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Possibility of In-House Preparation of Liver Cancer Diagnostic Kits Based on AFP ELISA Test

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Abstract

Our research was focused on the study of possibility of preparation the AFP Enzyme-Linked Immunosorbent Assay (ELISA) diagnostic kits using tumor marker protein named alpha-fetoprotein (AFP) for hepatocellular carcinoma (HCC), the most frequent cancer in Mongolia. It is important to prepare the diagnostic kits for detection of liver cancer early, simply and inexpensively in this country. Detection of the marker in human sera would significantly help successful therapy, since the tumor could be tackled at an early stage in its development, often before metastases and other consequences. Therefore, level of AFP in sera would give possibility to control the progression of liver cancer. The micro titer plates were prepared for AFP ELISA diagnostic kits, and their sensitivity and specificity were 94.4% and 0.4, respectively. Statistically, there were no differences between our prepared micro titer plates for AFP ELISA diagnostic kits and commercially available ones ($t = 0.071$, $P = 0.94$, df = 24). It was concluded that there is a possibility to prepare AFP ELISA diagnostic kits using our prepared micro titer plates in house.

Key words: AFP, hepatocellular carcinoma, ELISA, kit

Introduction

Liver cancer is the sixth most commonly diagnosed cancer, and the third most common cause of death from cancer worldwide with incidence rate of 626,162 cases and mortality of 598,321 cases per year (Jeffrey *et al*., 2009 & http://www-dep.iarc.fr).

The incidence of HCC in Asia is high, particularly in Eastern and South Eastern Asia (Vanessa & Chung, 2007; Teo & Fock, 2001; David & Dirk, 2008). As it was reported by the International Agency for Research on Cancer, the highest rate of HCC occurred in Mongolia (Office for National Statistics, 2008; Welsh Cancer Intelligence and Surveillance Unit, 2008; ISD Cancer Information Programme, 2008; Northern Ireland Cancer Registry and Cancer Incidence and Mortality, 2008; http://www-dep.iarc.fr).

For instance, Oyunsuren *et al*. (2006) noted that 35.3% of all newly registered cancer cases were liver cancers, with an incidence rate of 51.3 per 100,000 populations in the period of 2000-2005, and the National Cancer Research Center of Mongolia reported that incidence rate of 54 per 100,000 populations in 2007 (National Cancer Research Center of Mongolia, 2007).

The main factors associated HCC are hepatitis C viruses (HCV) and hepatitis B viruses (HBV) infections, dietary aflatoxin B1 exposure and intake of alcohol in worldwide (Navas, 2007; Hwang & Hassan, 2009; Oyunsuren *et al*., 2006). Oyunsuren *et al*. (2007) defined most commonly occurring genotypes relating to hepatitis viruses in Mongolia: 1b genotype among HCV, D genotype among HBV and 1 genotype among HDV.

AFP is the most common used tumor marker for monitoring the response to therapy (usually chemotherapy) of HCC (Beastall *et al*., 1991; Aburano *et al*., 1980; Czauderna & Perilongo, 2004; Mashayekhi *et al*., 2005; Gerald, 2001).

Prior to metastasis, most cancers can be cured by localized treatments, such as surgery or radiotherapy. Unfortunately, about 70-80% of cancers has already metastasized by the time of diagnosis, and therefore, cannot be cured by surgery alone (Cooper, 1992).

The best approach to reduce the morbidity and