



## **Cytotoxic activity of a novel TNF- related apoptosis inducing ligand (TRAIL) fusion protein on colon cancer cells**

**Shima Lotfollahzadeh<sup>a</sup> , Elahe sadat hosseini<sup>a</sup> , Maryam Nikkhah<sup>a</sup>**

a . Department of Nanobiothechnology, Faculty of Biological Sciences, Tarbiat Modares University

### **ABSTRACT**

Tumor necrosis factor (TNF) related apoptosis inducing ligand (TRAIL), has received considerable attention as a promising anti-tumor agent due to its ability to induce apoptosis selectively in a wide variety of tumor cells while sparing vital normal cells. However, its therapeutic efficacy has been hampered by its extremely short half-life and weak pharmacokinetic profile. To overcome these obstacles we have developed a novel TRAIL - fusion protein to benefit self-assembly properties of the fusion part and the fusion protein was then conjugated by non-covalent interactions with blue-luminescent graphene quantum dots (GQDs) synthesized by Hydrothermal method.

The physical properties of the conjugates were probed by UV-Vis, fluorescence and circular dichroism spectroscopies and the obtained results proved interaction between fusion protein and GQDs.

Potential anti-tumor efficacy of TRAIL – fusion proteins and TRAIL – fusion protein /GQD complexes was investigated in human colon cancer cell line (HT-29) by MTT assay. Conjugates showed markedly cytotoxicity in mentioned cell line.

According to the results, our designed nano-complex could be considered as a promising therapeutic potential agent for antitumor biotherapy and an important step toward successful clinical applications.

**Key words:** TRAIL –fusion protein, self-assembly, graphene quantum dot , apoptosis

