Non-Invasive Wearable Patch for Non-Enzymatic Glucose Monitoring Using Fluorescent Graphene Quantum Dots

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This study proposes a non-invasive and user-friendly approach for non-enzymatic glucose sensing using graphene quantum dots (GQDs) integrated into a wearable patch. The optical properties of GQDs or oxidized GQDs were investigated using density functional theory computations, and their response to glucose adsorption was demonstrated. Oxidized GQDs were chosen for experimentation due to their aqueous solubility. Varying concentrations of glucose were tested by exposing them to GQDs, and it was observed that the height of the absorbance peak decreased with increasing glucose concentration. To build a prototype device, GQD sensors were integrated into a wearable patch with a microfluidic system. The current prototype showed a change in fluorescence under UVC light. This gadget has the potential to provide a non-invasive, compact, and user-friendly solution to accurate glucose monitoring.

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