

## The preparation of Graphene oxide microcomplex for the biomedical application

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In the present invention, a functional material in which a catechol material that induces a synergistic effect on adhesion through numerous interactions including hydrogen bonding and covalent crosslinking with a gelatin protein has been developed. In particular, among the catechol-based substances, gallic acid, which has anti-inflammatory and antibacterial properties, was used in this study. Gelatin and gallic acid were combined by a crosslinking method using EDC/NHS as a crosslinker, and this was confirmed by FT-IR, <sup>1</sup>H NMR, and fluorescence. In order to add an additional antibacterial function to the gallic acid-gelatin complex, graphene oxide (GO) /Cu nanocomposite was encapsulated with gelatin complex. As a result, it has been proven that it has an antimicrobial effect against Gram-negative bacteria (E.coli) even with a small amount, and has biocompatibility in human cells (HDF) even at a concentration having antimicrobial activity. In the future, we intend to develop a biocompatible hemostatic and disinfectant material with cell/tissue adhesion, anti-inflammatory, and antimicrobial functions using the produced graphene oxide microcomplex.