

# A nanotechnological entry to fine carbohydrate-protein detection through CVD graphene

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Mass spectrometry (MS) is a valuable tool for functional genomics, proteomics, and glycomics studies. In particular, the combination of MS with microarrays is a powerful technique for analyzing the activity of carbohydrate processing enzymes and for the identification of carbohydrate-binding proteins (lectins) in complex matrices. On the other hand, graphene exhibits high desorption/ionization efficiency, good conductivity and optical transparency, specifications of a high-performance component for laser desorption/ionization (LDI) platforms.[1] However, current substrates are far from ideal in terms of stability, reproducibility and effective functionalization; thus, improved performance with new materials is demanded.

In this work, the potential of Chemical Vapour deposited graphene (CVDG) as a performance component for LDI-MS analysis is reported for the first time. In particular, the use of CVDG as a platform for the preparation of glycan arrays to monitor carbohydrate-lectin interactions by MS and fluorescence is described. In this array, CVDG behaves as anchoring platform, as conductive material and as matrix-free LDI surface. Likewise, the crucial role of

chemical functionalization for the manufacture of CVDG carbohydrate microarrays is discussed.

## References

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## Figures



**Figure 1:** General representation of preparation of CVDG-based carbohydrate microarrays for dual mass spectrometry and optical microscopy readout. As example, Lewis<sup>x</sup> carbohydrate structure is represented.