Research Internship at Wageningen University, The Netherlands

(Feb 1st – May 30th , 2011)

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IWATE UNIVERSITY

岩手大学

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For quality of life

About Wageningen University

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Wageningen University and Research Centre

Research in Wageningen University took place in :

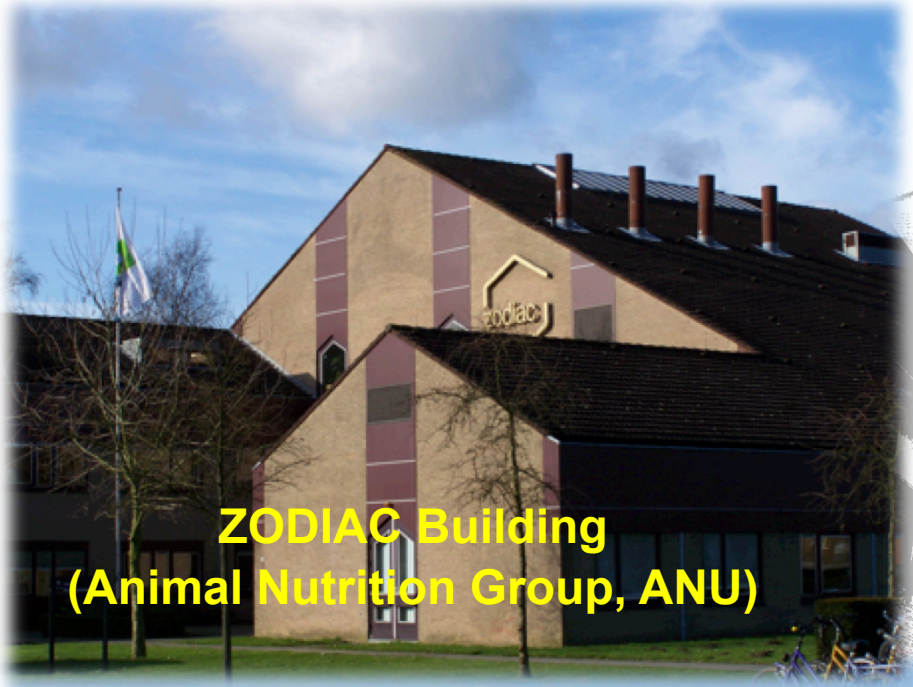
Departments :

- Agrotechnology and Food Sciences
- Animal Sciences → Animal Nutrition Group (ANU)
- Environmental Sciences
- Plant Sciences
- Social Sciences

Graduate Schools :

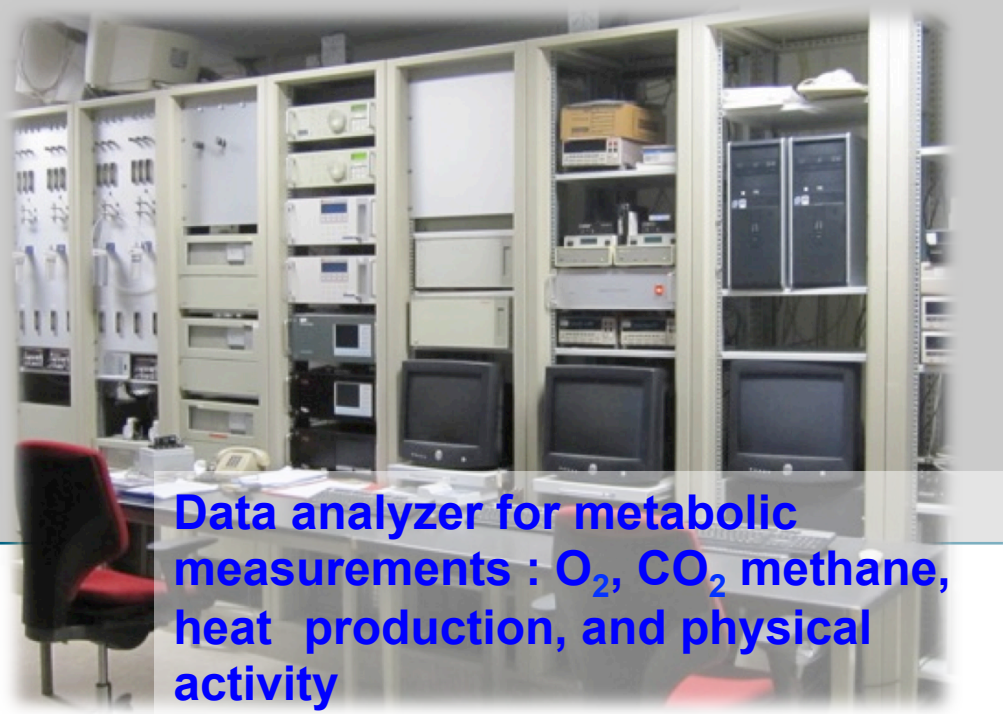
1. Experimental Plant Sciences (EPS)
2. Food Technology Agrobiotechnology Nutrition an Health Sciences (VLAG)
3. Production Ecology and Resource Conservation (PE&RC)
4. Wageningen School of Social Sciences (WASS)
5. **Wageningen Institute of Animal Sciences (WIAS)**
6. Wageningen Institute for Environment and Climate Research (WIMEK)

Facilities in Animal Nutrition Group (ANU)



ZODIAC Building
(Animal Nutrition Group, ANU)

Animal barn



Data analyzer for metabolic measurements : O_2, CO_2 methane, heat production, and physical activity

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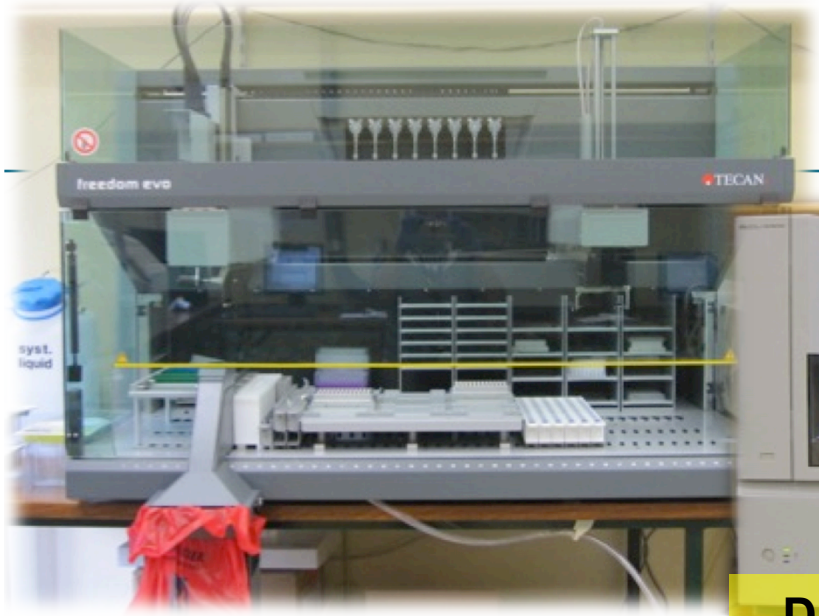


PCR

DNA analyzer

Gas Chromatography

In vitro batch culture

Internship Activities

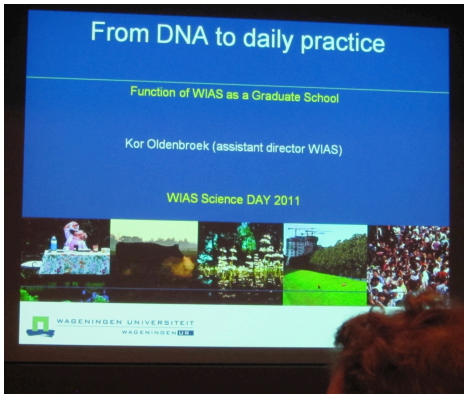
1. Participation in student presentation every Monday morning at Animal Nutrition Group (ANU).

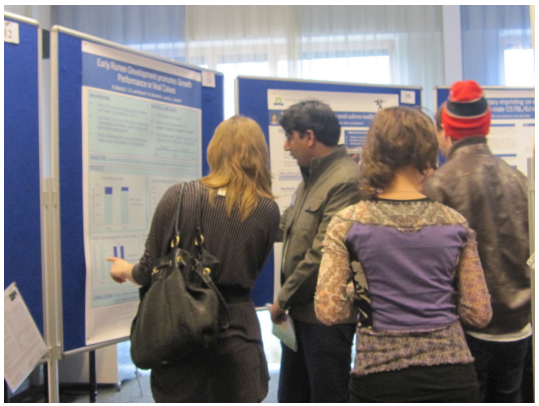
2. Research plan presentation: "**Effects of solid feed intake on the genes expression associated with VFA metabolism in rumen of calves**"

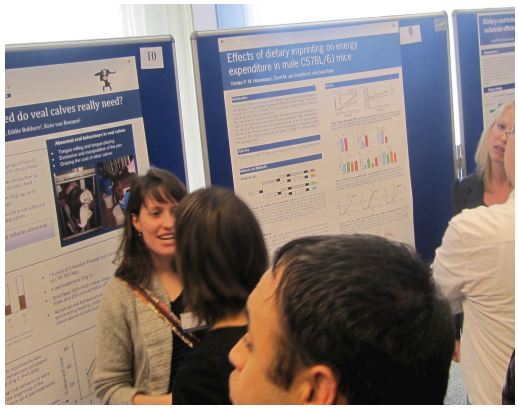
3. Participation in General Lectures at Graduate School of Animal Sciences (WIAS).

4. Participation in Symposium

① WIAS Science Day: one-day symposium at which PhD students within the graduate school present their research.





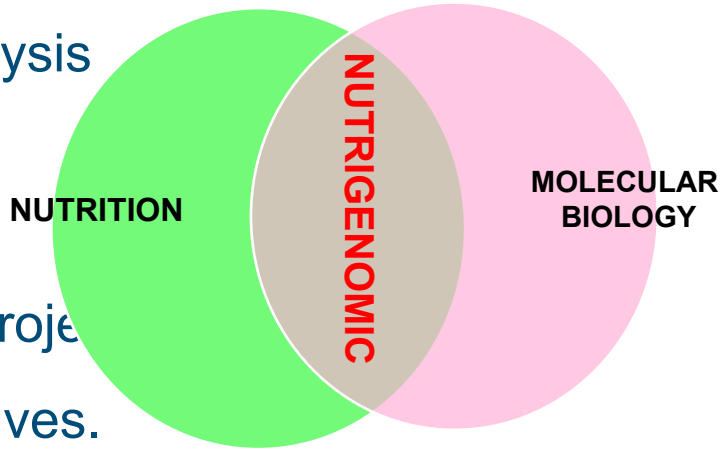


② the 36th Animal Nutrition Research Forum (ANR Forum 2011) at Leuven University, Belgium.

5. **Research work**:

☑RNA isolation ☑DNA synthesis (Reverse Transcriptase)

☑RNA purification ☑PCR analysis



6. Participation in another research proje

1. Estimation of rumen milk in calves.
2. Effects of the dietary energy source (lactose vs. fat) on energy partitioning and the development of insulin resistance in calves.

*Effect of solid feed intake on the expression of genes associated with VFA metabolism in rumen of calves

Dian Harjanti, Harma Berends,
Walter Gerrits, Joost van den Borne, Jurgen van Baal

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Background

Provision of solid feed :

- **Feeding solid feed become mandatory for calves industry since 1997 (EU Policies)**
- **Promoting rumination, reducing the incidence of rumen hair balls and abnormal oral behavior (Blokhuis et al., 2001).**
- **Stimulating rumen microbial proliferation and VFAs, which have been shown to trigger rumen development** (Suarez et al., 2007).

Rumen Development

Stimulates rumen microbe

VFA

Stimulate papillae growth

Hypothesize

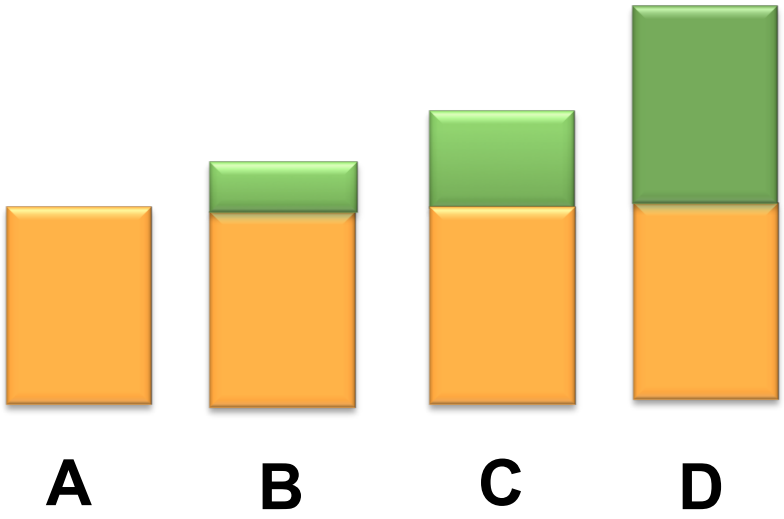
Solid feed would stimulate rumen development and up-regulate the expression of genes involved in VFA metabolism in rumen

G protein-coupled receptors : bGPR43 and bGPR41

- bMCT1
- bGPR68
- bPAT1

Material and Method

- 48 Holstein Friesian male calves
- Solid feed : 25% chopped wheat straw, 25% maize, and 50% concentrate on DM basis



SOLID FEED

0, 9, 18, 27 g/kg$^{0.75}$/d

MILK

42 g/kg$^{0.75}$/d

Rumen tissue : rumen ventral caudal

↓

RNA isolation using TRIzol

↓

RNA Purification& DNAse Treatment

↓

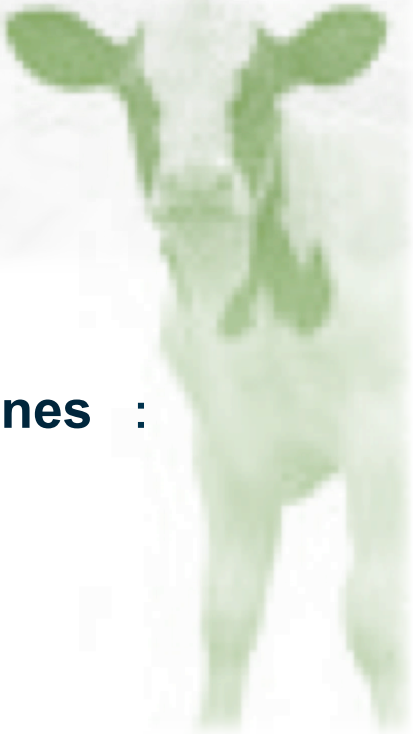
Reverse Transcriptase → cDNA

↓

quantitative PCR (qPCR) : 40 cycle

Housekeeping genes :

- **bACTB**
- **bIPO8**
- **beEF2**



Implication

- Analysis of gene expression on the effect of feeding could help to understand the molecular mechanism in physiological and pathological processes.

- Overall, outcomes of nutrigenomic study will provide novel strategies to optimize health and production of ruminant, thus contribute in the development of ruminant industry.

Thank You

Members of Animal Nutrition Group

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