Computational tissue-based pathology

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Organisation

Name of the organisation Université Libre de Bruxelles (ULB)

Department CMMI - DIAPath

Country Belgium

Geographical Area Brussels Region

Partners and collaborations

Université Libre de Bruxelles (ULB), Université Libre de Bruxelles (ULB)

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research, Education and training, Translational - Applied Research
Type of method	In vitro - Ex vivo
Specify the type of cells/tissues/organs	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 ;

Multidisciplinar 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).