

# The Evaluation of DNA-adduct Formation through DNA-Adductomics

**Commonly used acronym:** DNA adductomics

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## Organisation

**Name of the organisation** Ghent University (UGent)

**Department** Faculty of Veterinary Medicine, Department of Veterinary Public Health and Food Safety

**Country** Belgium

**Geographical Area** Flemish Region

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Animal health, Environment, Human health
<b>The Method is situated in</b>	Basic Research, Translational - Applied Research
<b>Type of method</b>	In chemico: DNA-Adductomics

## DESCRIPTION

### Method keywords

DNA damage

DNA adductomics

mass spectrometry

Liquid chromatography

metabolomics

### **Scientific area keywords**

analytical chemistry

cancer research

genotoxicity and carcinogenicity

red meat consumption

food safety

mycotoxins

### **Method description**

It is the goal of the DNA-adductomics to search for DNA-adducts that might be formed during interaction with contaminants. The analysis of DNA adducts is performed using ultra-high performance liquid chromatography coupled to hybrid quadrupole-Orbitrap high resolution mass spectrometry. Both the instrumental method, as well as generic extraction protocol have been extensively validated and enable both a targeted as well as an untargeted DNA adduct analysis. The metabolomics workflow consists of a sample preparation, followed by the UPHLC-HRMS analysis, after which multivariate statistical analysis will be performed to identify DNA-adducts.

### **Lab equipment**

UHPLC ;

HR-Orbitrap-MS.

### **Method status**

Internally validated

Published in peer reviewed journal

## **PROS, CONS & FUTURE POTENTIAL**

### **Advantages**

Investigation of DNA adduct formation can provide valuable information on exposure to both environmental and endogenous chemicals with genotoxic, mutagenic and/or carcinogenic properties on the one hand, and their possible

adverse health effects on the other.

DNA adduct analysis can be very useful to investigate the underlying pathways of several non-hereditary cancers, which comprise the vast majority of cancer cases.

## Challenges

Multi-step procedure => Long analysis time, extensive sample preparation ;  
Big data handling.

## REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

### References

Vanden Bussche et al (2012) Journal of Chromatography A, 1257, 25-33 L.Y.

Hemeryck et al (2015) Analytica Chimica Acta, 892, 123-131 L.Y.

Hemeryck et al (2016) Analytical Chemistry, 88, 7436-7446 L.Y.

Hemeryck et al (2017) Food Chemistry, 230, 378-387 L.Y.

Hemeryck et al (2018) Food and Chemical Toxicology, 115, 73-87

### Associated documents

[Vanden Bussche et al, 2012.pdf](#)

[Hemeryck et al, 2017.pdf](#)

[Hemeryck et al, 2018.pdf](#)

[Hemeryck et al, 2015.pdf](#)

[Hemeryck et al, 2016.pdf](#)

### Links

[Vanden Bussche et al, 2012](#)

[L.Y. Hemeryck et al, 2015](#)

[L.Y. Hemeryck et al, 2016](#)

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