Antibiotics

used for promoting growth

growth promoters

- **anabolic steroids**
- **antibiotics**
- **somatotropins**
- **probiotics**
- **banned drugs**

use of antibiotics

- **treatment**
  - sick animals, full doses
- **metaphylaxis**
  - healthy contact animals, full doses
- **prophylaxis**
  - healthy animals, low doses
- **growth promotion**
  - healthy animals, (very) low doses

Every time an antibiotic is given, there is selection pressure for resistance.

history

- **1949**
  - pigs fed old cultures of *S. rimosus* for vit B12 grew faster
- **1967**
  - Swann report - only non therapeutic drugs to be used for growth promotion
- **1997**
  - Denmark gets EU to ban avoparcin

mechanism

- **gnotobiotic animals grow about 5% faster**
- **inhibition of G+ bacteria in gut**
- **inhibition of protozoa in ruminants???**

residues

- fed at very low level
- most are not absorbed
- no residues at GP doses
- may be residues at prophylactic doses

resistance

- exposure to antibiotics selects for resistance
- animals exposed for long periods

resistance

- pathogens
- commensals
- targets unknown in growth promotion

species

- **poultry**
- **pigs**
- **feedlot cattle**
- **calves**
- **grazing cattle**

zoonoses

- **fluoroquinolone resistant**
  - *Salmonella* spp (DT104)
  - *Campylobacter*
  - *E.coli* O157

transfer of resistance

- **drug causes emergence of resistance in animal**
- **carcase contaminated by resistant organisms**
- **resistant organisms survive cooking and eating**
- **resistant organisms colonise people**
- **resistant organisms cause disease in people, or**
- **resistant organisms pass on resistance to human pathogens**

politics

- **1960s**
  - widespread emergence of tetracycline resistance
- **1967**
  - Swann report
- **1980s / 1990s**
  - emergence of VRE & MRSA

politics now

- **WHO recommendations**
- **most banned in EU**
- **most under pressure in USA & Australia**
- **Most banned as growth promoters in NZ, but allowed for prophylaxis**

drugs

- **avilamycin**
- **avoparcin**
- **bacitracin**
- **dimetridazole**
- **macrolides**
- **monensin**
- **quinoxalines**
- **virginiamycin**

avilamycin

- **broiler chickens**
- **pigs**
- **cross resistance**
  - everninomycin
- **still used in NZ, recently banned in EU**

avoparcin

- **cross resistance**
  - vancomycin
- **now history - not manufactured any more**

bacitracin

- **broiler chickens**
- **pigs**
- **calves**
- **no cross resistance**
- **toxic parenterally**
- **banned in EU, PAR1 in NZ**
  - prevention of necrotic enteritis

dimetridazole

- **pigs**
- **carcinogenic**
- **cross resistance**
  - other nitroimidazoles
- **banned everywhere except NZ**
  - swine dysentery

macrolides

- **tylosin**
- **spiramycin**
- **tiamulin**
- **pigs**
- **cross resistance**
  - other macrolides
- **PAR in NZ and EU**

monensin

- **cattle & broiler chickens**
- **toxic to horses and dogs**
  - pigs in combination with macrolides
- **no relevant cross resistance**

oxytetracycline

- **PAR 1**
  - respiratory disease in pigs
- **grossly over / ab used**

quinoxalines

- **carbadox**
- **olaquindox**
- **dinitro-o-toluamide**
- **carcinogenic**
- **banned everywhere except NZ**
- **do not use**
  - swine dysentery

virginiamycin

- **broiler chickens and horses**
- **(feedlot cattle overseas)**
- **cross resistance**
  - other streptogramins - Synercid
- **PAR1 level 4**
- **avoid if at all possible**

legal status

- **growth promoters**
  - general sales
  - being phased out
- **disease preventers**
  - PAR 1

The future??

- **more paperwork**
- **surveillance system**
- **vets will have to be able to justify their actions**

role of the vet

- **ensure good husbandry before use**
- **do not use drugs for disease prevention without evidence of disease**
- **provide written protocols for farmers (with withholding times)**
- **keep records**
- **monitor results - culture & sensitivity**
- **investigate outbreaks of disease properly**