

# Abstract

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## Imipenem-relebactam and cefoxitin are synergistic against clinical isolates of *Mycobacterium abscessus* from people with cystic fibrosis.

### Background /Purpose

*Mycobacterium abscessus* (M. abs) is a group of rapidly growing, nontuberculous mycobacteria (NTM) that can cause lung infections and is associated with rapid decline in lung function and shortened survival in people with cystic fibrosis (pwCF) (Illouz M et al, 2021). M. abs. is intrinsically resistant to many antibiotics, making it difficult to eradicate. Imipenem/Relebactam (IMI/REL) is a new antibiotic that was found to be an effective therapy for imipenem-non-susceptible bacterial infections (Hoffman, 2018). This study aims to test the susceptibility of clinical isolates of m. abs (CloM) from pwCF with IMI/REL. This study also aims to evaluate if Imipenem/relebactam can be synergistic with other antibiotics against CloM from pwCF.

### Methods

Susceptibility and synergy studies were performed using CSLI methods and designed to test the activity of IMI/REL alone and in combination with conventional antibiotics against CloM from pwCF (n=29). Antibiotics were selected based on treatment guidelines and previously published research. A lab isolate was used for comparison in both the susceptibility and synergy testing. Susceptibility data was summarized based on MIC50 and MIC90 values. Synergy was determined using the fractional inhibition concentration index calculation.

### Results

Cefoxitin exhibited an MIC50 of 32 mcg/mL and MIC90 of 128 mcg/mL. Based on the data collected, Moxifloxacin, Minocycline, Clofazimine, and Omadacycline were found to be additive while Cefuroxime, Cefdinir, Cefoxitin, Amoxicillin, Rifabutin, NITD-916, and Azithromycin were found to be synergistic with IMI/REL against the CloM.

### Conclusion

IMI/REL exhibited excellent in vitro susceptibility against CloM from pwCF. IMI/REL demonstrated synergy with several existing and one antibiotic in clinical development. Future in vivo research is justified to test these promising combinations.

### References

1. Illouz M, Alcaraz M, Roquet-Banères F, Kremer L. *Mycobacterium abscessus*, un modèle de résistance aux différentes classes d'antibiotiques [*Mycobacterium abscessus*, a model of resistance to multiple antibiotic classes]. *Med Sci (Paris)*. 2021;37(11):993-1001. doi:10.1051/medsci/2021164
2. Hoffman M. IMI/REL proves effective against certain drug-resistant bacterial infections. *Contagion Live*. <https://www.contagionlive.com/view/imi-rel-proves-effective-against-certain-drug-resistant-bacterial-infections>. Published December 19, 2020. Accessed August 2, 2022.