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# World Drug Delivery Summit

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### Telomerase enzyme as a molecular marker in hepatocellular carcinoma

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Hepatocellular Carcinoma (HCC) is a common cause of death in Egypt and worldwide. Hepatitis C Virus (HCV) was proven to be the most important risk factor. Telomere hypothesis of cellular aging and tumorigenesis explains major part in pathogenesis of HCC. So, in this study, we are aiming to investigate the use of telomerase enzyme in diagnosis of HCC. A group of 80 patients were divided into two groups, first group that has HCC and second group that has chronic HCV infection. Assay of telomerase enzyme activity was done in all patients using Telomere Repeat Amplification Protocol (TRAP–ELISA). This was correlated with full clinical, laboratory and histo-pathological evaluation of the patients. Results showed that telomerase activity was detected in 100% of HCC cases with a mean level of 136.75. On the other hand, telomerase activity was detected in 86.67% of HCV cases with a mean level of 16.38. There was a significantly higher telomerase activity in HCC group than HCV group (p value<0.001). Results also showed no correlation between enzyme level and tumor size, although higher levels were detected in late cases. Also the elevation of the enzyme levels in HCC with HCV infection compared to HCC cases without HCV ($p<0.05$) may predict more aggressive course of this cancer. The diagnostic validity test showed that best cut-off level of the enzyme is 9 with sensitivity of 98% and specificity of 60% and efficacy of 83.8%. In conclusion, assay of the Relative Telomerase Activity (RTA) may be a sensitive tumor molecular marker in diagnosis of HCC regardless sex, child class or tumor size. Finally, we recommend strict follow up of chronic liver patients with high RTA to detect any malignant transformation. Also, more studies are needed to study the validity of using serum RTA instead of tissue RTA to decrease the need of liver biopsy in HCC patients.

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### PEGylated monoolein-based liquid crystalline nanoparticles of aloe-emodin: Optimization, *in-vitro* characterization and anticancer activity on human breast cancer cell line

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Aloe-emodin (AE) is a herbal drug with potential anticancer activity against many tumors. However, its hydrophobicity handicaps its efficient parenteral administration for chemotherapy. PEGylated Monoolein-based liquid crystalline nanoparticles (LCNPs) of AE were first fabricated for enhanced water solubility and anti-tumoractivity.Optimization of various factors was performed based on particle size (PS) and zeta potential (ZP). Phase behaviour and physicochemical properties were characterized through polarized light microscopy, TEM, DSC, IR and XRD. Potential of PEGylation to reduce hemolytic toxicity of Monoolein was also assessed. Serum stability of LCNPs was evaluated in fetal bovine serum (FBS). Cytotoxicity and cellular uptake studies were assessed on MCF-7cell line. The fabricated PEGylated LCNPs showed PS of 190 nm ± 3.13 and ZP of -49.9±0.9 mV. PEGylation strategy could reduce MO hemolysis from 50% ±4.34 to 3%±1.04, and increase LCNPs stability. IC50 for AE-LCNPs was 3.18 and 4.3 folds lower compared to free AE after 24 and 48 hr, respectively. The cellular uptake of AE in LCNPs was about 3.21 folds higher than free AE after 24 hr incubation. In conclusion, PEGylated LCNPs could successfully enhance solubility, cellular uptake and cytotoxicity of AE and increase MO hemocompatibility, serving as a promising nanocarrier for efficient parenteral delivery of AE in cancer therapy.

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