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Exposure to manuka honey modules antibiotic susceptibility on wound isolates

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Background: The clinical application of Manuka honey has recently gained momentum, particularly in treatment of chronic wound infections. Changes in antibiotic susceptibility have been observed previously, following the exposure of bacteria to subtherapeutic concentrations of honey, however such findings have been limited to methicillin-resistant *Staphylococcus aureus*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa*. The aim of this study is to assess the modulation of antibiotic sensitivity in a broader panel of chronic wound isolates.

Methods: Parent strains (P0) of *Staphylococcus aureus*, MRSA, *Staphylococcus epidermidis*, *S. pyogenes*, *P. aeruginosa*, *Escherichia coli*, *Klebsiella pneumoniae* and *Proteus mirabilis* were passaged ten times in the presence of sub-lethal concentrations of clinical grade Manuka honey to generate strain P10. In order to assess any permanent or transient changes in bacterial susceptibility, the bacteria were grown in honey-free media for a further 10 passages (X10). Antibiotic sensitivity testing was performed using a combination of microdilution and disc diffusion methodologies.

Results: Variable changes in bacterial susceptibilities were

noted following subtherapeutic exposure to honey. P10 strains of *S. epidermidis* and *S. pyogenes* exhibited a ≥4-fold decrease in their sensitivities to erythromycin and tetracycline in comparison to baseline values. Similarly, *E. coli* displayed a 4-fold reduction in susceptibilities to gentamicin following passaging with honey. In contrast, *K. pneumoniae* and *P. mirabilis* showed notable increases in susceptibility towards both ciprofloxacin and gentamicin after 10 passages in the presence of honey. All changes in MIC, MBC and MBEC were shown to be transient in nature with the exception of *K. pneumoniae* and *P. mirabilis* (X10), which exhibited an MIC to ciprofloxacin >4 fold greater than the parent strains.

Conclusion: Wound isolates exposed to clinical grade Manuka honey exhibited transient changes in antibiotic profiles. The underlying mechanism and clinical implications of such changes are unclear and warrant further investigation.

Speaker Biography

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