

# Computational tissue-based pathology

Created on: 13-08-2019 - Last modified on: 12-11-2019

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Human health
<b>The Method is situated in</b>	Basic Research, Education and training, Translational - Applied Research
<b>Type of method</b>	In vitro - Ex vivo
<b>This method makes use of</b>	Human derived cells / tissues / organs
<b>Specify the type of cells/tissues/organs</b>	Animal and human cell and tissues

## DESCRIPTION

### Method keywords

Histopathology

immunohistochemistry

Image analysis

Machine learning

Data analysis

Biomarker validation  
Whole Slide Imaging  
Tissue microarray  
Cell block

### **Scientific area keywords**

Oncology  
Cell therapy  
Computational pathology  
Biomarkers

### **Method description**

Integrated approach for the characterization, validation and monitoring of protein biomarkers in animal tissue samples as well as on human tissue samples. The "cell-block" technique allows the study of cell lines with the same approach. The methodology involves histological and standardized immunohistochemical techniques, whole slide scanning, dedicated image analysis developments, biostatistics and data mining.

### **Lab equipment**

Automated microtome ;  
Automated immunohistochemistry system ;  
Automated tissue micro-arrayer ;  
Whole slide scanner ;  
Image analysis software packages.

### **Method status**

Published in peer reviewed journal

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

### **Advantages**

Standardized laboratory procedures and quality controls ensure reproducibility and traceability. Brightfield IHC has the advantage to preserve tissue morphology and thus antigen location at histological and cell levels. By simultaneously processing thousands of samples, the TMA technology allows standardized screening of protein expression using IHC and thus provides a very efficient way for biomarker validation. Slide scanning and image analysis enable archiving, sharing, quantitative staining characterization and colocalization analysis. Finally, data analysis enables biomarkers to be statistically validated and compared.

### **Challenges**

Time consuming ;  
Multidisciplinary expertise ;  
Standardization requirement.

### **Modifications**

In constant development of methods dedicated to new issues.

### **Future & Other applications**

Immunology ;  
Drug development (companion tests) ;  
Animal health.

## **REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION**

## References

Cfr. associated document.

## Associated documents

[List of publications.pdf](#)

## Links

[Quantitative image analysis](#)

[Tissue-based biomarker colocalization](#)

[DIAPath website](#)

## Other remarks

Method development is the result of a longstanding collaboration between the Pathology Department of the Erasme Hospital (Brussels) and the LISA (Laboratory of Image Synthesis and Analysis) of the Brussels School of Engineering (ULB).

## PARTNERS AND COLLABORATIONS

### Organisation

**Name of the organisation** Université Libre de Bruxelles (ULB)

**Department** CMMI - DIAPath

**Country** Belgium

**Geographical Area** Brussels Region

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