

Cytotoxic Effects and Induction of Apoptosis of Cisplatin Loaded on Polybutyl Cyanocryl Nanoparticles on the Growth of Human Cellular Cancer Cell Line In Vitro

Leila Kanaani^{a*}, Nafiseh Bahadori Birgani^b, Azim Akbarzadeh khiyavi^c

Authors' Affiliation:

^a Department of Toxicology, Faculty of Pharmacy, Islamic azad University, Shahreza Branch, Isfahan, Iran

^b Department of National Nutrition & Food Technology Research, Shahid Beheshti University of Medical Sciences, Tehran, Iran

^c Department of Pilot Nanobiotechnology, Pasteur Institute of Iran, Tehran, Iran

Abstract Presenter:

Leila Kanaani: Department of Toxicology, Faculty of Pharmacy, Islamic azad University, Shahreza Branch, Isfahan, Iran
E-mail: lk_rd@yahoo.com

*Correspondence:

Leila Kanaani: Department of Toxicology, Faculty of Pharmacy, Islamic azad University, Shahreza Branch, Isfahan, Iran
E-mail: lk_rd@yahoo.com

Abstract

Glioma is the most common primary tumor of the brain and CNS tumors and 80% of the malignant brain tumors. The average life time of patients with glioblastoma is 14.6 months due to various therapeutic options, including surgery, radiotherapy and chemotherapy. In recent years, biodegradable polymer nanoparticles have attracted attention as pharmaceutical carriers. Polymeric nanoparticles can be formed by polymerization of monomers or polymers. On the other hand apoptosis or a planned cell death is a regulated normalized cell suicide process that enables the living being to maintain the number of cells and eliminate unwanted cells that threaten existing survival. So, in this study, the effect of cytotoxicity and induction of apoptosis nanocisplatin was studied. To date, various carriers have been used to deliver cisplatin. We plan to load cisplatin on polybutyl cyanacrylate nanoparticles and compare its effect with the standard drug in the carcinoma cell of the brain C6 and examine its properties in the laboratory environment.

Introduction: Cancer is an important issue in modern medicine and is the most common cause of death after cardiovascular disease. Meanwhile, brain cancer is one of the most common causes of cancer deaths among women and men, with the third highest incidence among other cancers. Therefore, chemotherapy drugs aimed at preventing abnormal cell proliferation in certain tissues of the body and, on the other hand, inducing apoptosis in tumor cells are considered important candidates for cancer treatment. Due to the role of apoptosis induction, cisplatin can be used as anticancer therapeutic agent.

Methods and Results: The cytotoxic effect and induction of apoptosis cisplatin on brain cancer were investigated. The cytotoxicity of cisplatin by MTT was evaluated on brain cancer cell line (C6). Finally, to evaluate the effect of nanosilver platinum on the apoptosis process, a staining method with a Hawkish color 33258 was used by fluorescent microscope. The results of this study showed that nano-cisplatin had more cellular cytotoxic activity than free drug and the effect of induction of apoptosis with nano-drug was investigated.

Conclusions: Our results showed that synthesized nanorods can be used as a new nano-medicine to replace chemotherapy, and the effect of inducing apoptosis by nano-nutrition has been shown to provide favorable results.

Key words: Cisplatin, Cell cytotoxic effect, Induction of apoptosis, Brain cancer

Grants: We are grateful to our colleagues in the pilot nanotechnology department of Pasteur Institute of Iran who helped us with this research.

