RED KITE
VETERINARY CONSULTANTS

PIL A In Cattle

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Classification

Class:	Mammalia
Orders:	Artiodactyla – even-toed ungulates
Sub-order:	Ruminantia (ruminants)
Family:	Bovidae
Sub-family:	Bovinae
Genus:	*Bos*

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Cattle and ASPA

- Cattle are not on the Schedule 2 list, meaning they can be obtained from sources which do not purpose breed them for use in research procedures
- Audit of vendors advised before purchase

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Uses in research

- Infectious disease of humane health concern – Salmonella, E. Coli, TB
- Feed studies to ascertain the best quality meat and milk

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Breeds of Cattle

Dairy breeds	Holstein Friesian Jersey Guernsey
Beef breeds	Hereford Aberdeen Angus Charolais

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Breeds of cattle

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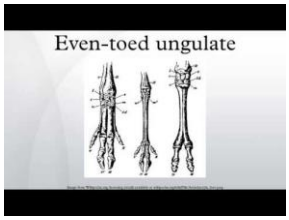
Ruminant

- Definition: even-toed ungulate mammal that chews the cud regurgitated from its rumen.



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Ruminants

Cattle are ruminants

As are sheep, goats, deer, antelope, giraffe

Closely related to camels and alpacas

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Ruminants

Strict herbivores, with a modified gastro-intestinal tract to digest the cellulose in plants

- No upper incisor (or canine) teeth– dental pad
- Produce copious quantities of saliva
- Large dorsum to tongue
- Unique four-chambered stomach:
- Regurgitate food for secondary digestion – chewing cud

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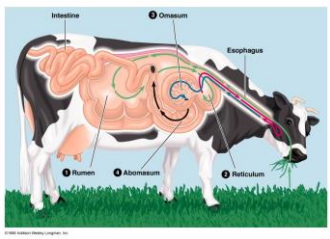
Digestive system – Foregut fermenter

Four chambers: Rumen, Reticulum, Omasum, Abomasum

Cellulose digestion occurs in the four chambered stomach



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Digestive process

1. Plant material is initially taken into the **Rumen (**largest section) where it, processed mechanically and exposed to bacteria than can break down cellulose.
2. The **Reticulum** allows the animal to regurgitate & reprocess particulate matter.
3. More finely-divided food is then passed to the **Omasum**, for further mechanical processing.
4. The mass is finally passed to the true stomach, the **Abomassum**, where the digestive enzyme lysozyme breaks down the bacteria so as to release nutrients.
    - The digestive process can take up to 100 hours!

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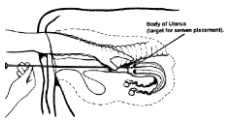
Bovine Reproduction



Breed all year
Oestrus every 21 days
Sexually mature at 12-15 months
Mated at 15 months
Natural service or artificial insemination
Embryo transfer relatively common
Gestation length 283 days (9 months)
Litter size 1 (occasionally 2)
Re-mated 3 months after parturition

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Calf rearing

- Beef – remain with mother for up to 9 months
- Dairy – remain with dam for 1-4 days to allow ingestion of antibody-rich milk (colostrum). Weaned at 6 weeks
- It is very important that as well as milk, calves are given some fibre (hay) in their diet from an early age to promote the development of the rumen.

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LO: 4.7 & 7.1 14

Handling

Small calves

- One competent person
- Restrain against a solid surface
- Rear of calf in a corner
- Hold the head and turn over your thigh

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Cattle Handling

Larger calves

- Two competent animal technicians.
- One person on head end and one on rear end (decide first!)
- May need to use a halter for the head

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Cattle Handling

Adult cattle should be restrained in a crush

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LO: 4.2 17

Environment for Ruminants

CODE OF PRACTICE FOR THE HOUSING AND CARE OF ANIMALS

Temperature 10-24C
Humidity 45-65%
Ventilation 15-20 ch/hr
Stocking densities
Lighting
Noise
Feeding
Bedding

Home Office
BUILDING A SAFE, JUST AND TOLERANT SOCIETY

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Natural behaviour and needs

Ruminants are very social animals - graze in herds/flocks for up to 10 hours a day

Need social and visual interaction with other animals

Prey animals, spend a lot of time watching

Naturally fearful and flee as a group when in danger.

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Feeding requirements

- They need ad lib fodder with a high fibre content.
- A lack of substrate can lead to metabolic in-balances, indigestion, behavioural disorders.

Ruminants need company, but must have sufficient room to ensure they can all feed at the same time.

Conserved forage such as silage and hay should be fed in winter months

Ad lib water needed – lactating cows need large quantities of water

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LO: 4.2 20

Housing needs

Beef cattle – hardy kept outdoors all year
Dairy cattle – kept indoors over winter

Separate standing and sitting area

Bare environment can lead to stereotypic behaviour e.g. matt chewing

Deep straw bedding allows natural foraging behaviour

Straw, sand, matting commonly used

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Calf housing

- Calves bedded on wood shavings, replacing bare concrete floor and rubber mats
- Drier & cleaner.
- Poor ventilation predisposes to respiratory disease
- Toys are hung around the room

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Environmental enrichment

Rotor brushes are excellent enrichment for adult cattle

Toys and playthings can work for young ruminants, but adults soon tire

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Routine tasks - Calves

Disbudding – must be done with anaesthesia

Castration

Ear tagging

Worm control

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Routine tasks - Cattle

- Vaccination
- Worm control
- Foot care
- Udder care

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Health status

Source: conventional v high health status?

Health checks

1) History

2) Clinical examination – body condition score
appearance
lameness
breathing
diarrhoea

3) Laboratory tests - blood, faeces, skin scraping

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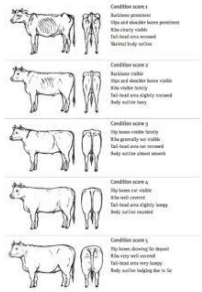
Assessing health



Rectal Temperature	38.50C
Respiratory rate	15 – 25 / minute
Heart rate	60 –90 / minute
Blood volume	65ml/kg

- Check eating/drinking/urinating/faeces
- Check weight or BCS
- Check skin
- Rectal examination if required

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Signs of pain

- Tail swishing
- **Teeth grinding**
- **Absence of chewing cud**
- Weight loss / reduced body condition
- Abnormal posture
- Increased respiration
- Lethargy
- Isolated from herd

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Signs indicating system affected

Respiratory - Coughing and sneezing, Ocular-nasal discharge, Raised temperature, Increased respiratory rate

Gastrointestinal – chronic weight loss, diarrhoea, dehydration, low temperature (common in calves)

Locomotor – lameness, feet abrasions, interdigital dermatitis

Nervous – tremor, head-tilt, circling, seizures

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Notifiable Diseases

- A **notifiable disease** is any disease that is required by law to be reported to government authorities.
  - REPORT TO DEFRA

- Examples:
  - TB – common in the UK
  - Anthrax
  - BSE
  - Bluetongue
  - Foot and Mouse disease
  - Rabies
  - Rift Valley Fever

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Zoonotic Diseases

Diseases that spread between animals and humans

Skin:	Ringworm (common)
Abortion:	Q fever
Digestive:	Cryptosporidia, Campylobacter, Salmonella, E coli O157
Respiratory:	Tuberculosis
Other:	Leptospirosis

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Common Bovine diseases

- Skin diseases – Ringworm, ectoparasites (lice, mites)
- Respiratory diseases – Calf pneumonia, IBR, TB
- GI diseases – viral, bacterial, parasitic, bloat
- Metabolic – hypocalcaemia, rumen acidosis
- Reproductive – metritis, abortion, mastitis
- Neurological – clostridial diseases, leptospirosis


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Disease prevention

Vaccination

Cattle
Clostridial
Respiratory viruses – IBR, PI3, BRSV
Leptospirosis
Bovine virus diarrhoea

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Minor Procedures

Administration of substances

- Oral
- Subcutaneous
- Intramuscular
- Intravenous
- Intranasal

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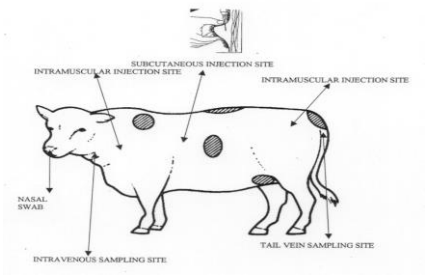
Common injection sites



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Venous sites


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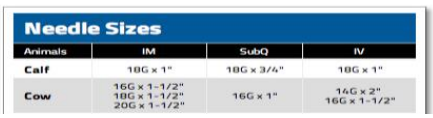
Needle selection

- Influencing factors:
  - Age – calf v cow
  - Route of administration IM (longer) v subcutaneous (shorter)
  - Viscosity of liquid to be injected – wider gauge needed for thick substances
- Never re-sheath/reuse needles



Needle Sizes			
Animals	IM	SubQ	IV
Calf	18G x 1"	18G x 3/4"	18G x 1"
Cow	16G x 1-1/2" 18G x 1-1/2" 20G x 1-1/2"	16G x 1"	14G x 2" 16G x 1-1/2"

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Anaesthesia in Cattle

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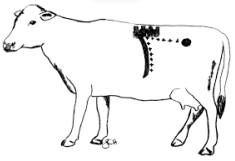
Local and regional anaesthesia

- Commonly used in cattle in combination with sedation
  - Disbudding
  - Castration
  - Caesarians
  - Displaced abomasums (bloat)



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Laparoscopic surgery increasing

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General anaesthetic risks in Ruminants

- Inhalation pneumonia:
  - Regurgitation
  - Salivation
- Accumulation of rumen gases - bloat
- Weight of abdominal contents on:
  - Respiratory system
  - Venous return

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Pre-GA considerations

- Acclimatisation – check local rules
- Health check
- Fasting – controversial some recommended for minimum of 24 hours
- Pre-medication – useful in ruminants

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General anaesthesia agents

- Induction: Injectable generally advised
  - Propofol
  - Alfaxalone
- Maintenance: volatile advised
  - Isoflourane

- Note ketamine + alpha 2 does not provide good surgical anaesthesia in ruminants so is best avoided.

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GA - considerations

- Positioning: flat, padded area
- Ventilation – often used due to weight of rumen conents pressing on diaphragm
- Heat source
- Rumen tubes – release gas build up.
- Fluid support
- Monitoring – pulse oximetry, capnorgraphy, Blood pressure measurement

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Analgesia

- Opioid
  - Not commonly used in ruminants as the effects vary and have a very short duration of action
- Non-steroidal anti-inflammatory drugs (NSAID's)
  - 1) Flunixin (finadyne solution)
  - 2) Meloxicam (metacam)
  - 3) Ketoprofen (ketofen)

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Schedule 1 methods

RUMINANTS

1) **Overdose of anaesthetic using a route and agent appropriate for the size and species of animal**

2) Destruction of the brain by a free bullet, carried out by a veterinary surgeon

3) Captive bolt, percussion or electrical stunning followed by destruction of the brain or exsanguination before return of consciousness, carried out by a veterinary surgeon or licenced slaughter-man

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Schedule 1 methods

FETAL FORMS

Only by overdose of anaesthetic using a route and agent appropriate for the size and species of animal

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Confirmation of death

1) **Permanent cessation of the circulation** /destruction of the brain

2) Dislocation of the neck

3) **Exsanguination**

4) **Onset of rigor mortis**

5) Instantaneous destruction of the body in a macerator

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Any questions?

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