Project information

Project title

Setup of a mouse model to study immunosuppression after exposure to pollutants

Year

2011/2012

Project leader

Jacques Godfroid, NVH

Participants

- Jacques Godfroid, Norges Veterinærhogskøle (NVH)
- Ingebjørg Nymo, PhD student, Norges Veterinærhogskøle (NVH)
- Morten Tryland, Norges Veterinærhogskøle (NVH)
- Heli Routti, Norsk Polarinstitutt (NP)
- Terje Josefsen, Veterinærinstituttet (VI)
- Jean-Jacques Letesson, Facultés Universitaires Notre Dame de la Paix, Namur, Belgium

Flagship

Hazardous substances, Theme: Animal health and ecosystem

Summary of Results

The mouse model of infection and exposure to pollutants has been established (this is a true highlight, since such a model in syngenic mice is not described in the toxicology literature).

This includes:

1. Exposure to PCB 153 via tainted feedstuff

2. Infection with *Brucella pinnipedialis* and analysis of the bacterial load postinfection

3. Analyses of relevant gene expression by qPCR (for example TH1 and TH2 cytokines to assess globally the cellular component of immune functions at the transcription level)

4. Bioplex cytokine analyses (TH1 and TH2 cytokines to assess globally the cellular component of immune functions at the translation level)

5. PCB analyses

6. Phase I and II xenobiotic metabolizing enzymes at both the transcription and translation level

7. Histopathology

WP 1: The experimental infection took place at NVH, Oslo under BSL3 containment. This experiment took 14 weeks (2 weeks acclimatization pre-infection, and 12 weeks post infection) and was terminated on November 11, 2011.

WP 2: The readout of this experiment, i. e. bacterial load in spleen, liver and kidneys has been at different time points after experimental infection (Week 1, 3, 6 and 12) has been completed.

WPs 3-4: All the sampling work for WPs 3-4, has been done.

The techniques are now implemented and preliminary results are available.

WP 5: All the sampling work for WP 5 has been done.

The results of the analysis are foreseen in the next coming months.

WP 6: All the sampling work for WP 6 has been done.

This technique still has to be implemented in collaboration with Heli Routti from NP.

WP 7: All the sampling work for WP 7 has been done.

Samples have to be selected according to the outcome (bacteriology) of the experiment. They will be processed and analysed in collaboration with Terje Josefsen

Published Results/Planned Publications

This work is part of Ingebjørg Nymo's PhD. One paper related to brucellosis in marine mammals highlighting the problem in hood seal has been published. This paper received lots of attention and is classified as a "highly accessed paper", i.e. the paper has been downloaded more than 1000 times one month after being published.

Nymo I., Tryland M., Godfroid J. 2011. A review of *Brucella* infection in marine mammals, with special emphasis on *Brucella pinnipedialis* in hooded seal (*Cystophora cristata*). Veterinary Research 2011, 42:93. doi:10.1186/1297-9716-42-93.

There are 2 other papers that will be submitted in 2011.

Papers related to the mouse experiment are expected to be submitted during 2012.

Communicated Results

Paper presented at the 4th European Wildlife Disease Association student Workshop 2011, April 14-17, 2011, Conference Center of the Mérieux Foundation, Veyrier-du-Lac, France.

Nymo Ingebjørg, Tryland Morten, Godfroid Jacques. A serological screening for Brucella-19, 2011. Jacques Godfroid, Ingebjørg Nymo, Anett Larsen, Kjetil Åsbakk, Carlos G. das Neves, and Morten Tryland. Positive results in brucellosis serological tests: what is your diagnosis?

Interdisciplinary Cooperation

The project is a true collaboration between infection biologists and toxicologist. Both disciplines were actively involved in the conception of the project. It is worth nothing that the WP6 (Phase I and II xenobiotic-metabolizing enzymes at both the transcription and translation level) of this project is a new WP resulting from this collaboration.

The project represented also a unique opportunity to get to know each other. This has already leaded to the submission of common projects to NFR.

Budget in accordance to results

The money received from NVH only covers the stipend of the PhD student. So, external funds are needed to actually do the work. The Fram center's contribution was really necessary to allow the purchase of expensive reagents. Some travel arrangements Tromsø/Oslo needed for the mouse experiments were also made possible by the Fram center funding. To summarize, the Fram center funding was indispensable.

Could results from the project be subject for any commercial utilization

No

Conclusions

a) The mouse model of exposure to pollutants will be used for other infections relevant in the Arctic like toxoplasmosis, which is found in several wildlife species both in the marine and terrestrial Arctic environments. Parallel to the mouse model, an *in vitro* macrophage model of infection has been developed. We are planning to develop this model further by exposing macrophage *in vitro* to pollutants. This will be part of our projects applications to the Fram center for 2012.

b) The RT-PCR technique is now implemented for the analysis of the transcription of genes of interest. This is a WP for which close collaboration between NP and NVH will be developed in the next coming years.