

Team develops groundbreaking membrane analysis tool

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To understand the complexity of cell membranes, scientists count on a panoply of technological tools that allow them to analyze microscopic images. A multidisciplinary team from VIB-KU Leuven has just added an important one to the list: 'QuASIMoDOH' is the first technique to study changes in these membranes that may be, for example, caused by cancer or neurodegenerative diseases. The method and its impact on the research community will be published in the upcoming issue of the leading scientific journal *PLOS Computational Biology*.

Quantitative Analysis of the Spatial distributions in Images using Mosaic segmentation and Dual parameter Optimization in Histograms: given this extensive name, QuASIMoDOH was conceived of in the Bio Imaging Core Leuven, a VIB facility dedicated to state-of-the-art microscopy services and tools for analyzing high-resolution images. The development was led by Prof. Sebastian Munck, VIB Expert Technologist, in close collaboration with VIB-KU Leuven researchers.

Capturing cell diversity

A specific need was at the root of QuASIMoDOH's development. Scientists at the Bio Imaging Core were struggling to quantify the distribution of receptors on a cell's membrane. Although there are already quite a few statistical tools that can be used to examine the makeup of a membrane, a lot of them only focus on clusters of proteins and lipids. In order to capture the full complexity of biological samples,

Prof. Munck and his team decided to establish a new method themselves.

Prof. Munck (VIB-KU Leuven): "Our approach describes the spatial patterns of membrane proteins and lipids in terms of deviation from a random distribution. The main difference is that QuASIMoDOH can map out polar distributions, meaning that unequal distributions such as gradients can be analyzed. The fact that our method is compatible with diverse types of cellular structuring characteristics, including polarity, has a huge impact. Cancer progression, for example, is characterized by a number of changes occurring within the cell membrane including changes in polarity. QuASIMoDOH allows us to study and understand these alterations."

Joining forces against diseases

It isn't just cancer that causes these changes—many other diseases as well as the aging process can affect the composition of membranes. The Bio Imaging Core is planning to use the QuASIMoDOH technology to support researchers - inside and outside VIB-KU Leuven - with screenings in fields ranging from neurobiology to cancer research. That is why the development team devoted special attention to the tool's accessibility: it is compatible with different microscopic technologies and has a pretty straightforward readout.

Dr. Geert Van Minnebruggen (Head Core Facilities at VIB): "Innovative tools like these are the result of pooling together technological and scientific expertise. In VIB's core facilities, including the Bio Imaging Core, expert technologists like Sebastian Munck have been joining forces with research group leaders for some time now. It is clear that the sharing of technological equipment and knowhow is becoming a prerequisite for scientific breakthroughs."

Provided by VIB (the Flanders Institute for Biotechnology)

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