Antimicrobial resistance and the Food Chain

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Outline

- what is antimicrobial resistance?
- why is the food chain important?
- considerations from the ACMSF report (1999)
- developments following the ACMSF report

What is antimicrobial resistance?

- an antimicrobial agent is a compound which, at low concentrations, exerts an action against microorganisms and exhibits selective toxicity towards them
- an antibiotic is a substance – produced by, or derived from, a microorganism – which selectively destroys, or inhibits the growth of, other microorganisms

What is antimicrobial resistance?

- antibiotic resistance is the ability of a microorganism to withstand an antibiotic

What is antimicrobial resistance?

- intrinsic vs acquired
- mutation vs acquisition
- types of resistance
  - change in target
  - changes in antibiotic uptake/efflux
  - enzymatic destruction/modification
- selection pressure

Why is the food chain important?

- resistance in foodborne pathogens
- resistance in commensals
  - GI tract as a source for endogenous infections
  - resistant organisms and transferable resistance
- antimicrobial use in animals

Use of antibiotics in animals

- Uses:
  - therapeutic
  - prophylaxis, including metaphylaxis
  - growth promotion
- UK reports prior to ACMSF 1999 report:
  - Netherthorpe 1962
  - Swann 1969
  - Lamming 1992

Background to ACMSF report

- focus on therapeutic and prophylactic use in animals (and farmed fish) as a source of organisms resistant to antibiotics used in treatment of human infections
- role of imported food as a source of resistant organisms

Conclusions of the ACMSF report

- resistant bacteria in food animals have arisen as a consequence of the use of antibiotics in the farm environment and current husbandry practice
- this is the origin of at least some of the resistant bacteria like *Salmonella* and *Campylobacter*

Conclusions of the ACMSF report

- some resistant bacteria will find their way to man through food chain exposure pathways
- fluoroquinolones of particular concern
- aim to reduce exposure of farm animal bacterial populations to antibiotics

Developments since ACMSF report

- recommendations taken forward through the Defra Antimicrobial Resistance Coordination (DARC) Group
- concern about antimicrobial resistance in animal gut flora (e.g. ESBLs)