The Effects of Testosterone on KAI-1/CD82 Gene Expression Level in Colon Cancer Cells

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***Abstract*:** *Various studies have shown that sex steroid hormones affect on cancer cells at cellular and molecular level. The aim of this study was to investigate the effects of testosterone on KAI-1/CD82 gene expression in HT29 colon cancer cells. In this laboratory-experimental study, cell lines were exposed to cytotoxic dose (1mg/ml) of testosterone. Real time PCR was used to evaluate Kai gene expression level. The data were statistically analyzed between groups using ANOVA. KAI-1/CD82 gene expression level did not significantly change in HT29 cells exposed to 1mg/ml of testosterone. It can be concluded that cytotoxic effect of testosterone on colon cancer has not triggered anti-metastasis Kai1 gene expression.*

Keywords: *Testosterone, KAI-1/CD82*

1. Introduction

Testosterone is a hormone that plays a key role in carbohydrate, fat and protein metabolism. It has been known for some time that testosterone has a major influence on body fat composition and muscle mass in the male [1].

CD82, also known as KAI-1, structurally belongs to tetraspanin family while categorised as metastasis suppressor gene on functional grounds. KAI1/CD82 is localized on cell membrane and form interactions with other tetraspanins, integrins and chemokines which are respectively responsible for cell migration, adhesion and signaling [2].

Colorectal cancer (CRC), also known as bowel cancer and colon cancer, is the development of cancer from the colon or rectum (parts of the large intestine). Signs and symptoms may include blood in the stool, a change in bowel movements, weight loss, and feeling tired all the time. Most colorectal cancers are due to old age and lifestyle factors with only a small number of cases due to underlying genetic disorders Some risk factors include diet, obesity, smoking, and lack of physical activity Dietary factors that increase the risk include red and processed meat as well as alcohol [3],[4].

2. Material and methods

In this laboratory-experimental study, cell lines were exposed to cytotoxic dose of testosterone. Real time PCR was used to evaluate Kai gene expression level. GAPDH gene was used as housekeeping gene. The data were statistically analyzed between groups using ANOVA.

3. Results

Figure I shows that KAI-1/CD82 gene expression level did not significantly change in HT29 cells exposed to 1mg/ml of testosterone

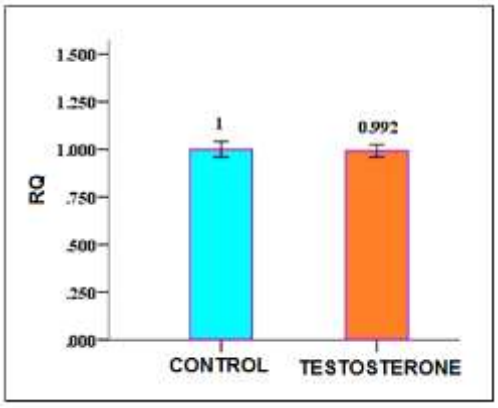

Fig. 1. KAI1/CD82 gene expression level in testosterone receiving HT29 cells compared with control group.

4. Discussion

The cytotoxic dose of testosterone did not affect on antimetastasis Kai gene expression level. Studies have shown that testosterone is associated with cancers including prostate cancer [5]. Estradiol and testosterone levels may play important roles in the development of breast cancer in older women. [6] Higher levels of calculated serum free testosterone are associated with an increased risk of prostate cancer [7].

However, certain studies show that testosterone therapy did not have a consistent effect on prostate-specific antigen levels[8]

The addition of testosterone to conventional hormone therapy for postmenopausal women also does not increase and may indeed reduce the hormone therapy-associated breast cancer risk—thereby returning the incidence to the normal rates observed in the general, untreated population[9]

Recently, it has been reported that testosterone membrane signaling regulates actin reorganization and induces pro-apoptotic responses in colon tumor cells [10].

Antimetastasis CD82 may stabilize or strengthen E-cadherin-dependent intercellular adhesion by regulating beta-catenin-mediated signal transduction on cancer cells, and consequently, prevent cancer cells from seceding from the primary tumor site[11] KAI-1 expression is induced by activating protein kinase C even in metastatic prostate cancer cell lines in which its expression was significantly down-regulated. KAI-1 expression was enhanced in a dose-dependent manner by PMA, and its induction is at least in part due to transcriptional activation [12].

Testosterone may promote the development of Colorectal cancer(CRC) via a number of pathways, which may place males at greater risk. Testosterone holds promise as a potential biomarker in CRC risk prediction[13].

We have shown that cytotoxic dose of testosterone did not affect on KAI1 gene expression level. In contrast to our finding, some studies have shown that lower serum total testosterone is associated with lymph node metastases in a radical prostatectomy cohort study [14]. Serum testosterone also plays an important role in the metastatic ability of castration resistant prostate cancer [15]. In addition, it has been shown that testosterone dietary supplement has probably harmful effect on prostate cancer metastasis [16].

5. Conclusion

It can be concluded that cytotoxic effect of testosterone on colon cancer has not triggered anti-metastasis Kai1 gene expression.

6. Acknowledgment

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