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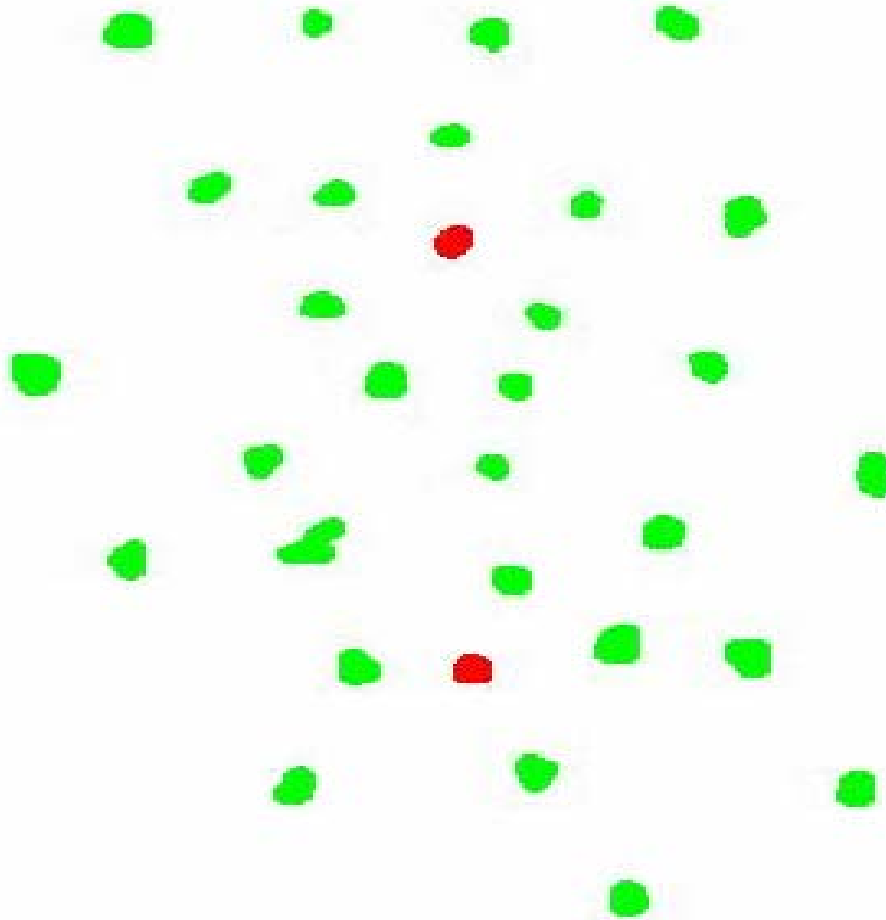
ANTIBIOTIC RESISTANCE in FOOD ANIMALS and POSSIBLE HUMAN HEALTH PROBLEMS

- Some basic principles
- Survey of veterinary/farming use of antibiotics
- Human medical use of antibiotics
- Human/food animal disease interactions
- Some suggestions



CHANGES IN BACTERIA

- Natural variation
- Mutation
- “Jumping genes”



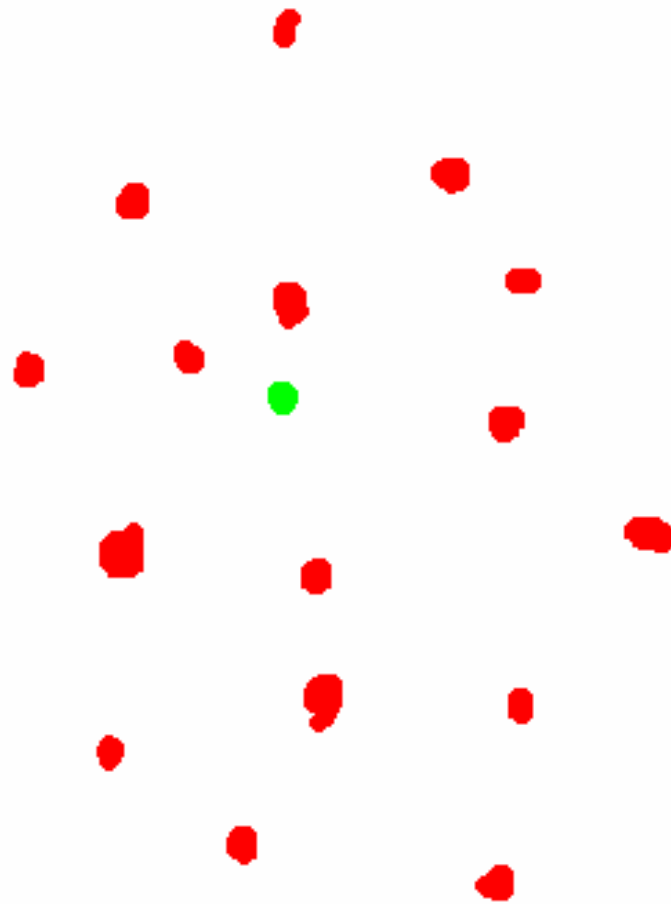
NORMAL-NO ANTIBIOTICS

GREEN ARE NORMAL BACTERIA

**RED ARE BACTERIA WITH RESISTANT
GENES**



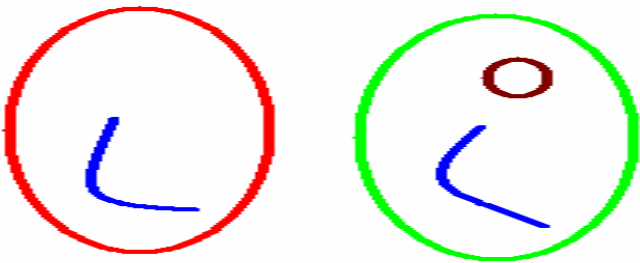
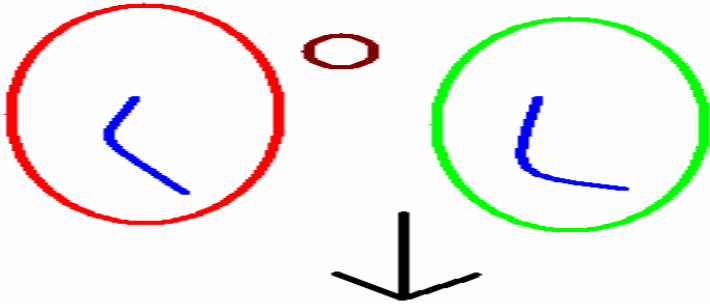
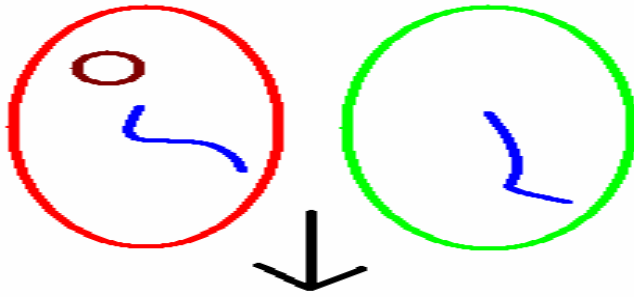
IMMEDIATELY AFTER ANTIBIOTIC USE



POST ANTIBIOTIC USE

RED ARE ANTIBIOTIC-RESISTANT BACTERIA

GREEN ARE NORMAL BACTERIA



USAGE OF ANTIBIOTICS IN ILO's (CAFO's, "Factory farms")

- Therapeutic-individual and herd
- Sub-therapeutic (some experts call this non-therapeutic)
- Growth promotion

ANTIBIOTIC USE IN NORTH AMERICA

- About 50-60% of antibiotic use is for animals (estimates vary)
- Total use in animals in US is about 18 million pounds-8 million kg annually
- About 10-20% of use is therapeutic (sick animals)
- The greatest proportion of antibiotics are used in recently-weaned animals

Bacteria in the water, soil, our food and AIR

The Human/Food Animal Connection

SUMMING UP

- When animals and/or humans are crowded together, the risk of disease increases
- Swine are almost all raised in intensive operations
- When exposed to antibiotics, bacterial colonies will inevitably develop resistance
- Bacteria, including resistant ones, are passed between species

CONCLUSIONS

- Diseases can be, have been, and will continue to be passed between human beings and species we raise for food
- This chance is increased by the way we raise our food animals
- We don't know exactly how antibiotics are being used in livestock-there are wide variations in practice, and no monitoring, other than sample studies

WARNINGS

SUGGESTIONS

- Better surveillance-we don't know the scope of the problem-some European countries (Sweden, Denmark, the Netherlands, etc) have been doing this
- Legislation (see above)
- More biosecurity
- Education of those raising and caring for animals
- Changing methods of animal husbandry

THE FOUR LAWS OF ECOLOGY

- Everything is connected
- Everything goes somewhere
- There is no free lunch
- Nature bats last