# Molecular uptake of antibiotics through the silent chitoporin from *Escherichia coli* (*Ec*ChiP)

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**Abstract:** *Ec*ChiP is a monomeric protein channel found in the outer membrane (OM) of *Escherichia coli* (*E. coli*) and used for the transport of small chitooligosaccharides across the OM. In this study, we identified antibiotic transport through the *Ec*ChiP-reconstituted in lipid membrane. The antibiotics that can inhibit bacterial growth were further chosen for evaluating their specific interactions with *Ec*ChiP channel. The results show that 2 mM of gentamycin, minocycline, and tigecycline could occlude the ion flow through the *Ec*ChiP channel, indicating that these antibiotics could enter and interact with the channel lumen. Crystallizations of *Ec*ChiP in complex with gentamycin, minocycline, and tigecycline were grown in the optimized condition G8 (33% PEG400, 0.1 M sodium chloride, 0.1 M MES, pH 6.5) from MemGold1™ and the condition E10 (33% PEG400, 0.23 M sodium chloride, 0.05 M sodium acetate, pH 4.5) from MemGold2™ screening kits. The crystals have a long tetragonal shape with estimated sizes of 300 – 500 μm. The predicted structure of *Ec*ChiP in complex with minocycline, gentamycin, and tigecycline indicated that all three antibiotics occupied the constriction zone of the protein pore. Understanding the antibiotics-*Ec*ChiP interactions may suggest an effective approach to design for novel anti-microbial agents against infectious strains of *Escherichia coli*.

**Keywords:** antibiotic resistance, chitoporin, *E. coli*, single channel



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