

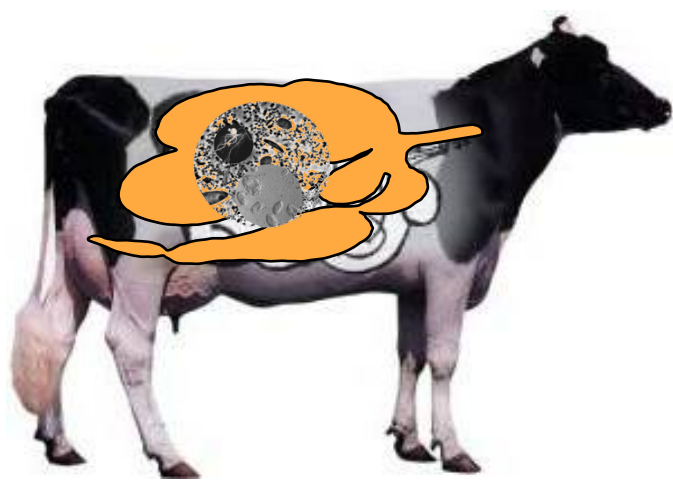
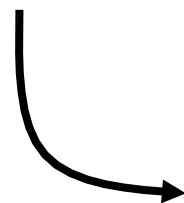
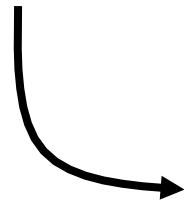
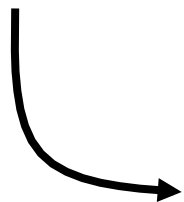
SMEthane

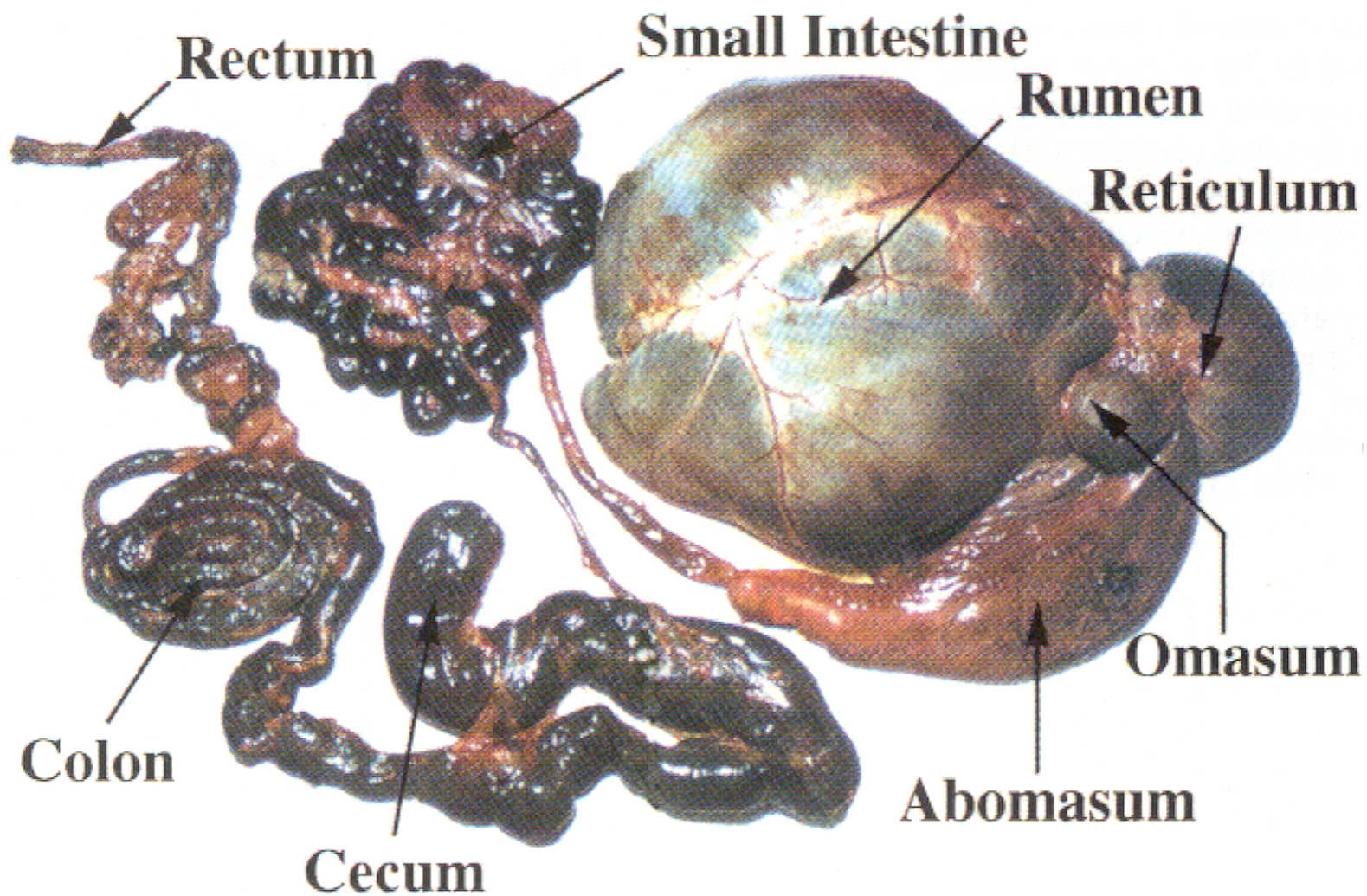
3rd workshop

Integrating the whole story: stability-in vitro-
in vivo (short-long term)

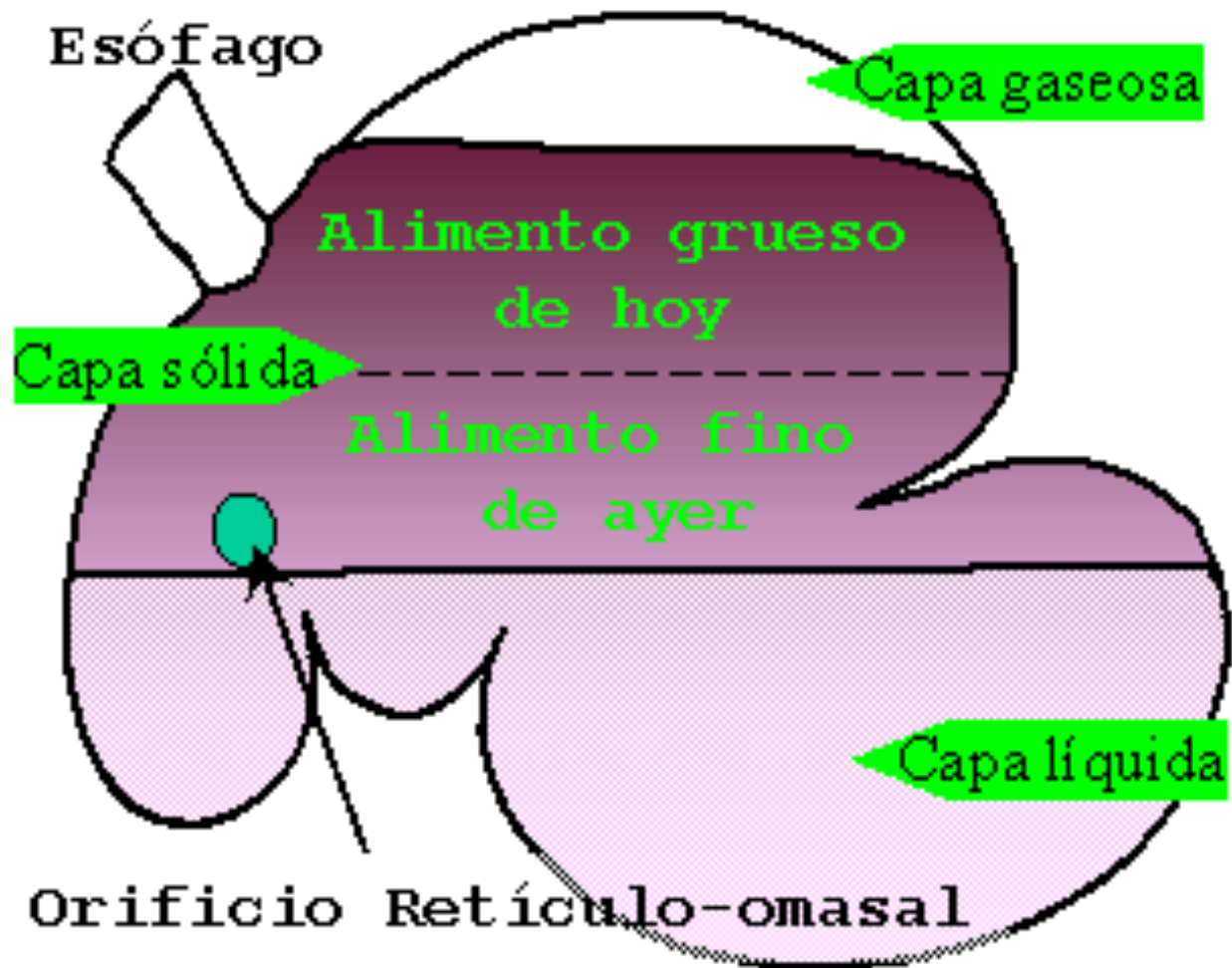
4-5 October 2012

Hotel Oceania, Clermont-Ferrand, France



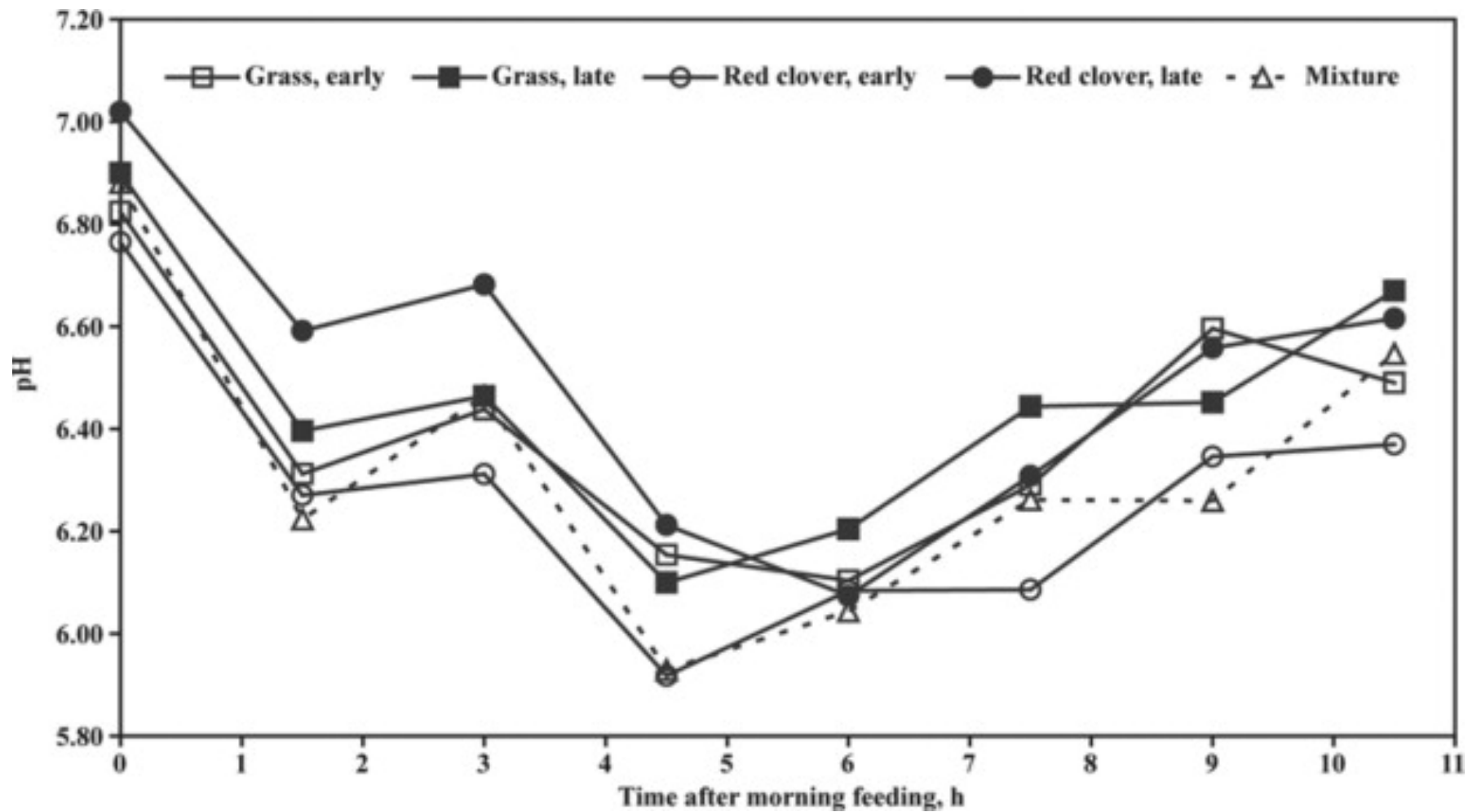


Rumen

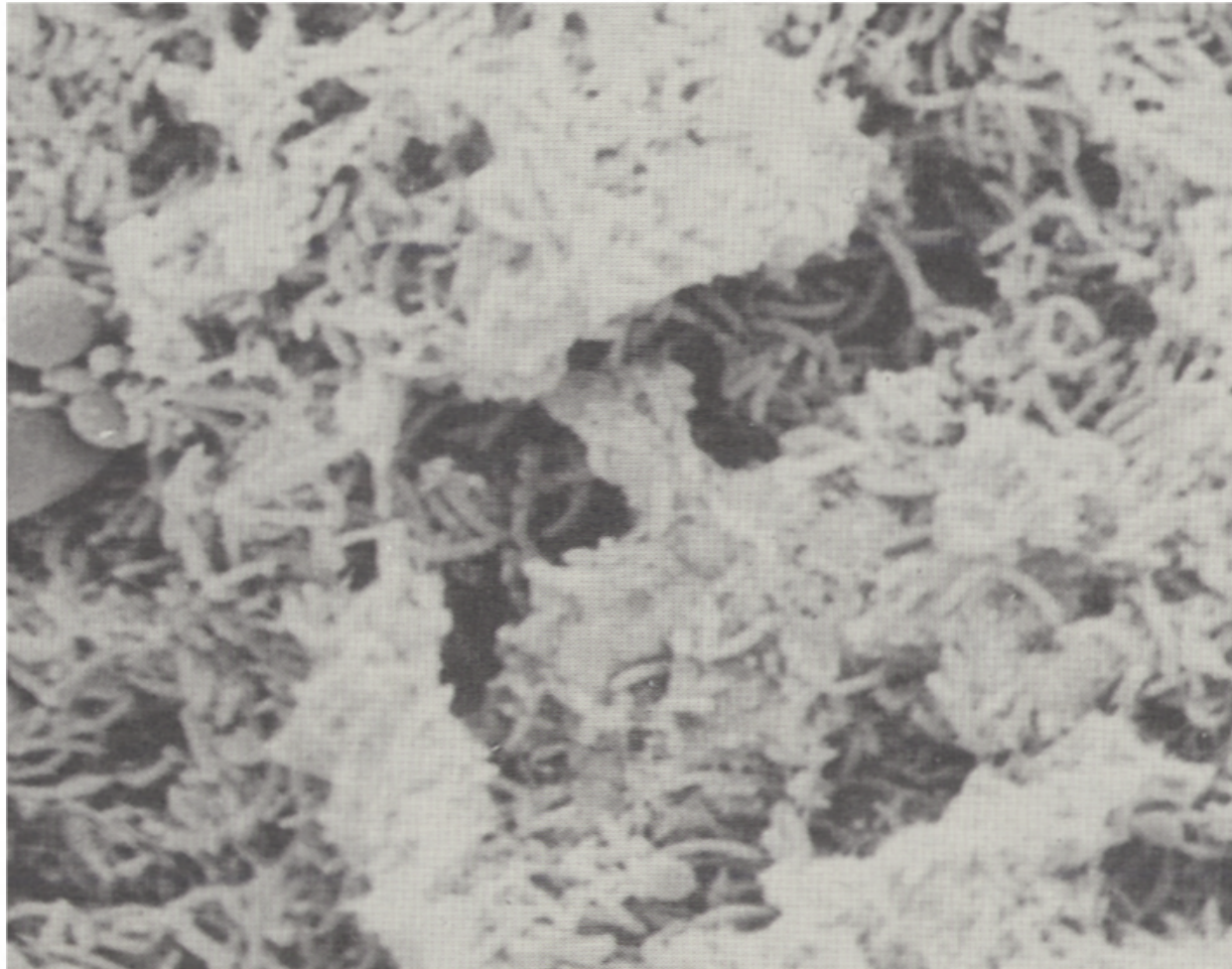


Rumen contractions



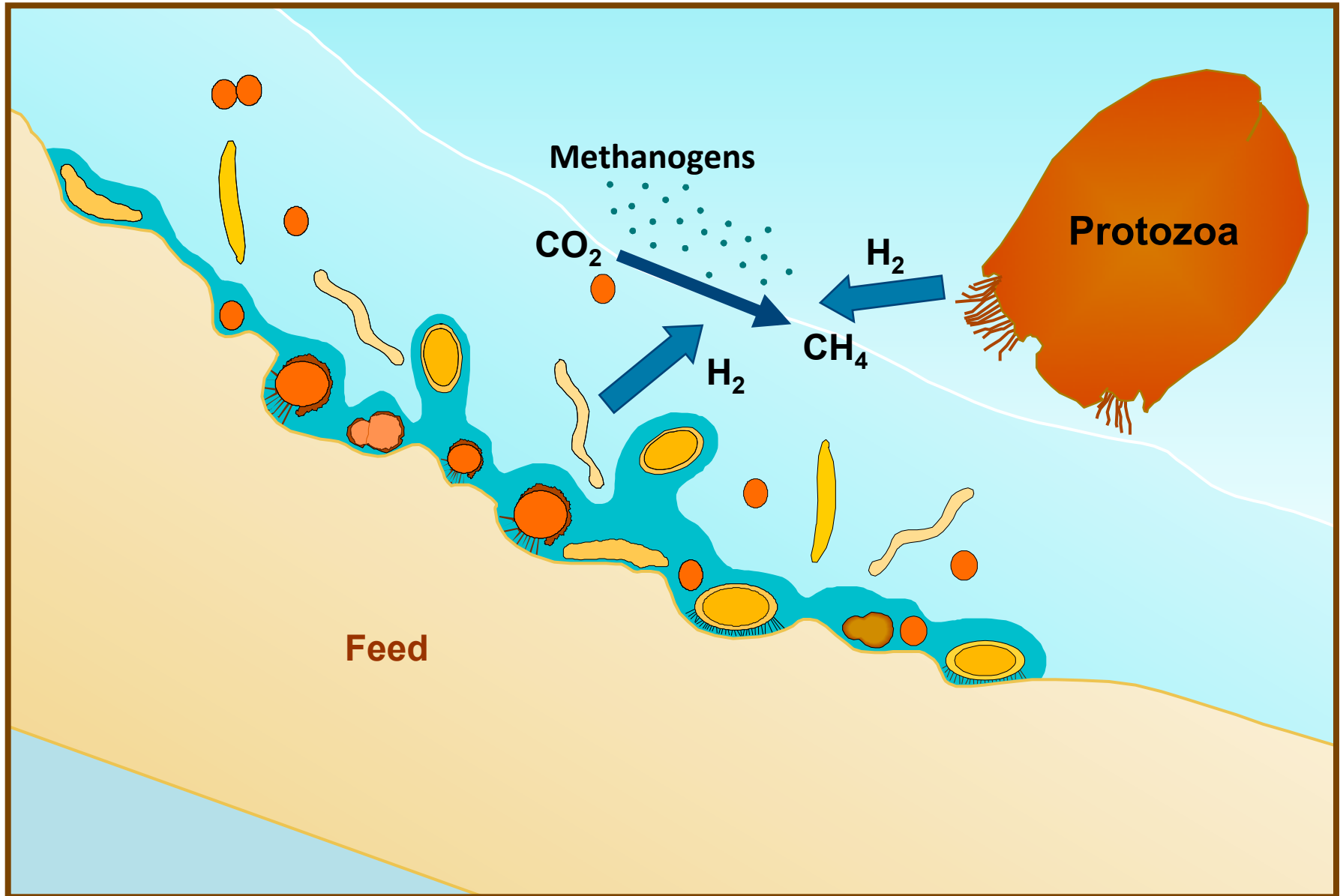


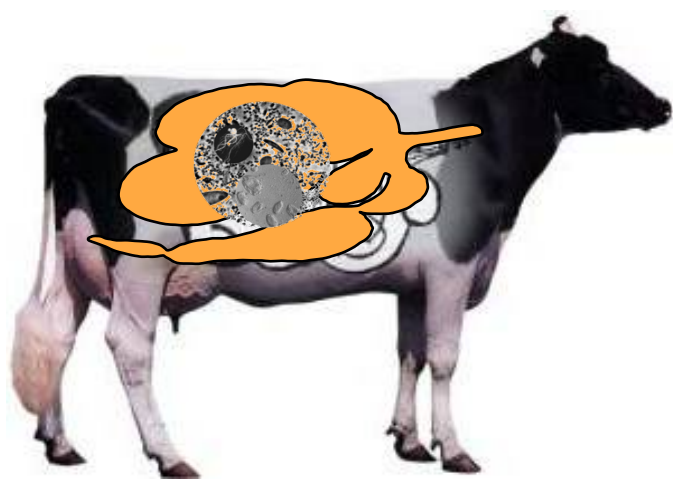
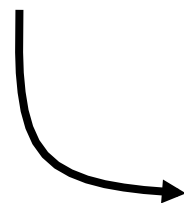
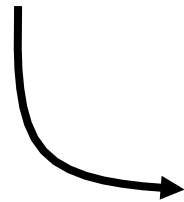
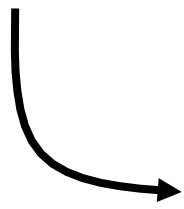
Microbial attachment to feed particles

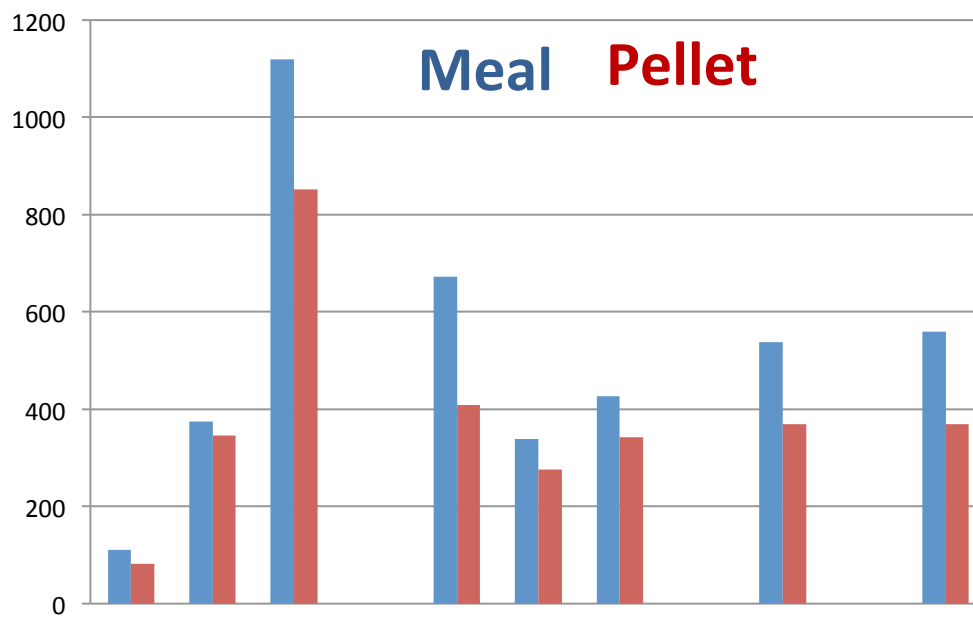


Video ERCULE

Methane production: a microbially driven process to remove hydrogen



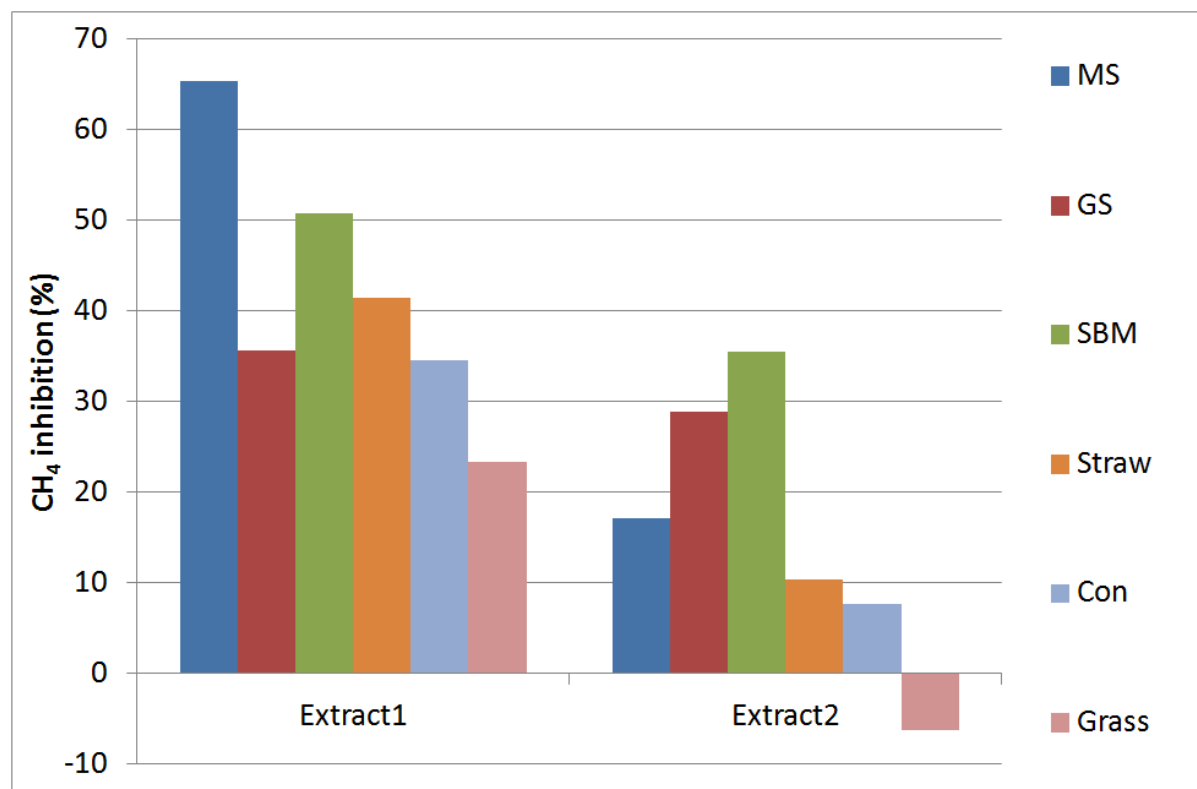


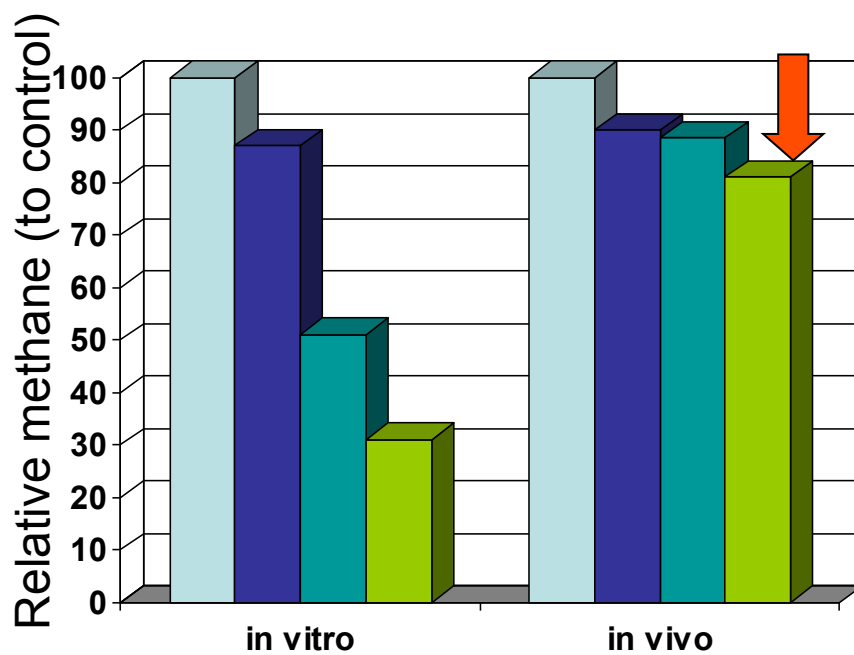


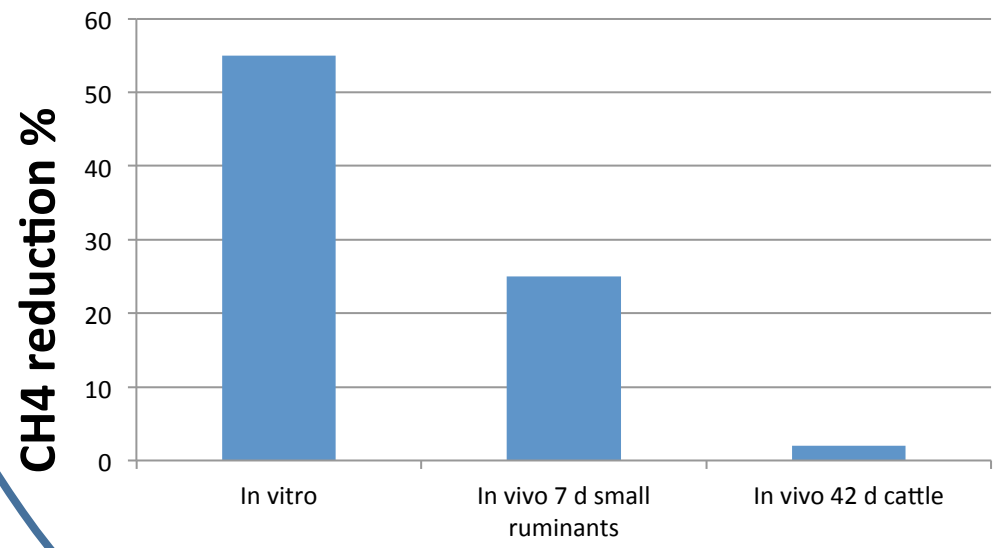


pH

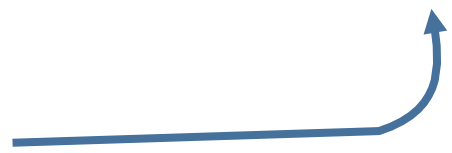
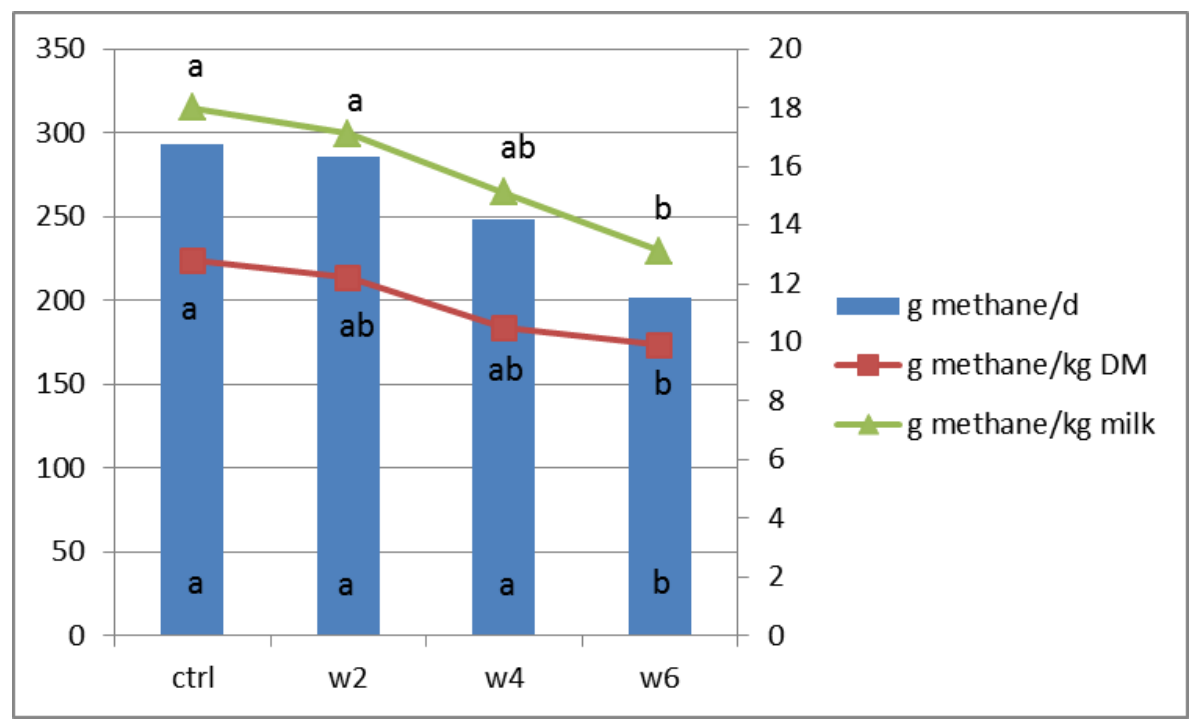
Substrate







Does size matter?

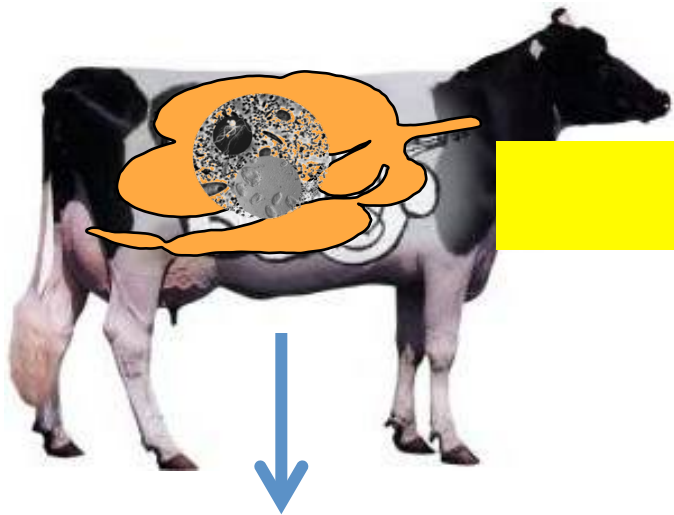


Current project

- Plant extracts **can manipulate** rumen fermentation and decrease methane
- **Doses** required are often too **high** to be economically viable
- Issues of **taint** in products are evident
- It is difficult to see how this approach might be applied to **grazing** animals

the challenge,

Methanogens composition



Resilience in adult animal



Degradation of Carbohydrates

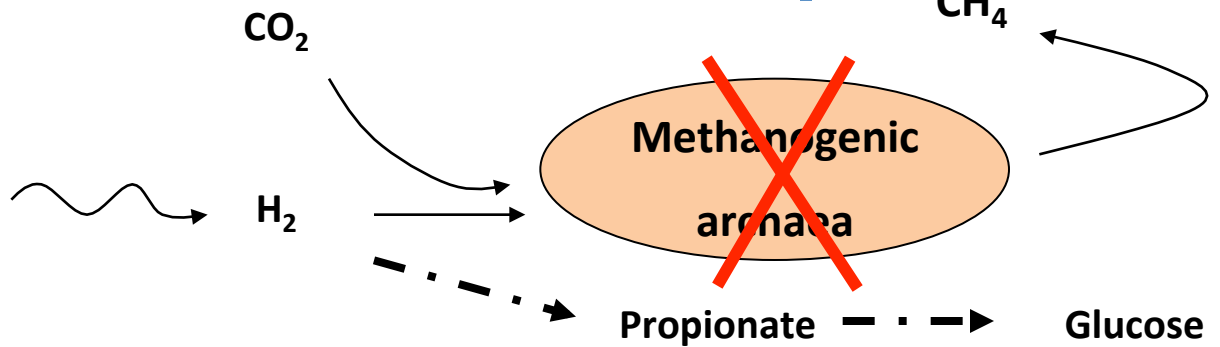


~~Methanogenic
archaea~~

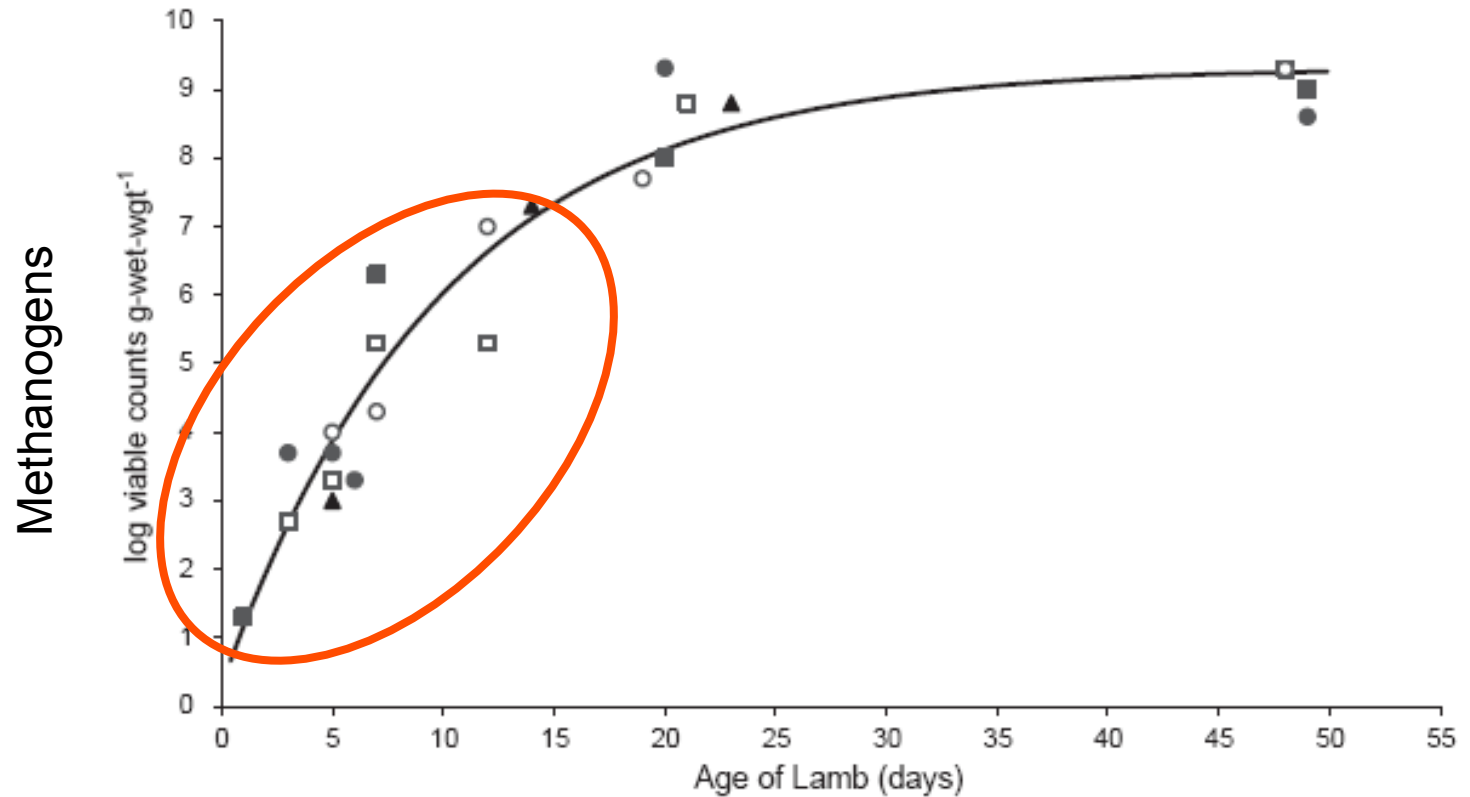


Propionate

Glucose



Rumen colonization



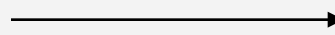
Skillman et al., 2004 Anaerobe.

Influence of early experience

- Early exposure to wheat grain¹

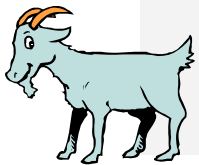


1h/d for 5d at 6 wk



3 years later

- Early exposure to low quality forages²



1-4 month age



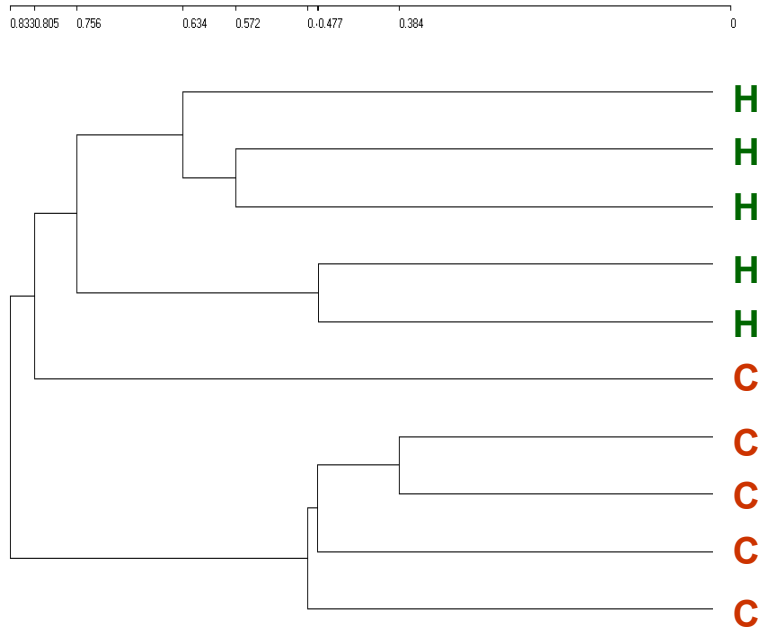
3 years later

¹Green et al. (1984) Proc. Aust. Soc. Anim. Prod. 15: 373.

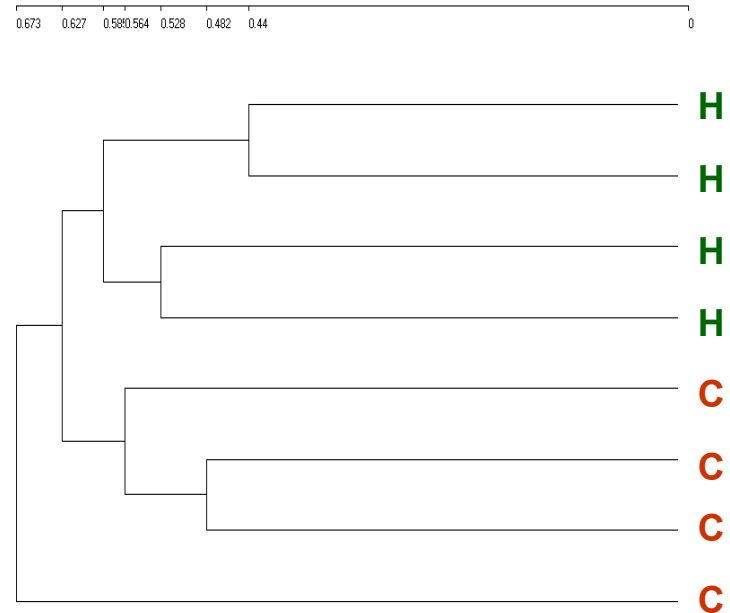
²Distel and Provenza (1991) J. Chem. Ecol. 17:431

Persistency of early experience

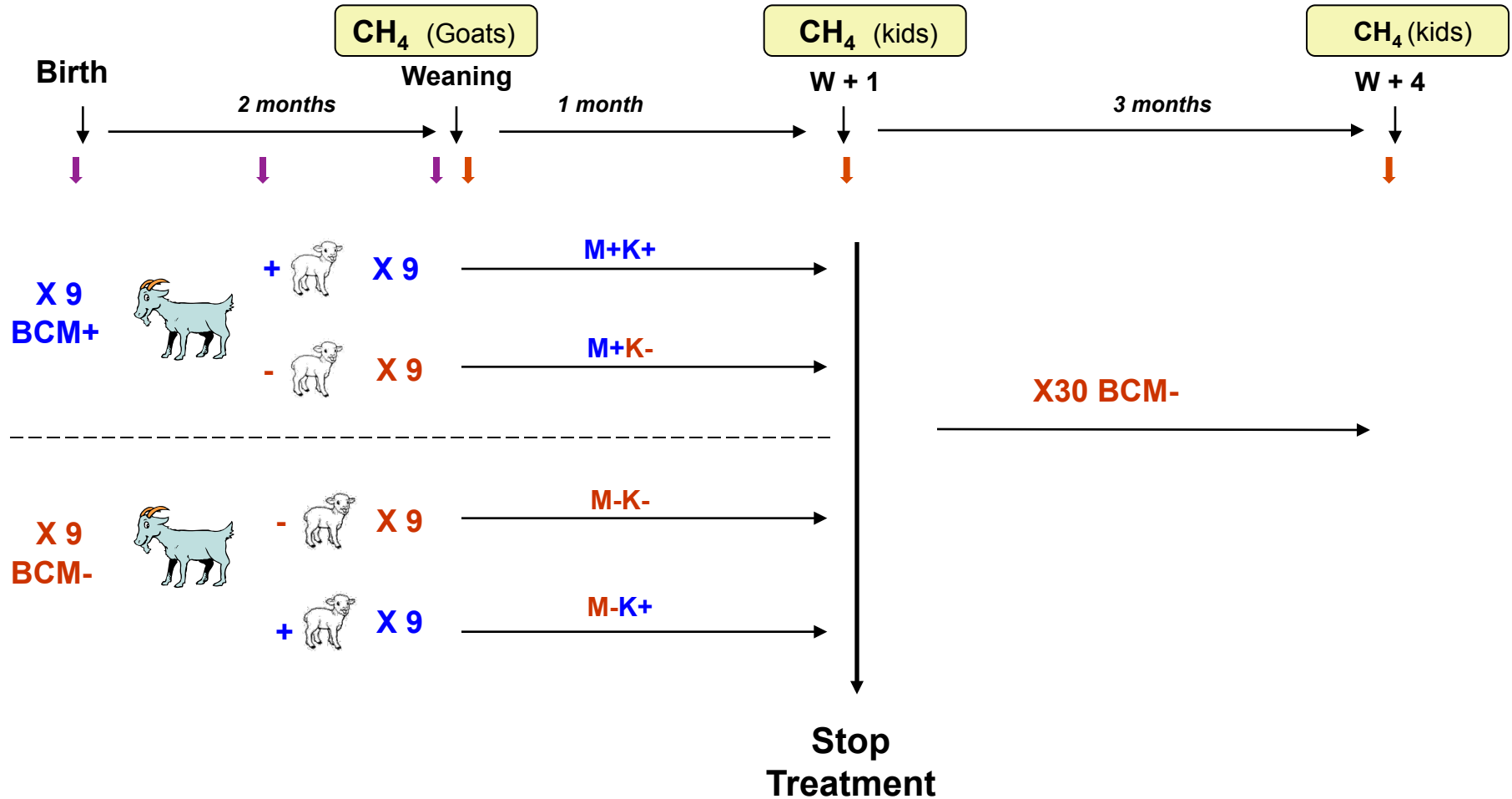
Pre-weaning



Post-weaning (4 months)



Methods: experimental design



Kids

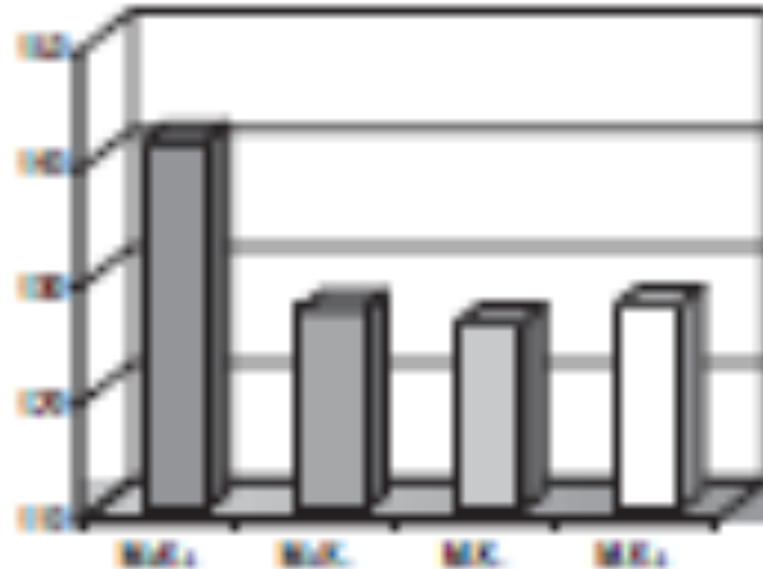
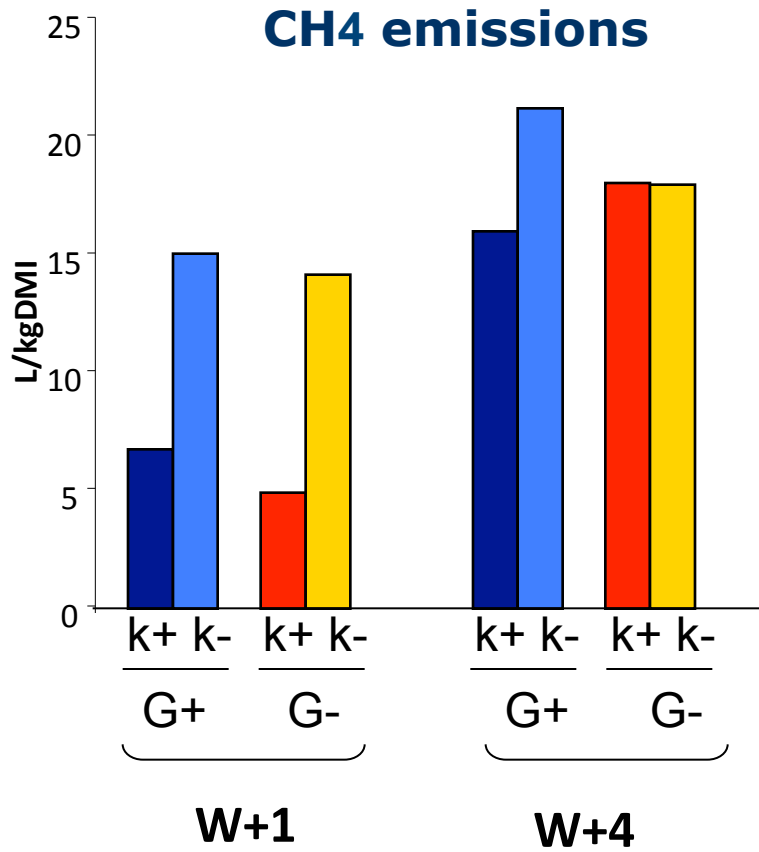


Fig. 2. Daily weight gain (g) in 10 weeks.

Would it be possible to feed high doses of plant extracts in early life to effect rumen function in latter life

- Does this work in cattle
- How long does effect last for
- What is the window you need to feed additive for/ treating the mothers
- Are treated animals more/less sensitive to additive in latter life
- Can you target other activities

SMEarly

Offer to each SME

- Test 1 compound through a standardized model in small ruminants including molecular and in vitro characterization
- One customized trial to address specific issues some ability to select species (but be aware that we will need to vary animal numbers and thus there may be loss of statistical power) clearly there will also be a trade off between trial design and length of project (ie the latter you leave it to start the 2nd trial the more limited the options will be)
- One bespoke workshop run at a location of mutual agreement and subject to a minimal number of external participants
- Dissemination via major Agricultural shows