Silent antibiotic resistance: A threat to antimicrobial therapy

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Bacterial resistance to drugs is an increasing threat to the human community

Human gut is the reservoir of antibiotic resistance genes

Dense microbial load also influences antibiotic resistance gene transfer among bacterial groups in the gut
Mechanisms of Resistance

https://adailydeed.wordpress.com/tag/antibiotic-resistance/2015
An overlooked issue
Caused by mutation
The phenomenon may be reversible
unexpected therapeutic failure of antibiotic therapy

Silent antibiotic resistance
Methods

Antimicrobial susceptibility test

Identified some silent antibiotic resistance genes in *Salmonella* and *E. coli*

DNA sequencing

SubJECTED TO DIFFERENT INVITRO GUT CONDITIONS

Minimum inhibitory concentration

Expression analysis of resistance gene
Deletion of promoter region of *catA1* of *Salmonella* Weltevreden

**Results**

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AACTCCGGTTGGCGGTTTACGCCCAACCGGCGTGATTGCGTGATAGTGCACTGACATCGCTCGCTCACTTGCGAACCATGACATCCGCAGCAGTAC
GTAATGGTTAAGAAAAGACGCCATCGCGTGATACACGTGCGACATCGTCTTCGCTGTACATCTCCCCTTCGCTGCGATCTTTTGCTT
TCGTGCCGACCCGCCAGCTCTTTTCTGAACACGTGCCCTCTATAGTGATATGAGTAATGACTTTCAACCGTGCTAG
TGCGGCGCTGCGAAGCCGACGCTTAATTACAGTGAGAACTGGCCTCGGCGGACGCTGAAGCGGCTCTT
TTATTTAGGACCAACAGGACAACTATGAGCCCTCGGCGGACGCTGAAGCGGCTCTT
TACTCTGCAATACGTGCGACTCCGCGCATCCTCAACAGTTGAAAGTGATTACATTTACGTCTAG
GATG GCCCG CATAAA AACTTACATAGCTCAAAGTTGCTCTCGATTCTCTGATTCTATTTAC
TAATATCCGGTAAAAGTCACTGACAGCTCGTTATGAGTGCTGACAGCGACCAC
TTACTGCGCCGAAAATTTCTGCGACTTTTATTCTGCTGTACAAATAGCGCCGA
AAATAGTTGTAAGAAAACGCGCGACTTCAGAAGCTGCCTAAAGCAGTACCCGATAC
TTCTGCGCCATCGACCAAATACTACATACGCAAGCTGGAAACAGTGCGAAAGGAGA
CTCGTGGCAGCTGGCAAAGTGACGAGACCTCACCCTATAGTGCTGCTAAAGGGCGTG
AAAGAATGTGATATAGGCTGCTACACCGCAATAGCGGCACTTTGGACCCGATAGAAG
GGATTCCGAAATAACTCTTAGATAAAAAAGCAAGATCTCTGGAGGACCCATCGAAA
GTGCTAAAATACATATTTGCCACCGGTATTACCTGGATGAAGAGAGCGGGGCAAAAGGT
GGCTACCGTTAAAATACGCTGCCGTCTGTCACACGACTACGCGCAGCGCTCAAGCC
AAGTAGTACGGCAACACCTACCAGAAGGACAGC
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Growth curve of *S. Weltevreden* strains: resistant (SW9), sensitive (SW30) and resistance induced (SW30R)
Epithelial cell invasion by *S. Weltevreden* - 2h post infection

Intracellular replication and survival of *S. Weltevreden* -16 h post infection
Representative gel image showing presence of qnrB1 in *E. coli*. Lane M: 100bp DNA ladder; Lanes 1-4: qnrB1 gene of *E. coli*; Lane 5: negative control.

Presence of pentapeptide protein on plasmid of MU2
Growth kinetics of MU2
Relative Expression of QnrB

Gut conditions

- NaCl: 1.43
- Bile: -1.93
- Hydrogen peroxide: -2.57
- Anaerobic: -0.77
Concluding remarks

• Silent antibiotic resistance genes can revert back when subjected to infection related gut condition
• Can results in failure of antimicrobial therapy
• There is an urgent need to study the prevalence of silent resistance genes in bacterial pathogens
Future work

• Conjugation ability of *qnrB1* carrying plasmid will be checked

• Its expression will be analyzed in other *E.coli* strains

• More isolates will be checked for the presence of silent resistance genes
Acknowledgements
Thank you