ANTIBIOTICS RESISTANCE

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INTRODUCTION

- Antibiotic resistance occurs when an antibiotic has lost its ability to effectively control or kill bacterial growth; in other words, the bacteria are "resistant" and continue to multiply in the presence of therapeutic levels of an antibiotic.

INTRODUCTION . . .

- Antibiotic resistance is a form of drug resistance where bacteria are able to survive after exposure to one or more antibiotics. Bacteria that are resistant to multiple antibiotics are considered multidrug resistant (MDR) or, more colloquially, superbugs.

INTRODUCTION . . .

- Antibiotic resistant bacteria cannot be controlled or killed by antibiotics. Methicillin-resistant Staphylococcus aureus (MRSA or golden staph), vancomycin-resistant Enterococcus (VRE) and multi-drug-resistant Mycobacterium tuberculosis (MDR-TB) are serious public health problems.

INTRODUCTION . . .

- Repeated and improper uses of antibiotics are primary causes of the increase in drug-resistant bacteria. While antibiotics should be used to treat bacterial infections, they are not effective against viral infections like the common cold, most sore throats, and the flu.

HOW DO BACTERIA BECOME RESISTANT?

- Some bacteria are naturally resistant to certain types of antibiotics. However, bacteria may also become resistant in two ways: 1) by a genetic mutation or 2) by acquiring resistance from another bacterium.

MUTATION

- Mutations, rare spontaneous changes of the bacteria's genetic material, are thought to occur in about one in one million to one in ten million cells. Different genetic mutations yield different types of resistance.
- Some mutations enable the bacteria to produce potent chemicals (enzymes) that inactivate antibiotics, while other mutations eliminate the cell target that the antibiotic attacks.

RESISTANCE FROM ANOTHER BACTERIUM

- Bacteria can acquire antibiotic resistance genes from other bacteria in several ways. By undergoing a simple mating process called "conjugation," bacteria can transfer genetic material, including genes encoding resistance to antibiotics (found on plasmids and transposons) from one bacterium to another.

RESISTANCE FROM ANOTHER BACTERIUM . . . .

- Viruses are another mechanism for passing resistance traits between bacteria. The resistance traits from one bacterium are packaged into the head portion of the virus.
- The virus then injects the resistance traits into any new bacteria it attacks. Bacteria also have the ability to acquire naked, "free" DNA from their environment.

CONCLUSION

- Any bacteria that acquire resistance genes, whether by spontaneous mutation or genetic exchange with other bacteria, have the ability to resist one or more antibiotics. Because bacteria can collect multiple resistance traits over time, they can become resistant to many different families of antibiotics.

Thankyou