1. Fluids
   - more…
2. concentrated ions
   - potassium chloride
   - bicarbonate
   - calcium (boro) gluconate
   - magnesium hypophosphite
   - magnesium sulphate
3. potassium
   - hypokalaemia
     - give KCl
     - dilute before use
     - label bag
   - hyperkalaemia
     - correct acidosis
     - soluble insulin in 5% dextrose
     - (calcium borogluconate)
4. additives
5. potassium
   - hypokalaemia
     - give KCl
     - dilute before use
     - label bag
   - hyperkalaemia
     - correct acidosis
     - soluble insulin in 5% dextrose
     - (calcium borogluconate)
6. acidosis
   - sodium bicarbonate solution
   - incompatible with Hartmann’s

- avoid (relative) overdose

7 bicarb
- estimate / measure base excess
- estimate blood volume
- calculate BE in blood
- give this much bicarb
- reassess

8 What would you do?
- 500kg TB with colic
- severely depressed and shocked

9 haematology
- PCV 65%
- arterial BE -10mM

10 treatment
- fluids then
- surgery

11 fluids
- Hartmann's / saline
- colloid
- bicarbonate

12 bicarb dose
- 500kg horse, BE -10mM
- blood volume 50L
- therefore needs 50 x 10 = 500mmol to correct blood BE
- = 500mL 8.4% $NaHCO_3$-
- = 833mL 5%

13 parenteral nutrition
- lipid emulsions
- amino acid solutions

- propylene glycol
- propionate
- glycerol

14 parenteral nutrition
- lipid emulsions
- aminoacid solutions
- not glucose

15 problems
- central catheterisation
- phlebitis
- sterility
- cost
- avoid

16 ruminants
- metabolic disturbances common
- prevention is better than cure!

17 ketosis
- glucose precursors
  - propylene glycol
  - propionate
  - glycerol
- glucocorticoids

18 hypocalcaemia
- milk fever
- eclampsia
- oxalate poisoning

19 milk fever
- calcium salts
  - 1mg calcium =

- 11.2mg calcium gluconate =
- 13.2mg calcium borogluconate
- compound Ca / Mg / P salts
- vitamin D

20 calcium
- slow iv
- care with sc injections
  - vasoconstriction
  - very slow absorption
  - danger of ischaemic necrosis
  - NEVER in dogs & cats

21 hypomagnesaemia
- prevent with Mg po
  - ruminal bolus
  - calcined magnesite on pasture
  - etc etc
- compound Ca/Mg/P iv
- magnesium sulphate sc not iv

22 trace elements
- only a trace needed
- beware toxicity, esp Se

23 oral fluids

24 oral fluids
- Na+, K+, Cl-
- glucose or glycine
- bicarbonate precursors
- (starch)
- tap water

25

26 bicarb precursors
- propionate - 1 HCO3-
- citrate - 3 HCO3-
- acetate - 1 HCO3-

27 starches
- metabolised to glucose

28 water
- need not be sterile
- solution must be slightly hypotonic

29 indications
- diarrhoea
  - especially neonatal animals
- water deprivation

30 contra-indications
- vomiting
- gut obstruction
- severe electrolyte imbalances
- shock

31 administration
- allow to drink
- drench with bottle
- stomach tube
- pharyngostomy tube

32 dose
- ad libitum
- little and often

33 weaner piglet
- diarrhoea for several days
- temp 39˚C

- eyes sunken

34 problems
- water loss
- ion loss

35 treatment
- oral fluids
- not antibiotics

36 What would you do?
- 5 week old Rottweiler pup
- severe vomiting & diarrhoea for 3 days
- temperature 37˚C
- panting
- anuria
- anorexia

37 problems
- parvovirus infection
- gut mucosal damage
- water loss
- ion loss

38 treatment
- Hartmann's iv
- colloids?
- antibiotics?
- antiemetics?
- nutrition?
- infection control!!!

39 fluids
- use oral fluids rather than iv where possible
- avoid parenteral nutrition – use pharyngostomy tube

- prevent metabolic disease in ruminants rather than wait and try to cure it