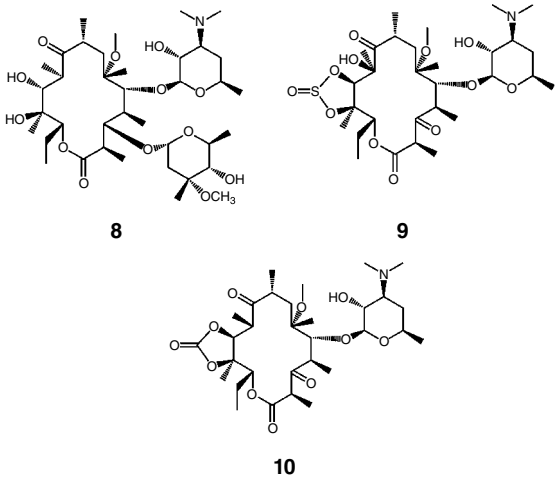

Scheme 16.2 Chemical structures of (**8**)–(**10**).

For the same goal of developing new generation macrolide antibiotics against macrolide-resistant pathogens, You's group also developed some ketolide derivatives and industrialized intermediates (Zhao et al. 2003; Wei and You 2006). In 2013, they used the clarithromycin (Structure **8**) as the starting material and obtained the antibacterial compounds (**9**) and (**10**) (Jiang et al. 2013). By evaluating the antibacterial activity, both of them showed outstanding killing ability comparing with the commercialized clarithromycin, and the minimum inhibitory concentration (MIC) against *Staphylococcus epidermidis* was markedly decreased from 64 to 8 $\mu g\,ml^{-1}$ and 0.0625 $\mu g\,ml^{-1}$. These two above reports not only illustrated effective potential antibiotics but also guided promising ketolide frameworks. More importantly, they demonstrate once again that the semisynthetic modification strategy of existing antibiotics is a rational method for improving drug effects (Scheme 16.2).

Glycopeptide antibiotics (GPAs) are another kind of key antibacterial drugs for fighting with drug-resistant pathogens. As a mainstream drug among them, vancomycin (**11**) is used for treating serious and life-threatening Gram-positive infections, when other common antibiotics are no long antibacterial responsive. Thus, vancomycin is also well known as the last resort for curing methicillin-resistant *S. aureus* (MRSA) (McComas et al. 2003). However, only 30 years after its clinical introduction, the vancomycin-resistant enterococci (VRE) was discovered and reported (Kaplan et al. 1988). Thus, many chemists have been attached in the modification of vancomycin for singling out potent vancomycin derivatives in dealing with drug resistance. Some of these products have been successfully industrialized and applied in clinical therapy, such as chloroeremomycin, teicoplanin, telavancin, oritavancin, and dalbavancin (Structures **12**–**16**) (Blaskovich et al. 2018; Jiang et al. 2018) (Scheme 16.3).