

## Unravelling the epigenetic modulators of feather pecking in laying hens

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Feather pecking in laying hens is an important behavioural welfare problem in group housed laying hens. Despite the vast amount of studies looking at the predisposition of feather pecking, not much is known about the potential epigenetic modulators of this behaviour. Epigenetic mechanisms may play a role in the predisposition for feather pecking in laying hens.

DNA-methylation is a proposed mechanism to affect feather pecking, as this pathway is known to be affected by various environmental conditions in mammalian and fowl species (Jensen, 2015; Isles, 2015). To understand the epigenetic modulators of feather pecking, I analysed DNA-methylation in the thalamus in White leghorn chicks from lines selected on feather pecking (Kjaer and Sorensen, 2002).

For the purpose of this short term scientific mission (STSM) within the COST Action CA15134 Synergy for preventing damaging behaviour in group housed pigs and laying hens (GroupHouseNet) I conducted the DNA methylation laboratory analysis at the Linköping University in Sweden. In collaboration with Carlos Ge

A genome-wide comparison of DNA-methylation of gene promoters in the hypothalamus took place. By means of a reduced representation sequencing approach, a restriction enzyme cuts the genome. 2% of the genome remains, where methylation was assessed with a methylation sensitive antibody to be sequenced further. This method is called methylated DNA immune precipitation (MeDip); (Guerera-Bosanga & Jensen, 2016).

We compared the sequence of methylated and non-methylated regions. Hereby we are able to see the effects of selection on feather pecking genetically and epigenetically. With the data obtained we will be able to assess the epigenetic changes as a consequence of selection of feather pecking. It will be the first study to see if these mechanisms play a role. Moreover, in the future we will combine it with gene-expression further enhancing our understanding how feather pecking is regulated by different genes. This study could shed light on the potential role of the parents and transgenerational effects on feather pecking, important for breeding and housing of parental and grandparental breeding flocks.

### References

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