et al., 2015; Nandi et al., 2009; Inzana et al., 2015). To summarize, owing to the concerns about PMMA, other alternatives have been studied, aiming at more effective treatments of osteomyelitis.

Thus, an alternative to PMMA should be: (1) resorbable biomaterials to avoid the need of a second surgery for its removal; (2) and that could deliver antimicrobial agents in a controlled manner. In this sense, these biomaterials could be able to simultaneously induce bone regeneration and release antibacterial drugs (Inzana et al., 2016; Wentao et al., 2017; Taha et al., 2017).

Bioresorbable and bioactive ceramics have been studied as systems for delivery of antibiotics for treatment of bone infections. Among these bioceramics, bioactive glasses (BGs) are one of the most studied. These ceramic materials not only show high biocompatibility, biodegradability, and can be chemically bonded to bone tissues, but also are able to induce osteoconductivity response (Inzana et al., 2016; Dion et al., 2005; Taha et al., 2017; Sethu et al., 2017). In the next section, further properties and features of BGs will be discussed.