



PAGés : One « Glyco-toolbox », many « Glycotools »

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Introduction

Created at the end of 2012 from the UGSF laboratory, PAGés (Platform for Glycoconjugate Analysis) is now part of the PLBS unit, supported by the University of Lille, the CNRS, the Lille University Hospital, the Pasteur Institute of Lille, INSERM, and the national platform coordination program (IBISA). Since 2020, it has been associated with the P3M platform of the Pasteur Institute of Lille, specializing in proteomics, and since 2026 with the laboratory of Dr. Fabrice Bray (UAR2638 IMEC/UAR 2014 PLBS), specializing in high-resolution mass spectrometry, in order to carry out glycoproteomic studies.

PAGés is dedicated to the analysis of glycans and glycoconjugates, regardless of their origin (microorganisms, fungi, plants, algae, animals). PAGés provides strategic and technical support in the field of structural analysis of glycans and glycoproteins to the academic and private sectors in various forms often as a scientific partner or service provider. Furthermore, the PAGés platform offers educational and personalized trainings. It provides the opportunity to study specific samples (for example, purified polysaccharides or other types of sugars isolated by oneself) in order to understand the philosophy of the study of the primary structure of glycans. To carry out these studies, PAGés has gas chromatographs equipped with FID and MS detectors, a mass spectrometer, and a laboratory dedicated to sugar chemistry (e.g. hydrolysis, chemical modification, enzymology, etc.). In addition, PAGés uses the local NMR spectrometry facilities of the UAR2638 Michel Eugène Chevreul Institute, which offer a wide range of magnetic fields (from 9.4 to 28.3 T) including HR-MAS spectrometry. PAGés is able to support all types of structural analyses, from glycomics (nanometer scale) to primary polysaccharide structure (millimeter scale), including their extraction, preparation and purification from all biological sources.

Staff box

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Chromatographies



Figure 1 : GCFID Agilent



Figure 2 : HPAEC ThermoScientific

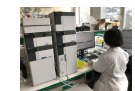


Figure 3 : HPLC Fluo, Shimadzu

Mass Spectrometry facilities



Figure 4 : LC-MS on X3000 Thermo coupled to Q-exactive



Figure 5 : GC-MS Agilent equipped with a robot



Figure 6 : FTICR Bruker

Nuclear Magnetic Resonance Facilities



Figure 7 : NMR 900 US Bruker equipped with a cryo-probehead and a sample jet for high-throughput analyses

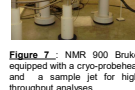


Figure 8 : NMR 800 Bruker equipped with a 4mm HR-MAS probehead for the in vivo analyses

30th GFG Congress, Vers, Lot



Administrative box

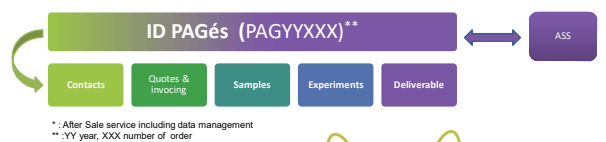
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Workflow

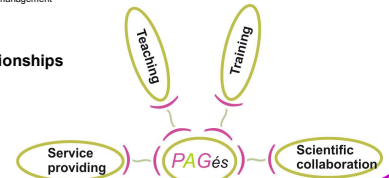


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Types of working relationships



Skill box

Chemistry-Biochemistry

PAGés has an expertise in sugar chemistry as well as hydrolysis, solvolysis, derivation, coupling etc... prior to analyses. Moreover, PAGés uses a large panel of lectins and antibodies for molecular detection and various kinds of glycoconjugates.

Chromatographies

PAGés disposes of several kinds of chromatographs (Fig 1-3) : Gas chromatographs (FID and MS detections) HPLC with UV, visible or fluorometric detections HPAEC (High Performance Anionic Exchange Chromatography)

Mass Spectrometry

PAGés disposes of various mass spectrometers (Fig. 4-6) which allows us to achieve primary structures of all kinds of glycans, to do glycan mapping, in support of NMR analyses .

Nuclear Magnetic Resonance

A close partnership with UAR2638 IMEC allows PAGés to dispose of various NMR spectrometers for liquid NMR that are matched to different magnetic fields (9.4, 18.8, 21.9 and 28.2 T, Fig 7,8) where protons resonate at 400 to 1200 MHz. Out of those, the 1200 MHz spectrometer is equipped with a high sensitivity cryogenic probe head and a sample-jet robot for high-throughput analyses. Moreover, PAGés is able to perform HR-MAS (High Resolution-Magic Angle Spinning) analyses on 18.8T spectrometer for pro- and eukaryotic cells (Bacteria, yeasts) or high molecular weight molecules. We primarily record ¹H, ¹³C and ³¹P in one- or two-dimensional experiments.

Reviewing

The staff participates in the scientific evaluation of articles for the journals Carbohydrate research, Molecules, Glycoconjugate Journal and Biomacromolecules.

Toolbox

Qualitative & quantitative structural exploration

Toolbox Development

The PAGés platform is constantly developing and adapting its IT and chemical tools. It is currently testing the commissioning of two useful tools in glycoscience. The first, GlycoTrap, facilitates the interpretation of mass spectrometry data on isolated glycans. The second involves updating the GlycoBase database, dedicated to glycans characterized primarily by NMR in our laboratory. This database is linked to a glycoBank. Both tools will be operational in 2026.

CONCLUSION

PAGés is able to achieve primary structure of all kinds of glycans as glycolipids, free and linked O-Glycans, N-glycan and polysaccharides. Moreover, our platform can resolve glycan mapping of various types of glycoproteins, cells and tissues. Finally, we can analyze complex mixtures and perform molecular mapping on these mixtures.

Toolbox

Primary structure

"When studying the primary structure of sugars, approximation is not an option."

Poster

