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# Immunosensing procedures for carcinoembryonic antigen using graphene and nanocomposites

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## Abstract

Two-dimensional (2D) graphene,  $sp^2$ -hybridized carbon, and its two major derivatives, graphene oxide (GO) and reduced graphene oxide (rGO) have played an important role in immunoassays (IAs) and immunosensing (IMS) platforms for the detection of carcinoembryonic antigen (CEA), an implicated tumor biomarker found in several types of cancer. The graphene family with high surface area is functionalized to form stable nanocomposites with gold nanoparticles (AuNPs) and electron mediators. The capture anti-CEA antibody (Ab) with high density can be anchored on AuNPs of such composites to provide remarkable detection sensitivity, significantly below the level found in normal subjects and cancer patients.

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