promotion and progression, can be innovative therapeutics. In the previous study, we showed anti-invasiveness effect of brittle star saponin. Lee *et al* in 2011 explored the anti metastatic properties of polysaccharide from *Asterinapectinifera* against breast cancer cells and demonstrated starfish polysaccharide as promising anti tumor agent.

Conclusion: Consequently, the extracted polysaccharide from brittle star, which exerted cytotoxicity on cervical cancer cells can potentially prevent cervical cancer progression and migrations.

Keywords: Cervical cancer, Apoptosis, Polysaccharide, Brittle star, Metastasis

Conflict of interest: The authors declare no conflict of interest.

Acknowledgements: The authors would like to thank Research Center for Animal Development Applied Biology, Islamic Azad University, Mashhad, Iran

Quantum dot-based technologies for cancer cell imaging, diagnosis applications and therapy

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Extended Abstract

Introduction: The important modality applied in appropriate determination of cancer therapy is cell imaging. The current imaging approaches used in cancer screening and diagnosis application have been classified as x-ray, computed tomography, ultrasound, radionuclide imaging and MRI. However, major limitation associated with current imaging techniques such as lack of sufficient sensitivity for detecting small number of cancer cells in primary level of metastasis and not appropriate efficient for determining cancer cell-surface markers, demand improvement strategy in current imaging methods and development of efficient imaging probes for highly sensitive and specific detection. Furthermore, the unavailability of simple, quick and sensitive cancer diagnostic techniques has become the main driving force for Quantum Dots (QDs), a new class of fluorescent probes with fascinating optical electronic properties, to the era of bioimaging.

The unique optical properties of QDs compared with organic fluorescent compound such as rhodamine is the main reason for impressive progress of QDs in *in vivo* cancer imaging filed. This review focuses on the unique optical properties of QDs over organic dyes fluorophores. The most prominent properties of QDs were defined as their large absorption coefficient across a wide spectral range, high photostability and intense fluorescent emission and most importantly, their size- and composition-tunable emission from visible to infrared wavelengths. The light photostability of the emitted fluorescence over several months guarantees the imaging repeatability and also symmetric and much narrow QD emission peak compared with rhodamine 6G, decreases peak interference and surely will increases the reliability and accuracy of cell imaging. On the other hand, QDs can be efficiently excited in a broad wavelength range which allows more wavelengths for exciting the QDs-tags and thus routine wavelength such as UV-light (330 nm) can excite QDs for emitting visible light. Furthermore, these advantages provide exceptional conditions for detecting several target cells without any emission interference simultaneously by several kinds of QDs. The release of cadmium ions can be considered as a disadvantage because this heavy metal is toxic for living cell but their coating, by promoting stability, can restrain the release of cadmium. The several studies in cell lines indicated that cell growth under normal media did not affect by QDs.

Due to their ideal properties, rapid development of QD-based technology for Bioimaging is not

unexpected and following global efforts, nowadays numerous QD-based imaging methods exist for addressing diagnostic issues. On the other hand, the development of biomolecules conjugation area to different tags such as quantum dots, provide background for progressing and promoting the QDs Biomarkers for targeting the tumor cells and quantitative measurement of molecular targets.

Key words: Quantum dot, photostability, fluorescent, sentinel lymph node, metastasis

Role of exosomes in cancer

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Extended Abstract

Introduction: Exosomes are naturally occurring membrane-enclosed vesicles 30–100 nm in diameter that are produced under both physiological and pathological conditions and by the most cell type of hematopoietic and non hematopoietic origin, such as mast cells, macrophages, antigen-presenting cells (APCs), B and T lymphocytes, platelets and dendritic cells (DCs) and tumor cells, as well. Analyzing by electron microscopy, they usually show a "cup-shaped" morphology.

Exosomes are recognized as mediators of cell-to-cell communication and involve specific proteins from endosomes, the plasma membrane and the cytosol from the parental cells. Cellular origin of exosomes is the main factor in determining their protein content and enrichment of certain molecules such as targeting/adhesion molecules (e.g., lactadherin), membrane trafficking molecules (annexins), cytoskeleton molecules (tubulin), chaperones (Hsp90) and cytoplasmic enzymes (GAPDH). The protein composition of exosomes is different in tumor cells compared to nonmalignant cells. These structures have been isolated from various body fluids, including semen, blood, urine, saliva, breast milk, amniotic fluid, ascites fluid, cerebrospinal fluid and bile.

Tumor-derived exosomes (TDEs) containing tumor antigens, immunosuppressive proteins and functional RNAs and they have pleiotropic biological functions: I- The intercellular swapping of proteins and genetic materials through exosomes play a significant role in cell-to-cell communication and induce phenotypic changes within the tumor microenvironment. The interaction between exosomes and target cells is mediated by surface-expressed bioactive lipids, growth factors and membrane receptors. Exosomes contained mutated mRNA transcripts and DNA fragments promote growth and proliferation of many primary and metastatic cancers. Besides, TDEs involve distinct microRNA profiles in many cancers.

II-TDEs have been suggested as a new cancer vaccine. Possessing tumor rejection antigen with elevated immunogenicity, exosomes derived from IL-2 and IL-18 gene-modified tumor cells could induce specific antitumor responses. So, these exosomes expressing cytokines as adjuvants expose a modern strategy of exosomes-based vaccines. Using this strategy, it is possible to accommodate the adhesion molecules, cytokines and chemokines into exosomes to obtain cancer vaccines supplying sufficient immune responses in future trials.

III- recent studies definitely represent that some tumor cell lines produce exosomes expressing death ligand such as functional FasL and TRAIL which can induce the apoptotic pathways in the activated T cells both in vitro and in vivo. Similarly, TDEs inhibit cytotoxic