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## Could Methylation changes in the bovine GSTP1 gene be caused by certain pesticides?

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**D**NA methylation represents the main and one of the most studied epigenetic modifications. It involves the addition of a methyl group to the cytosine ring within the CpG dinucleotide in DNA. Generally, it has been known that DNA methylation in the promoter region of genes indicates transcriptional repression while hypo methylation means transcriptional activation and increased gene expression. On the other hand, methylation in the body of genes may induce gene activation (Langevin and Kelsey, 2013).

Accumulating lines of evidence indicate that DNA methylation is susceptible to nutritional and environmental influences and alterations in DNA methylation profiles can alter gene expression leading to diverse phenotypes with the potential for increased/decreased productivity and disease risk (Choi and Friso, 2010; Jang and Serra, 2014).

Pesticides represent a broad range of chemicals used for crop protection, agricultural food production and disease control, which are designed to impact living systems (Paul *et al.*, 2018). They consist of one or more active agents and several adjuvants which improve their applicability and solubility. In addition to their pest-reducing effects, however, they may also affect non-target organisms. These negative effects can be studied at the biochemical, physiological and/or molecular levels (Schwarzbacherová *et al.*, 2016).

The glutathione S-transferases (GSTs) represent an important group of enzymes. GSTs protect the cell against xenobiotic substances and products of oxidative stress through conjugation of electrophilic and hydrophobic substrates and reactive oxygen species with glutathione. The most widely studied member of the GST family is the GSTP1 gene, whose inhibition of gene expression due to aberrant methylation would have a significant negative effect on the organism.

### Recent Publications

1. Halušková, J, Choi, S.-W., Friso, S., 2010: Epigenetics: a new bridge between nutrition and health. *Adv. Nutr.*, 1, 8—16. DOI:10.3945/ an.110.1004.
2. Halušková, J., Holečková, B., Staničová, J., Verebová, V., 2019. The preliminary study of pesticide Mospilan effect on the GSTP1 gene methylation in bovine lymphocytes. *Folia veterinaria* 63(2): 1-7.
3. Halušková, J, Jang, H., Serra, C., 2014: Nutrition, epigenetics and diseases. *Clin. Nutr. Res.*, 3, 1, 1—8. DOI:10.7762/ cnr.2014.3.1.1.

### Biography

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