

Graphene and 2D materials: from cancer research to antivirals

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Abstract

Graphene and 2D materials have attracted a lot of attention in biomedical sciences since their discovery, especially in cancer research. Thanks to their extraordinary properties, we have been using them to diagnose cancer, delivery chemotherapeutics or exert anti-tumor activities through various mechanisms. The COVID-19 pandemic has shown the success of nanotechnology in combating with viruses in different applications including the development of vaccines or personal protective equipment (PPE). Among these nanotechnology-based systems, two-dimensional (2D) materials with intrinsic physiochemical properties can efficiently favor antimicrobial activity and maintain a safer environment to protect people against pathogens. During this presentation, the antiviral studies performed using 2D materials will be discussed by shedding light on how these materials can reduce the chance of infection effectively. 2D materials can be used alone or combined for the disinfection process of microbes, antiviral or antibacterial surface coatings, air filtering of medical equipment like face masks, or antimicrobial drug delivery systems. At the same time, they are promising candidates to deal with the issues of conventional antimicrobial approaches such as low efficacy and high cost. Specific attention will be also provided in order to suggest new approaches to develop and design novel antimicrobial agents using 2D materials for combating global infectious diseases in the future.