Antibiotic Resistant Bacteria Emerging From the Agricultural Industry
Stormy R. Thomas and Paul-Michael Gallagher
Department of Biological Sciences, College of Arts and Sciences & Honors College
Faculty Mentor: Duane Huggett, Dept. of Linguistics and Technical Communications, Arts and Sciences

BACKGROUND
In the past 50 years the use of antibiotics in the agricultural industry has been used in order to promote growth of livestock and reduce the amount of disease among the population. This misuse could have a direct relation with the rise of antibiotic resistant infections seen in hospitals worldwide. 2-50 grams of antibiotics are used per ton of animal feed. Enough exposure to select for the survival of antibiotic resistant bacteria in the normal biota of the cattle. These antibiotics are transmitted to the population from several vectors: Undercooked meat, contamination of local crops in agricultural regions through feces runoff, workers who are in direct contact with the cattle, feces runoff into local water supplies, etc...

MATERIALS AND METHODS
By collecting data obtained from peer reviewed journals we hope to correlate strains of bacteria increasing in resistance to feed practices in the animal husbandry industry. The specific bacteria to be investigated include Escherichia coli O157:H7, Vancomycin Resistant Enterococci, and Multidrug-resistant Salmonella typhimurium definitive type 104

RESULTS
In our findings, 90% of antibiotics used in agriculture are for the promotion of growth and prophylaxis. Escherichia coli O157:H7 isolates on a Wisconsin farm were found to have become resistant to therapeutic and subtherapeutic antibiotics used in the location (penicillin, sulfamethazine, chlorotetracycline, oxytetracycline, and neomycin). 0.25-1.00 g to a ton of feed was the reported dosing of the cattle. In Great Britain where the antibodies apramycin and gentamycin are used more often, the cultured bacteria had a resistance to this. Vancomycin Resistant Enterococci has been connected to the usage of avoparcin, a veterinary antibiotic which is also a glycopeptide antibiotic, like vancomycin. Enterococci are also only normal flora to European populations, where the veterinary antibiotic is used. Cattle from farms in Germany, Denmark, and Great Britain where avoparcin was used had colonies of VRE. These were not noted from the United States cultures. Multi-Drug Resistant Salmonella typhimurium DT104 shows a direct increase in human infections with the increased use of antibiotics in the humans and cattle were phage typed and shown to be identical. With each drug resistant species that was researched, definitive co-relation were made between the overuse of antibiotics and antibiotic resistance in bacteria, which then spread to the population through food.

CONCLUSIONS
The problem of antibiotic resistance has become a widespread problem. The use of last choice antibiotics such as Vancomycin had increased significantly in the last decades. Other synthetic antibiotics have been found potent against antibiotic resistance cases, as well as the combination of certain antibiotics. The proliferation of antibiotic resistance is an important issue that requires our attention to stop the appearance antibiotic resistant infections in people. Actions on reducing the unnecessary use of antibiotics in agriculture must be taken to prevent the spread of disease that could become fatal. Uncombatable bacteria are becoming more prevalent, and are reported around the world. The Food and Drug Administration should be concerned by the rising levels in antibiotic resistant infections and the subtherapeutic use of antibiotics in the agricultural industry. Instead of fighting the problem of producing even stronger synthetic antibiotics, perhaps we could solve the original problem and stop this misuse of chemotherapy.

BIBLIOGRAPHY


Plasmid transfer between bacteria via the F factor and a sex plius. A unidirectional flow of genetic information is spread from one bacterium to another. The R factor is responsible for antibiotic resistance.

Antibiotic resistance is acquired through random mutations, which produces a genome that will be selected for when exposed to antibiotics. Bacteria have a brief generation cycle, averaging 4-8 hours, increasing the rate at which mutations appear.

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