Graphene-based materials for (bio)applications : the need & emerging role of Artificial Intelligence

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Last year, we celebrated the 20th anniversary of the discovery of graphene, the atomic monolayer of carbon atoms forming a honeycomb lattice in two dimensions. After two decades of intense efforts to bring the wonder material to real life applications, supported by the European Commission and member states through the Graphene Flagship Instrument, a variety of scientific knowledge has been acquired and novel technologies successfully developed and commercialized [1].

In this talk, I will overview the milestones and key achievements of the field, presenting how morphological specificities of this material (low dimensionality, transparency, flexibility, record electronic and thermal mobilities, chemical reactivity, biocompatibility and so on) have enabled for instance the design of innovative (bio)devices (such as ultrasensitive and selective biosensors, brain implants and scaffold for neuronal growth and activity monitoring). The possibilities for further disruptive advances in health and biotech ecosystems afforded by the emergence of Artificial Intelligence (AI) tools will be also discussed.
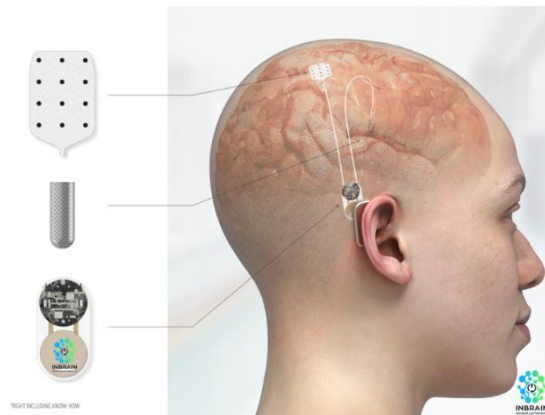

Figure 1: Schematic of a brain implants made from graphene-based composites and developed by ICN2 spinoff InBrainNeuroelectronics (https://inbrain-neuroelectronics.com/)

1. Reference

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