Summary

Among other embryonic structures, *Hoxd* genes direct the development of the caecum, a major organ of the gastrointestinal tract of herbivorous species. All *Hoxd* genes, with the exception of *Hoxd12* and *Hoxd13*, are expressed in the caecum under the control of a regulatory sequence located telomeric to the *HoxD* complex. The two most posterior *Hoxd* genes fall outside the control of this enhancer because of the presence of a putative polar silencing element located between *Hoxd12* and *Hoxd13*.

In this project, we investigated the qualitative and quantitative profile of expression of the *HoxD* complex in the developing caecum of wild-type animals. We found that groups of *Hoxd* genes are transcribed along with large intergenic regions, resulting in two large blocks of transcription. In addition, we discovered several caecum-specific transcripts, whose function is unknown. When considering the quantitative profile of expression of *Hoxd* genes, we found that two groups of genes, correlating with the two previous blocks of transcription, are expressed at different levels, suggesting that *Hoxd* genes do not follow obvious quantitative colinearity in the caecum.

With the analysis of wild-type *HoxD* expression profile as a baseline, we would like to repeat our experiments with a genetic configuration in which a specific portion of the *HoxD* cluster has been inverted. We hope that this configuration will help us to further understand *Hoxd* gene regulation. In order to reproduce the inversion, we crossed mice, heterozygous for the floxed non-inverted allele, with CMV-Cre/0 mice. We recovered one CMV-Cre/0 mouse, mosaic for the inversion, which we further crossed with wild-type animals in order to obtain the founder of the mice line of interest.

Finally, we tested the presence of the putative polar silencing element with *in situ* hybridisation for *Hoxd12* on embryos in which *Hoxd13* had been deleted, a deletion, which was supposed to remove the regulatory element. However, we found no ectopic expression of *Hoxd12* in the caecum of these mice, suggesting that this regulatory sequence follows a mode of action, which is more complicated than initially anticipated.