8 Summary

“Expression profiling of endometrial transcripts as potential fertility parameters in dairy cattle”

High reproductive performance is required for successful management of dairy farms. After calving, especially endometritis is one of the main reasons for reproductive failure. However, subclinical endometritis remains undetected in many cases and causes a high financial loss. To elucidate the cellular processes in the endometrium, the acquisition of the gene expression of selected transcripts will provide helpful information. In the literature, numerous cytokines and enzymes were discussed to play important roles in preparing the endometrium for implantation. The aim of the present study was to examine of the mRNA expression of pro-inflammatory systems in the bovine endometrium. Endometrial cells were harvested by using the cytobrush®-method. Quantitative RT-PCR was performed to investigate the mRNA expression of inflammatory mediators as bovine granulocyte chemotactic protein 2 (bGCP-2), cyclooxygenases 1 and 2 (COX-1/-2), haptoglobin, interleukins 1ß (IL-1ß), 6 (IL-6) and 8 (IL-8) as well as tumor necrosis factor alpha (TNFα). In the first part of the present study, endometrial cells were collected at a local slaughterhouse. The mRNA expression was examined in relation to different regions of the uterus (ipsilateral, contralateral horn and corpus) as well as during the estrous cycle (n=8 for each phase). Bovine uteri were classified into the following four phases: pre- (day 19-21) and postovulatory phase (day 1-5), early luteal phase (day 6-12) and late luteal phase (day 13-18). All of the investigated mediators were detected in the bovine endometrium. bGCP-2, IL-1ß and IL-8 were significantly higher expressed around ovulation compared to the luteal phase. Concerning the different regions of the uterus, there was no significant difference observed between the ipsilateral, contralateral horn and the corpus. On a commercial dairy farm, the expression of the inflammatory mediators were investigated under field conditions in the endometrium of healthy cows as well as of cows with subclinical and clinical endometritis (n=9 for each group). The differentiation between healthy cows and cows with subclinical endometritis was performed in relation to the percentage of PMN in the endometrium. Subclinical endometritis was diagnosed when the percentage of PMN exceed 5%. Purulent vaginal discharge was defined as a sign for clinical endometritis. Endometrial samples were harvested between 21 and 27

days post partum. Cows with subclinical or clinical endometritis showed a significant higher mRNA expression of the mediators bGCP-2, IL-1ß, IL-8 and TNFα compared to the group of healthy cows. In the third part of the study, the mRNA expression was examined in the endometrium of heifers (n=5) directly after calving. Samples were collected on days 10, 17, 24, 31, 38 and 45 post partum. bGCP-2, COX-2, haptoglobin, IL-1ß, IL-6, IL-8 and TNFα were expressed significantly higher on day 17 compared to day 31 post partum.

In addition to the results of the present study, it can be concluded that the used method is appropriate in diagnosing subclinical endometritis. Furthermore, it is not important whether the endometrial cells were collected from the ipsilateral, the contralateral horn or the corpus. It has to be considered, that the investigated cytokines were expressed physiologically during the estrous cycle and the post partum period. For a better diagnostic of subclinical endometritis in dairy cows, the mRNA expression should be investigated after day 24 post partum.