

Effect of thiazolidinediones – PPAR γ agonists on hormones secretion by cells of human adrenocortical cancer *in vitro*

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INTRODUCTION

Adrenocortical carcinoma (ACC) is characterized by the high malignancy of the lesion, poor prognosis and high mortality rate. The surgical treatment and available chemotherapy have generally low efficacy so the search for new therapeutic options is still necessary. Some research indicated that thiazolidinediones (TZDs) - synthetic ligands of peroxisome proliferators-activated receptor γ (PPAR γ) have oncostatic action on neoplasm, including endocrine tumours [1-3]. Moreover, previous investigations have shown the inhibitory effect of TZDs on the growth of human adrenocortical cancer [4-6]. Therefore, in the present study, we decided to examine whether TZDs influence the secretion of adrenocortical hormones.

MATERIAL AND METHODS

The experiment was conducted on human adrenocortical carcinoma line H295R. The cancer cells were treated with two TZDs - rosiglitazone (ROS) or pioglitazone (PIO) at the concentrations 10^{-8} - 10^{-5} M for three days. In the culture medium, we measured the levels of the following hormones: aldosterone, cortisol, dehydroepiandrosterone sulfate (DHEAs), androstendione and 17-hydroxyprogesterone by using chemiluminescence immunoassay and radioimmunoassay.

RESULTS

Both TZDs at most of the concentrations have increased DHEAs level. Besides, PIO stimulated cortisol secretion by cancer cells at all tested concentrations and ROS increased cortisol level only at the highest concentration. However, TZDs did not change significantly the levels of other adrenal hormones.

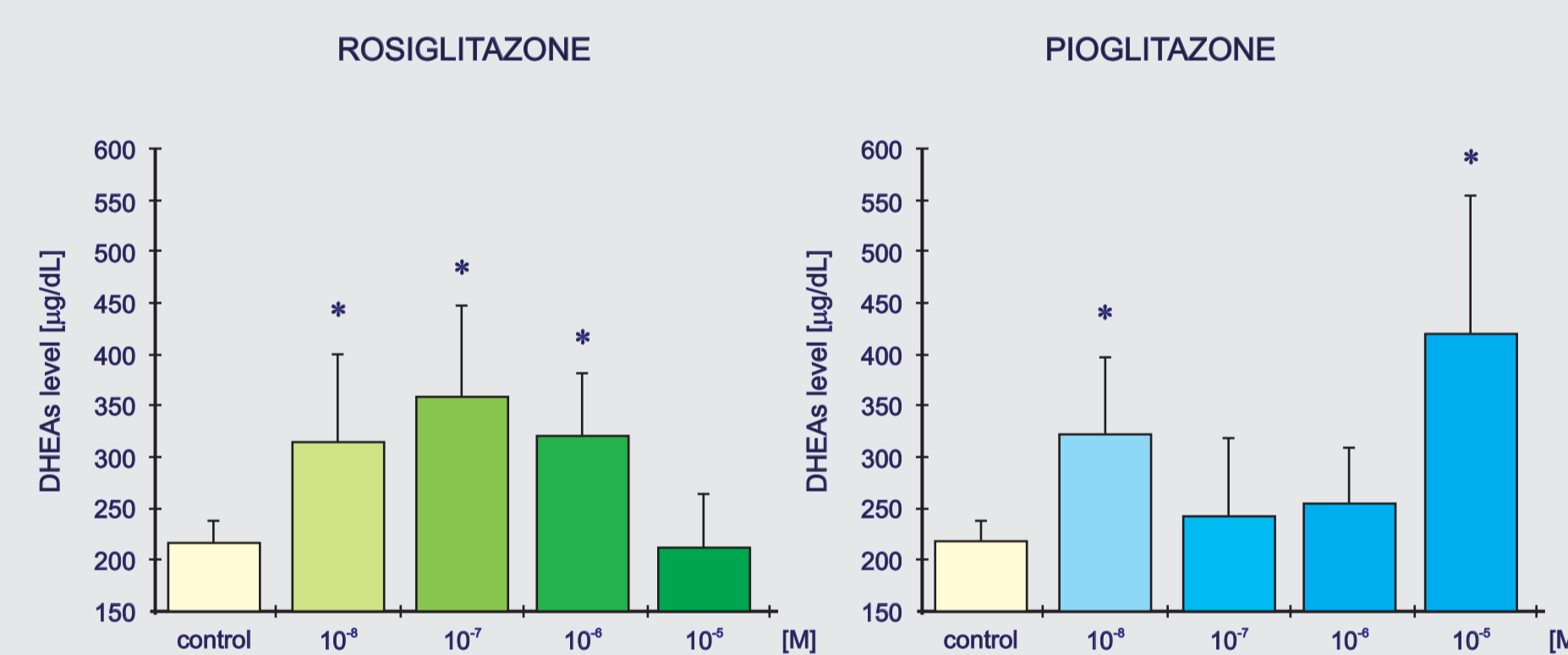


Fig. 1.

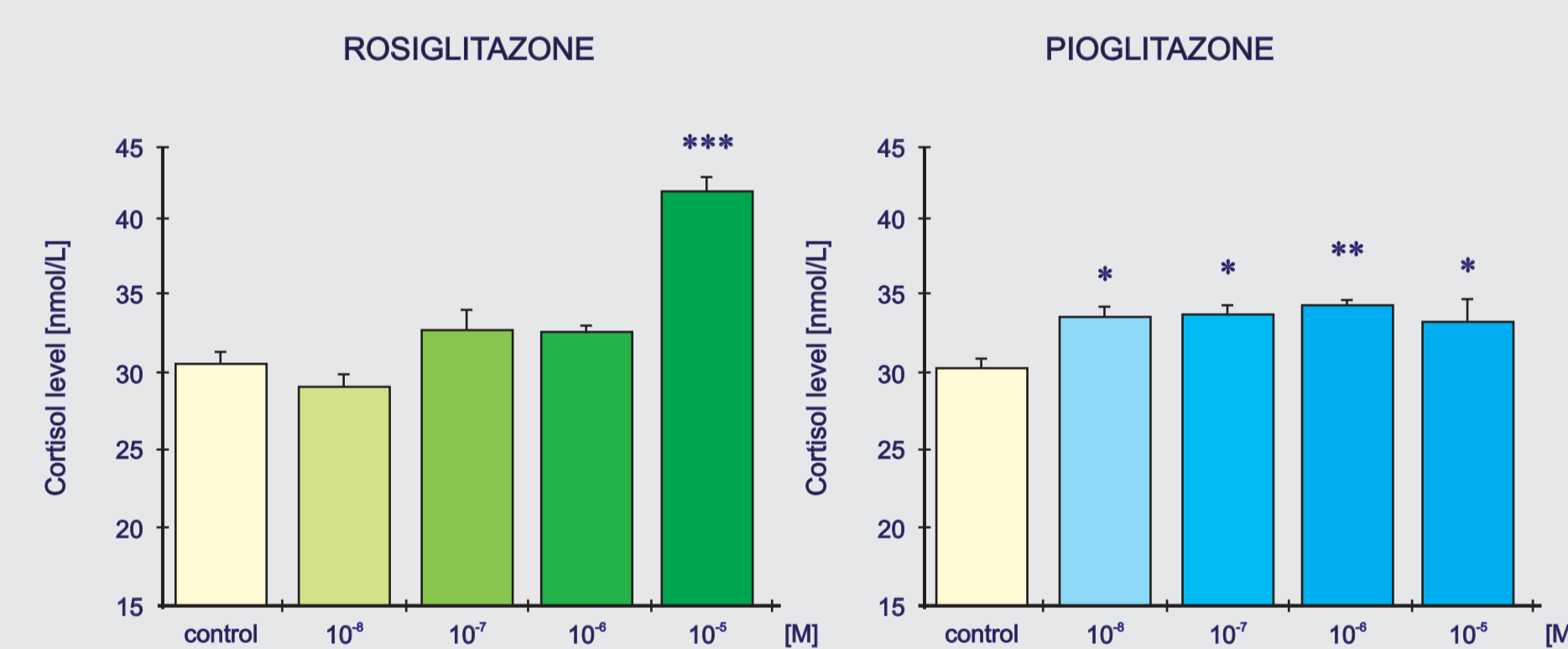


Fig. 2.

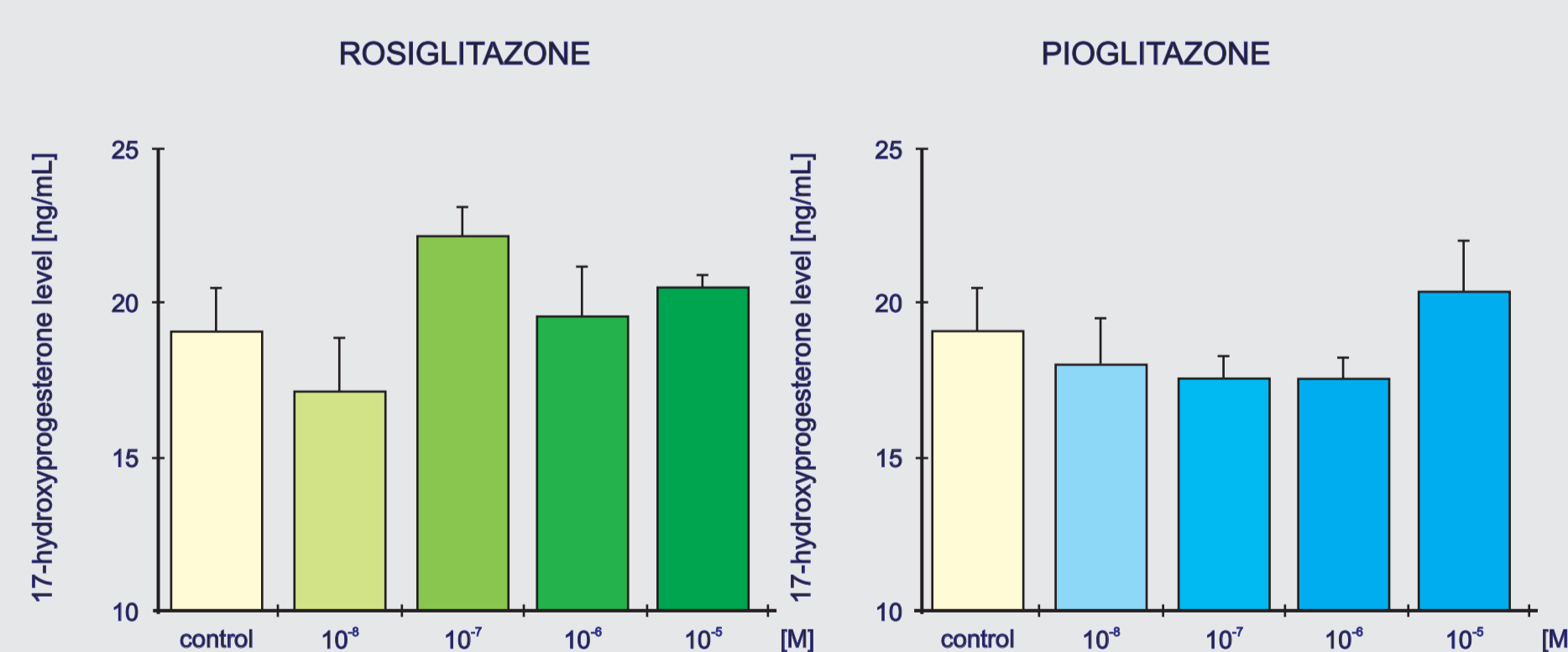


Fig. 3.

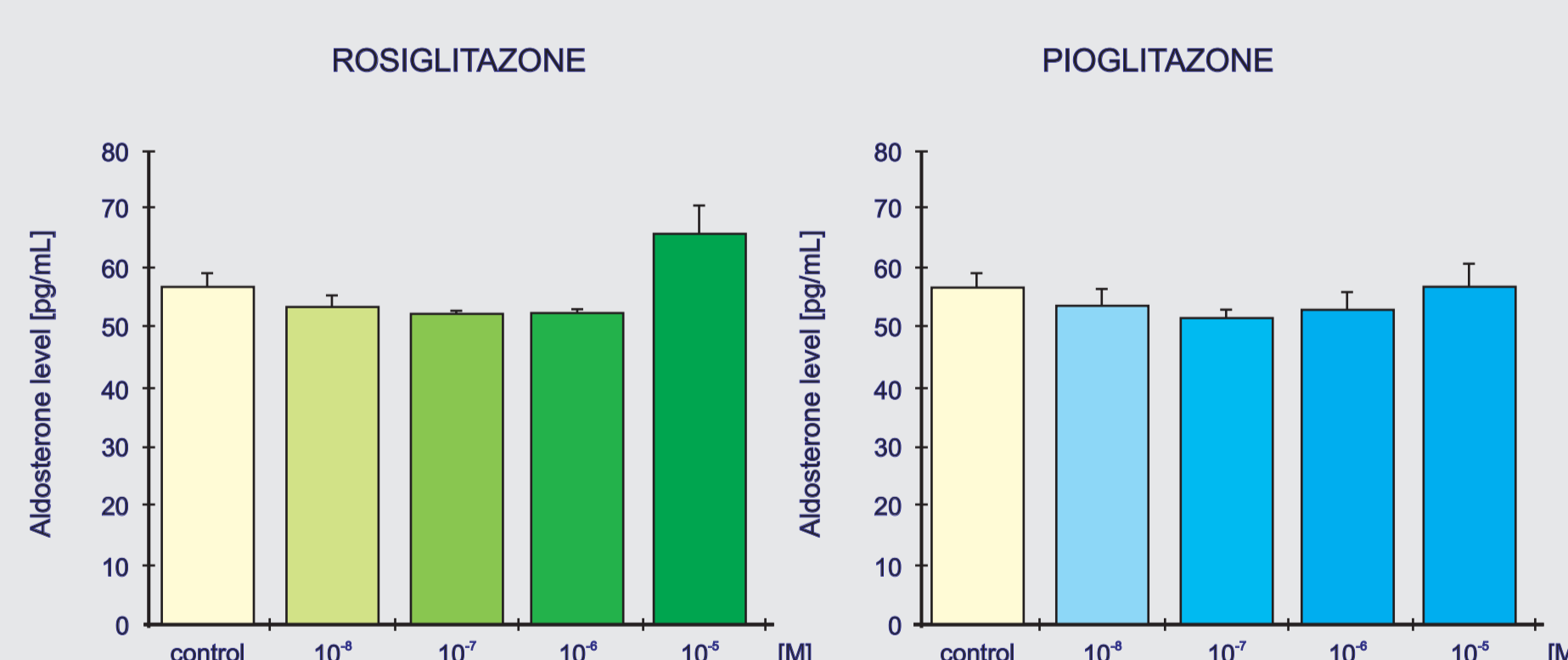


Fig. 4.

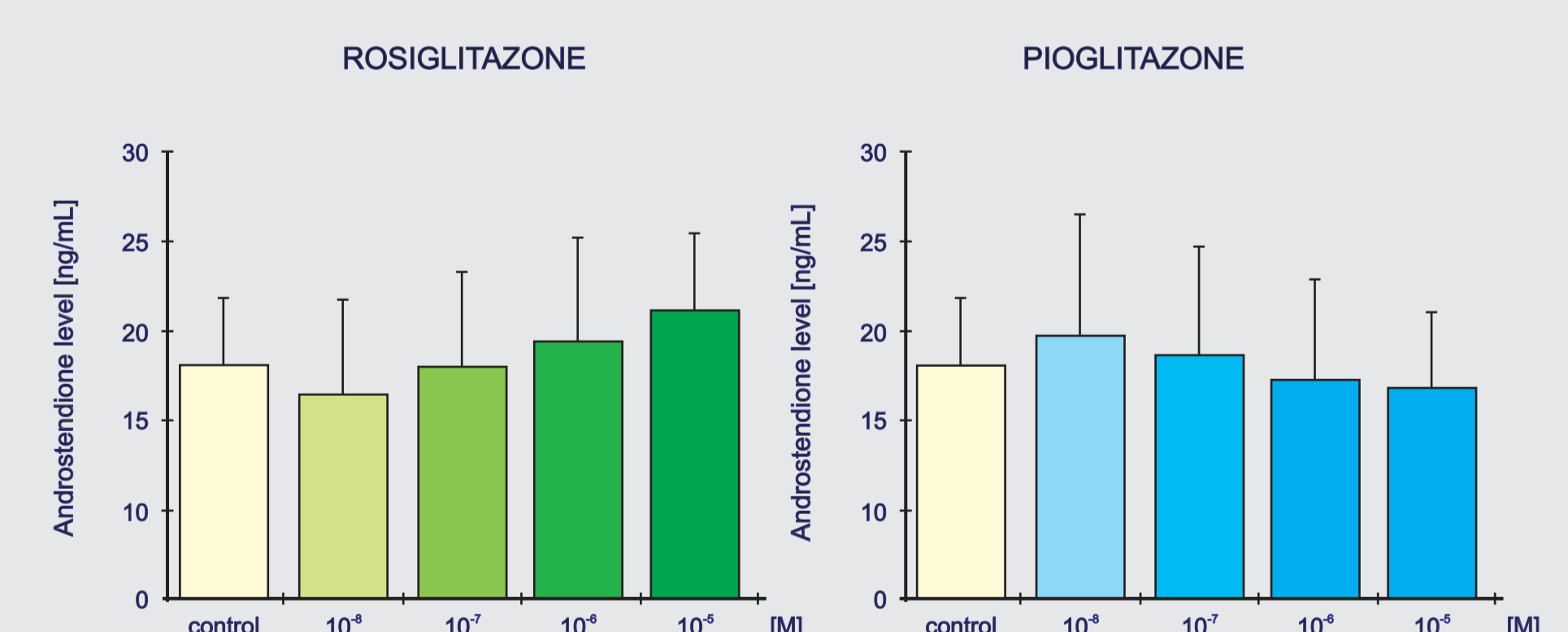


Fig. 5.

Fig. 1-5. Effect of rosiglitazone and pioglitazone on the hormones secretion by cells in H295R line.

* - $p < 0,05$; ** - $p < 0,01$; *** - $p < 0,001$.

CONCLUSION:

Agonists of PPAR γ , despite the inhibitory effect on the growth of adrenocortical carcinoma, do not reduce the hormonal activity of cancer cells. So it can be presumed that oncostatic action of TZDs and their influence on the synthesis of adrenal hormones are unrelated and depend on a different intracellular mechanism.

References:

- Sertznig P, Seifert M, Tilgen W et al. Present concepts and future outlook: function of peroxisome proliferator-activated receptors (PPARs) for pathogenesis, progression, and therapy of cancer. *J Cell Physiol* 2007; 212: 1-12.
- Winczyk K. Receptory aktywowane proliferatorami peroksyosomów gamma – ich znaczenie w karcinogenezie i terapii nowotworów; stan wiedzy po piętnastu latach badań. *Folia Medica Lodziensia* 2007; 34: 117-140.
- Winczyk K, Kumer-Radek J, Gruszka A et al. Effects of rosiglitazone–peroxisome proliferators-activated receptor gamma (PPARgamma) agonist on cell viability of human pituitary adenomas *in vitro*. *Neuro Endocrinol Lett* 2009; 30: 107-110.
- Farruzzi P, Ceni E, Tarocchi M et al. Thiazolidinediones inhibit growth and invasiveness of the human adrenocortical cancer cell line H295R. *J Clin Endocrinol Metab* 2005; 90: 1332-1339.
- Cantini G, Lombardi A, Piscitelli E et al. Rosiglitazone inhibits adrenocortical cancer cell proliferation by interfering with the IGF-1R intracellular signaling. *PPAR Res* 2008; 2008: 904041.
- Luconi M, Mangoni M, Gelmini S. Rosiglitazone impairs proliferation of human adrenocortical cancer: preclinical study in a xenograft mouse model. *Endocr Relat Cancer* 2010; 17: 169-177.