In-silico anti- cervical cancer potential of a quercetin

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Abstract: Cervical cancer is known as a serious malignancy that affects women can considerably threaten their health. A wide range of molecular mechanisms and genetic modifications have been involved in cervical cancer pathogenesis making it difficult to develop effective therapeutic platforms. Hence, the discovery and development of new therapeutic approaches are required. Nutraceuticals from medicinal plants could potentially be used alone or in combination with other medicines in the treatment of various cancers such as cervical cancer. Among various nutraceuticals, quercetin has shown great anti-cancer, antioxidant and anti-inflammatory properties. In-silico analysis has revealed that quercetin possesses a cytotoxic impact on cervical cancer cells. Diverse types of cervical cancer responsible proteins were analyzed under Autodock vina software tools such as PTEN, NKCR, BRCT7 and BRCT8, Chek1, BRCA, Rad51D, BRCA1, HSP27, and HSP70. Proteins study revealed the maximum anti-cancer effects on cervical cancers. Quercetin's roles in cervical cancer treatment were annotated employing systems biology with strong evidence. A detailed study and investigation of pathways associated with cervical cancer revealed several targets whose crystal structure can be used for molecular docking against Quercetin. Molecular docking via AutodocVina revealed that the binding energies of compounds associated with the p53 pathway showed great affinity towards Quercetin, the best candidate among them being DHODH protein, the inhibition of which helps in the activation of tumor suppressor protein in the p53 pathway. This study reveals the use of quercetin in pharmaceutical and nutraceutical industries to combat cervical cancer.

Keywords: Cervical cancer, Nutraceuticals, Quercetin, In-silico analysis.

Nano-nutraceutical formulations for the delivery of antiviral drugs: a promising solution for the treatment of viral infections

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Abstract: Global pandemics are serious threats to human life. While well-established and characterized viruses such as The human immunodeficiency virus (HIV) and Hepatitis are still killing millions of people, the emerging viruses are also problematic and have caused several serious outbreaks in recent years, such as the Severe Acute Respiratory Syndrome-Coronavirus (SARS-CoV) in 2002–2003, Swine influenza A (H1N1) in 2009, and Ebola Haemorrhagic fever outbreak in 2014 which has caused thousands of deaths worldwide. The widespread problem of a 2019-novel coronavirus (SARS-CoV-2) strain outbreak has prompted a search for new drugs to protect against these viral infections in the future. It is necessary to immediately investigate this due to the mutation of the viral genome and there being no current protective vaccines or therapeutic drugs. Nano nutraceutical strategies can be considered a powerful tool to enhance the effectiveness of nutraceuticals as antiviral drugs, which are usually associated with solubility and bioavailability issues. Consequently, high doses and frequent administrations are required, resulting in adverse side effects. To overcome these limitations, various nanomedicine platforms have been designed. This review focuses on the protein-based nanoparticles for the delivery of approved nutraceuticals. A brief description of the main characteristics of nanocarriers is followed by an overview of the most promising research addressing the treatment of the most important viral infections. The activity of antiviral nutraceuticals can be enhanced by nanoformulations. Hence nanoparticles can affect the fate of the encapsulated nutraceuticals, sustained-release kinetics, enhanced bioavailability, modified pharmacokinetics, and negligable side effects. Besides, the physicochemical properties of nanocarriers can enable their capability to target specific sites and to interact with virus structures. In this regard, nanomedicines can be considered an opportunity to enhance the therapeutic index of antivirals. Efficacy, safety, and manufacturing issues need to be carefully assessed to bring this promising approach to the clinic.

Keywords: Antiviral drugs, nano-nutraceuticals, nanoparticles, targeted delivery.