Available online at www.annclinlabsci.org

Transforming Growth Factor Beta 1 (TGF-β1) in Thyroid Cancer Patients: a View from the Peripheral Blood

Snezana Zivancevic-Simonovic[1], Olgica Mihaljevic[1], Dusan Mihajlovic[2], Olivera Milosevic-Djordjevic[1], Zorica Jovanovic[1], Ljiljana Mijatovic-Teodorovic[1,3], and Miodrag Colic[2]

[1]Faculty of Medical Sciences, University of Kragujevac, Kragujevac, [2]Institute for Medical Research, Military Medical Academy, Belgrade, and [3]Clinical Center Kragujevac, Kragujevac, Serbia

Abstract. Transforming growth factor beta (TGF-β) plays an important role in many pathophysiological conditions, including cancer. The level of TGF-β in patients with differentiated thyroid cancer (DTC) has not been examined so far. The aim of this study was to measure TGF-β concentration in serum samples and in PHA -stimulated whole blood culture *in vitro* and to analyze possible associations of TGF-β1 levels with leukocyte, lymphocyte and platelets counts, the histological type of thyroid cancer, and stage of disease. TGF-β1 was measured in 22 DTC patients and 20 healthy controls using the duoSet ELISA Development kit for human TGF-β1. The concentration of TGF-β1 in serum samples from both groups correlated positively with the platelet counts. There was no statistically significant difference in the serum concentrations of TGF-β1 between DTC patients and control subjects, but PHA stimulated whole blood cultures of DTC patients produced less TGF-β1 than those from controls. Additional studies are needed to determine the significance of these *in vitro* findings.

Introduction

Transforming growth factor beta (TGF-β) is a potent pleiotropic cytokine ubiquitously distributed in tissues and synthesized by many different cells [1]. In mammalians, three isoforms are found: TGF-β1, TGF-β2 and TGF-β3 [2,3]. It is well known that TGF-β plays an important role in numerous physiological and pathophysiological processes. Thus, TGF-β is involved in the regulation of development, differentiation, and homeostasis of nearly all cell types and tissues [4]. Also, a role for TGF-β in a number of pathophysiological conditions, including atherosclerosis [5], fibrotic disease [6] and cancer [7], has been shown. The regulation of tumorigenesis by TGF-β signalling might be dependent upon its ability to influence the biology of tumor cells or the functions of immune cells [8]. The activity of TGF-β on tumor cells has been attributed to growth inhibition, maintenance of genomic stability and stimulation of apoptosis [9], while effects on the immune system may be mediated by changing the function of cells, such as T cells, NK cells, neutrophils, monocytes and macrophages [8].

Address correspondence to Snezana Zivancevic Simonovic, Faculty of Medical Sciences, Svetozara Markovica 69, 34000 Kragujevac, Serbia; phone: +38134306800; fax: +38134306800, ext 121; e mail: snezana@medf.kg.ac.rs

The level of TGF-β has been determined in serum samples from patients with gastric and colorectal cancers [10-13], pancreatic cancer [14], nasopharyngeal carcinoma [15], breast cancer [16-18], ovarian cancer [19] and parathyroid cancer [20], but not so far in thyroid cancer patients. The aim of this study was to analyze the concentrations of TGF-β1 in patients with differentiated thyroid cancer (DTC). TGF-β1 concentration was measured in serum samples and supernatants from phytohemagglutinin (PHA)-stimulated whole blood cultures *in vitro*. In addition, possible associations of TGF-β1 levels with leukocyte, lymphocyte and platelet counts, the histological type of thyroid cancer, and stage of disease were also evaluated.

Materials and Methods

Study population. The study was planned according to ethical guidelines following the Declaration of Helsinki. The institutional review committee approved our study protocol (number 01-5868) according to local biomedical research regulations. All patients and control subjects gave informed consent prior to enrollment in the investigation.

The study population included 22 differentiated thyroid cancer patients (17 females and 5 males) of mean age 53.00±14.34 years. Among the 22 DTC patients, 15 (68.2%) had papillary carcinoma and 7 (31.8%) had the

0091-7370/16/0400-401. © 2016 by the Association of Clinical Scientists, Inc.