Antibiotic Resistance

Michael Shepherd, Pharm.D.
Sparks Regional Medical Center
Fort Smith, AR

Disclosure

☐ I have no relevant financial relationships to disclose concerning any topic in this presentation.

The Count of Monte Cristo
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- "What do you prescribe, doctor?" demanded Villefort. "Give me some water and ether. You have some in the house, have you not?" "Yes." "Send for some oil of turpentine and tartar emetic. Villefort immediately despatched a messenger.

- "Oh, doctor," cried Barrois, "the fit is coming on again. Oh, do something for me." The doctor flew to his patient. "That emetic, Villefort -- see if it is coming." Villefort sprang into the passage, exclaiming, "The emetic! the emetic! -- is it come yet?" No one answered. The most profound terror reigned throughout the house.


- "Here is a glass with one already prepared," said Villefort, entering the room. "Who prepared it?" "The chemist who came here with me."

Objectives

- Explain the basic mechanisms of antibiotic resistance
- Interpret antibiotic susceptibility data
- List examples of current strategies for combating antibiotic resistance
- Describe examples of cutting edge strategies for combating resistance

History of Resistance

- Pre-antibiotics
  - Ecology
- Post-antibiotics
  - Sulfonamides
  - Penicillin
History of Resistance

Events in the Age of Antibiotics

1946 - Penicillin discovery
1963 - Antibiotic resistance begins
1970 - Target
1980 - Genomic ITS
2000 - The Lean Years
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Current Status

In The News
Superbugs Run Rampant
Current Status

Resistant Organisms

Mechanisms of Resistance
- Inactivation
- An alteration in the target site
- The modification of metabolic pathways
- Decreasing permeability and/or increasing active efflux
Data Interpretation

- MIC
- Susceptibility reports
- Antibiograms

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Data Interpretation

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Data Interpretation
Current Strategies

12 Steps to Prevent Antimicrobial Resistance

- Prevention
  - Vaccinate
  - Remove Catheters
- Diagnose and Treat Effectively
  - Target the Pathogens
  - Access the Experts

- Use Antimicrobials Wisely
  - Antimicrobial control
  - Use local data
  - Treat Infection, not Contamination
  - Treat Infection, not Colonization
  - Know when to say no
  - Stop treatment when appropriate
- Prevent Transmission
  - Isolate the pathogen
  - Break the contagion

Antibiotic Stewardship

- Tracking
- Reporting
- Intervention
- Education
Cutting Edge Strategies
- Novel Antibiotics
- Immune Modification
- Adjunct Treatment
- Microbiome
- Bio-materials
- Vaccines

Conclusion
- Explain the basic mechanisms of antibiotic resistance
- Interpret antibiotic susceptibility data
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Questions?