

# The effects of endocrine disruptors on the in vitro hormone regulation of rat pituitary

Z. Valkusz<sup>b</sup>, M. Radács<sup>a</sup>, Z. Molnár<sup>a</sup>, R. Pálföldi<sup>a</sup>, K. Sepp<sup>b</sup>, A. Laszló<sup>a</sup>, T. Alapi<sup>c</sup>, M. Gálfi<sup>a</sup>

<sup>a</sup>Department of Environmental Biology and Education of Gyula Juhasz Faculty of Education, <sup>b</sup> 1 st Department of Medicine, <sup>c</sup>Department of Inorganic and Analytical Chemistry of Faculty of Science and Informatics, University of Szeged, Hungary

## Introduction

The endocrine disruptor compounds (EDCs) /e.g. monurone (MU), diurone (DU), phenurone (PU), chlorobenzenes (CIB)/, may cause disorders in the neuroendocrine homeostatic balance. These agents may alter the normal hormone synthesis and/or release, and other cell functions.

## Objectives

Our aim was to investigate the effects of EDCs on the normal hypophysis regulation; particularly the arginine-vasopressine (AVP) activated adrenocorticotrop hormone (ACTH) release from adenohypophysis cells and the monoamine activated AVP release from neurohypophysis cells.

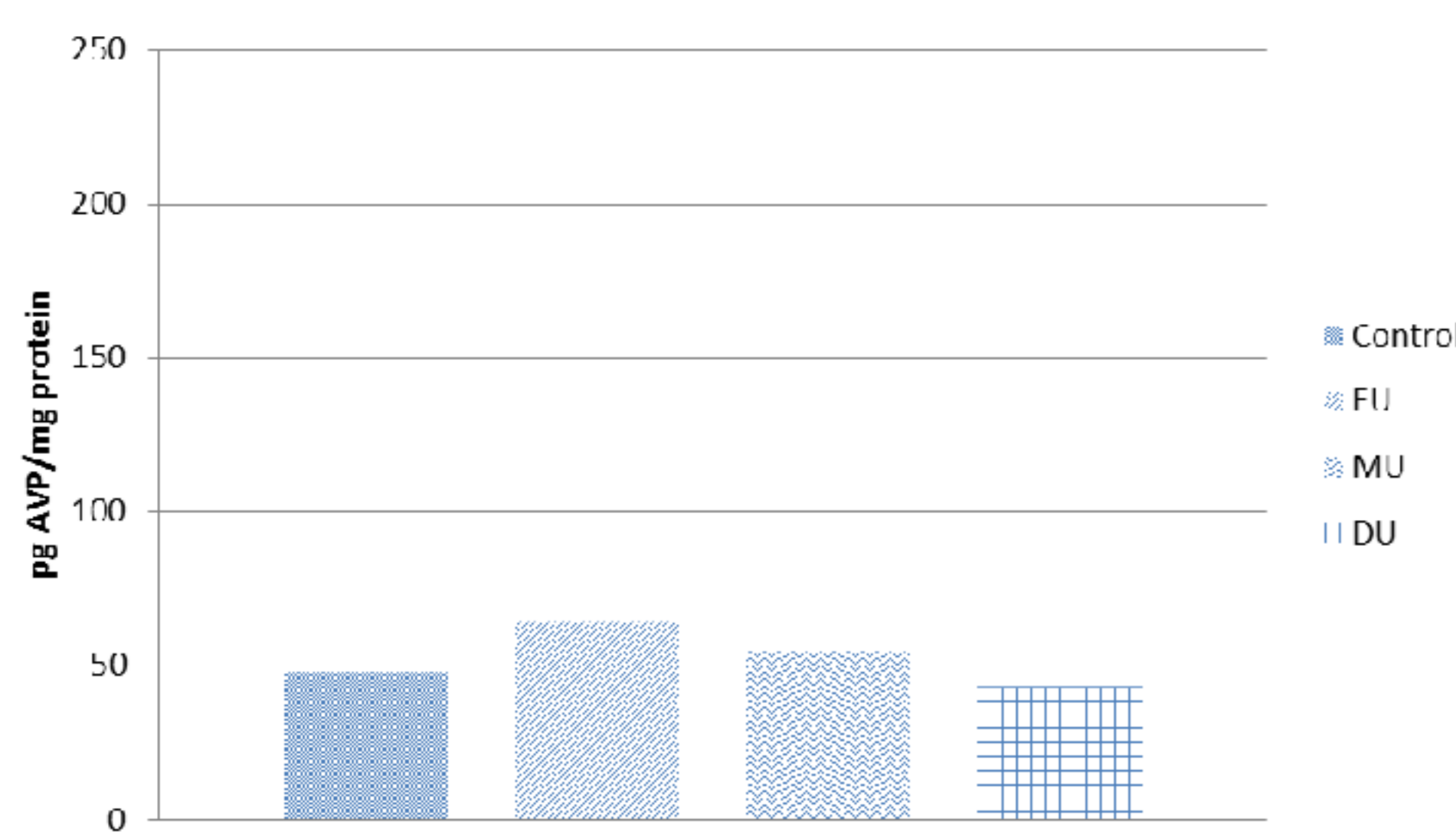
## Methods

Primary monolayer cell cultures were prepared from normal Wistar rat (♂) hypophyses. The separated adenohypophysis (AdH) and neurohypophysis (NH) tissues were dissociated by enzymatic (0,2% Trypsine, 0,02µg/ml Collagenase mix, 0,1 mM DNA-se I and II) and mechanic (neylon-blutex filter d=40nm) methods. The washed, standardized and dispersed cells were transplanted on collagen coated plastic plate in DMEM (with+10% FCS +10 IU/ml [PEN+STREP]). The 14 day-old cultures were standardized for ACTH in AdH,-for AVP in NH cultures and for cell-viability. The ACTH and AVP contents of the endocrine cells were checked by immunohistochemical methods and the hormone release function was challenged with an aspecific osmotic stimulus (30 mM K<sup>+</sup>). During the experiment, we also used control (untreated) cultures. Further cultures were treated *-I.*: 1 hour 0,1 µg/ml EDCs (CIB, MU, DU, PU) /N=8/; *-II.*: 10<sup>-6</sup>M monoamines (epinephrine: A; serotonin: 5-HT) alone /N=8/; *-III.*: the stimulant agents (AVP, monoamines) in combinations with EDCs /n=8/.

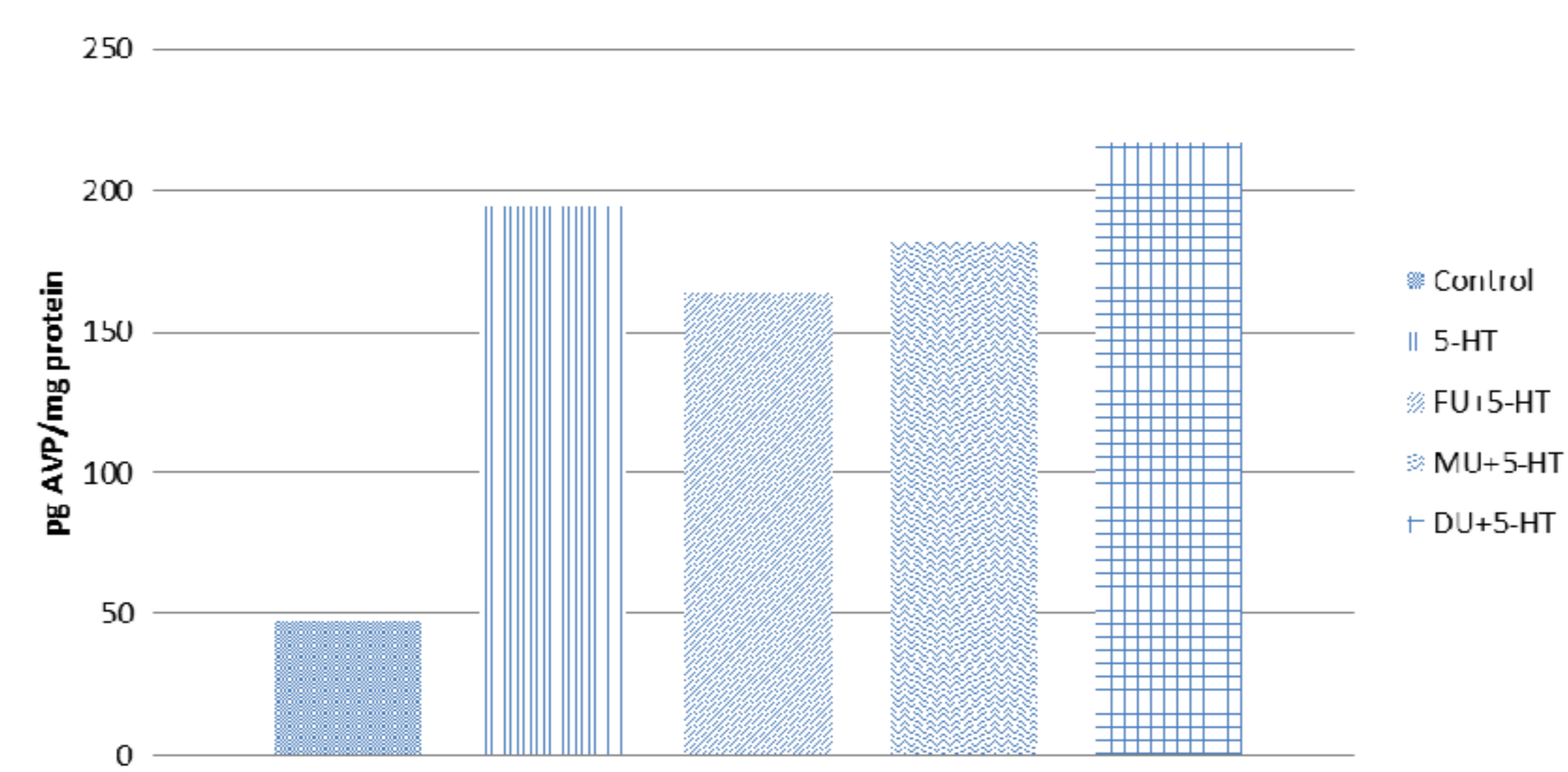
The hormones: ACTH and AVP were measured from supernatant media with radioimmunoassay (RIA), and protein content was measured with Protein Assay system. The data were analysed by ANOVA.

## Results

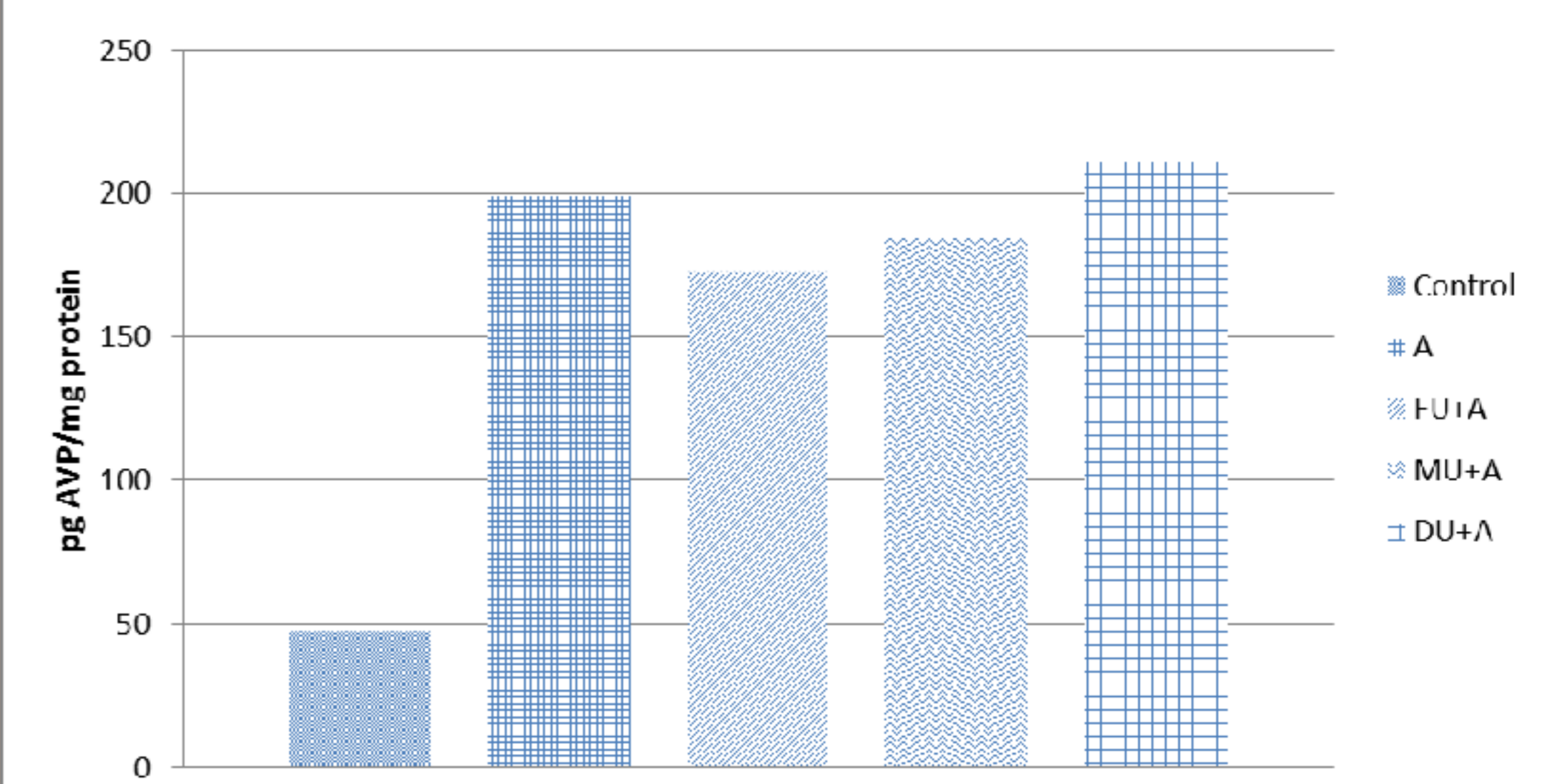
The effects of urones on the AVP release of NH cell cultures



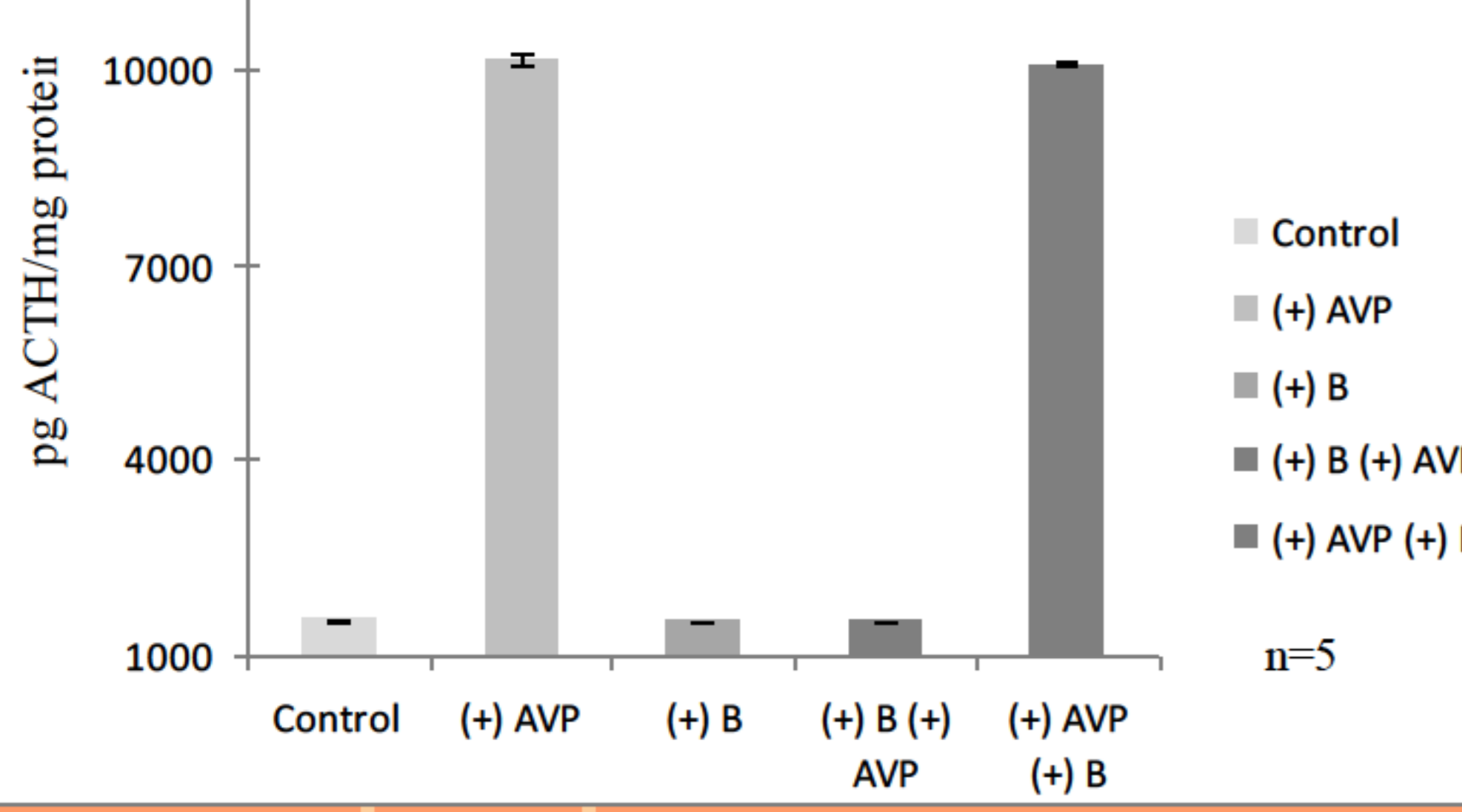
The effects of urones on the 5-HT induced AVP released on the NH cell cultures



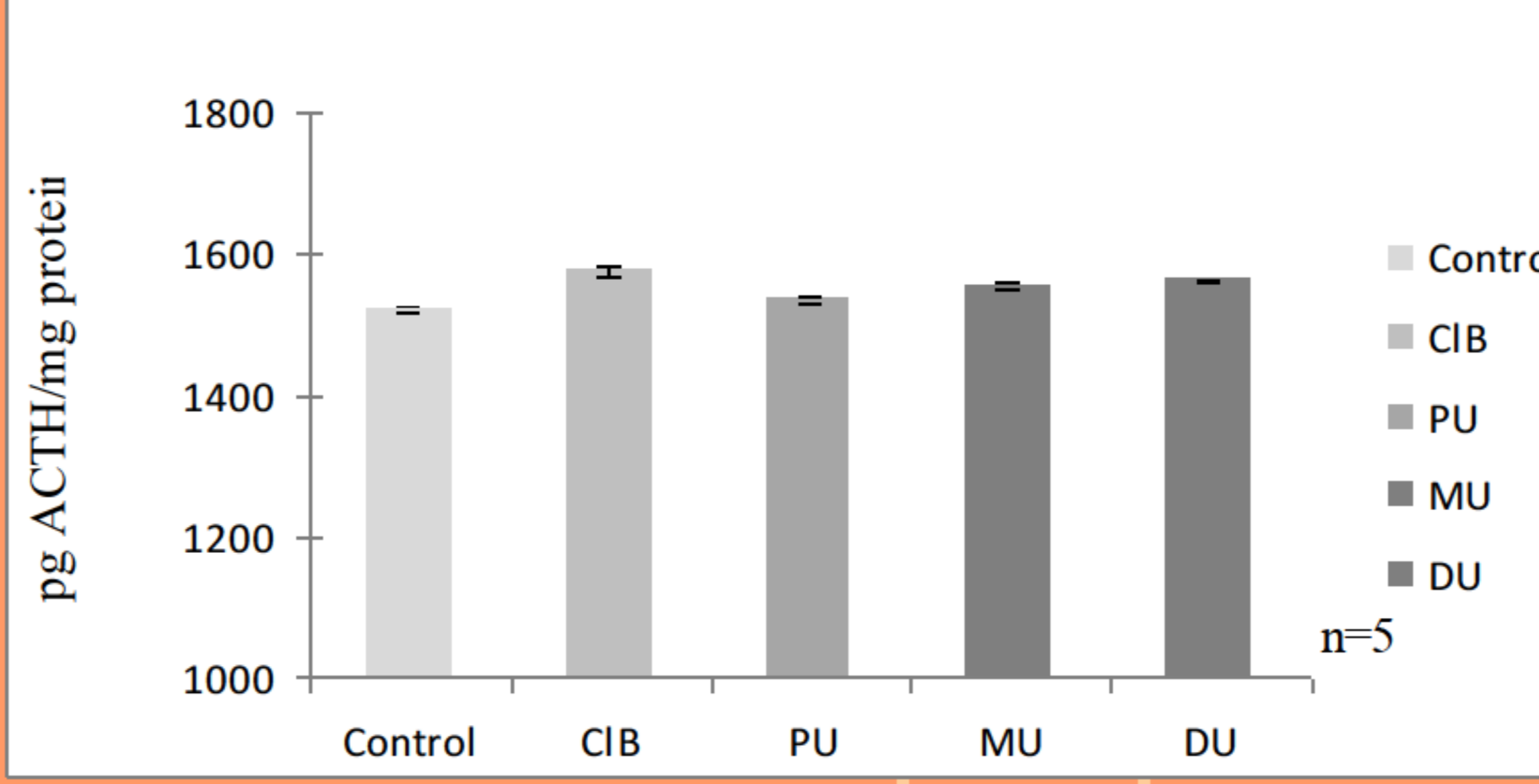
The effects of urones on the A induced AVP released on the cell cultures



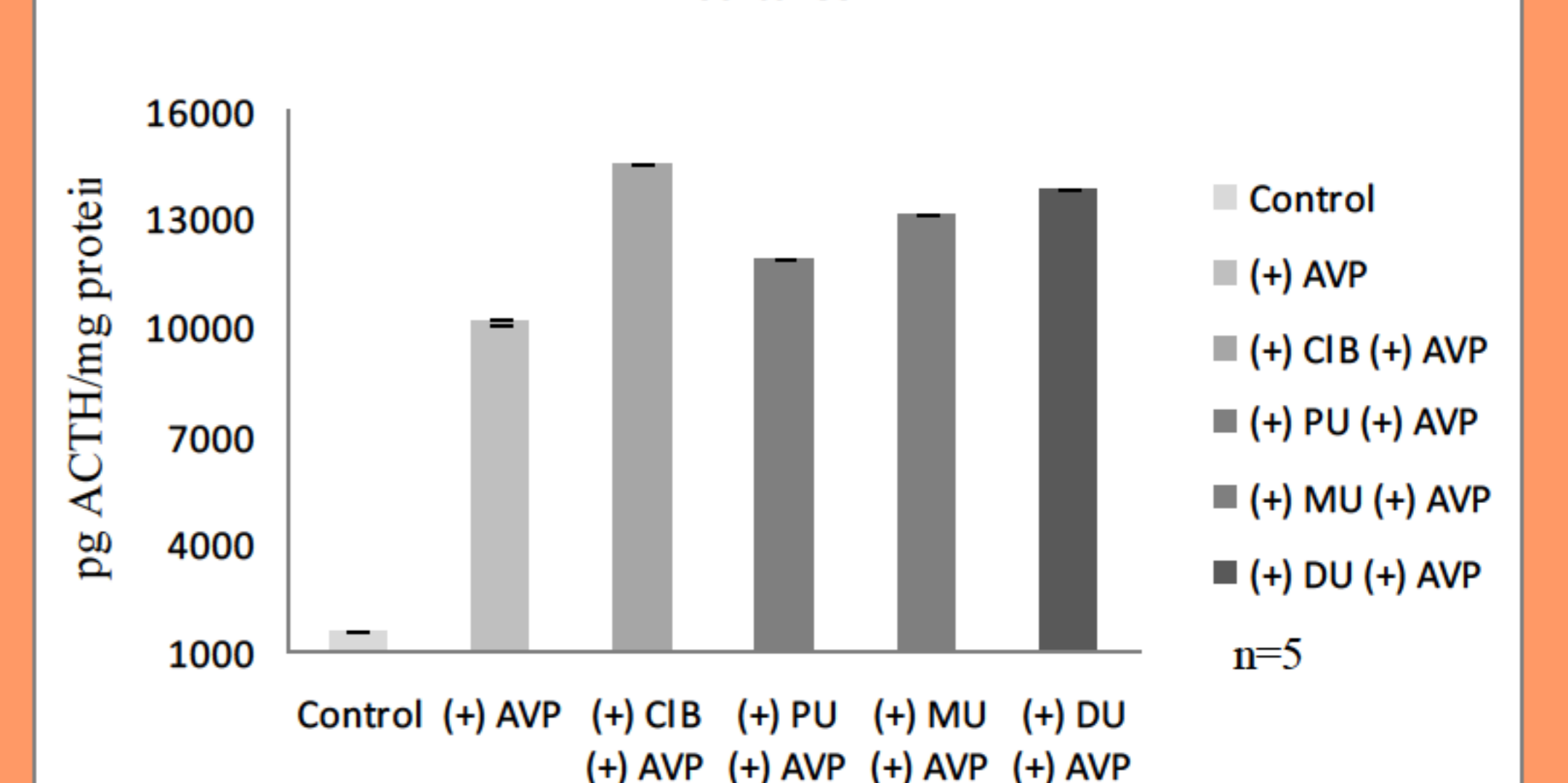
Regulated release of ACTH on the normal adenohypophysis cell culture



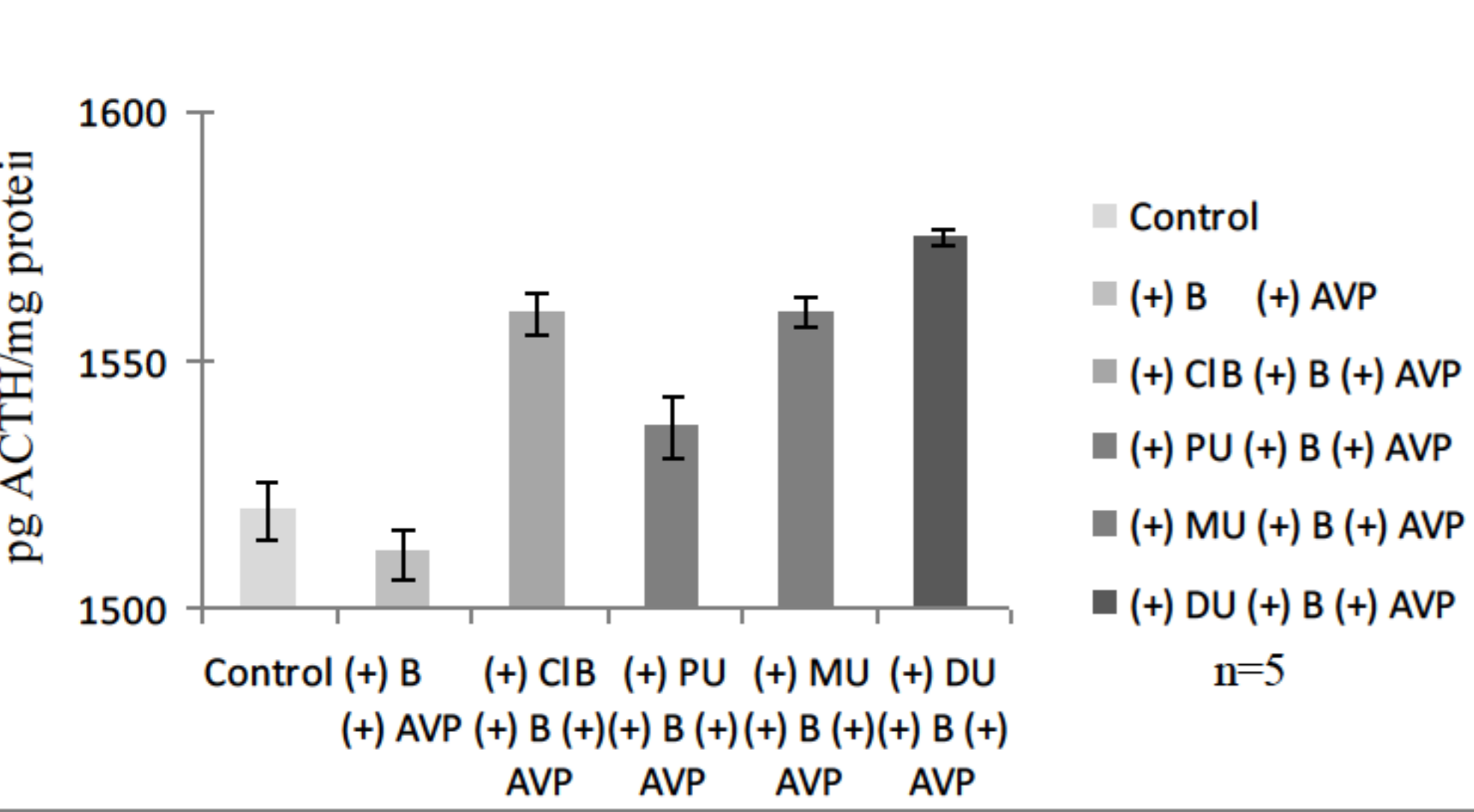
Effects of EDC on ACTH release of AdH cell cultures



Effects of EDC on AVP activated ACTH release on AdH cultures



Effects of EDCs on negative feedback of ACTH release on AdH cell cultures



## Conclusions

The above results demonstrate that EDCs can moderate the pituitary cell regulation in vitro. The AVP and monoamine regulated hormone release from hypophyseal cells was influenced variably depending from the EDCs applied.

Nagyeri G, Valkusz Z, Radacs M, Ocsko T, Hausinger P, Laszlo M, Laszlo FA, Juhasz A, Julesz J, Galfi M. Behavioral and endocrine effects of chronic exposure to low doses of chlorobenzenes in Wistar rats. *NEUROTOXICOLOGY AND TERATOLOGY* 34:(1) pp. 9-19. (2012)

Valkusz Z, Nagyeri G, Radacs M, Ocsko T, Hausinger P, Laszlo M, Laszlo FA, Juhasz A, Julesz J, Palfoldi R, Galfi M. Further analysis of behavioral and endocrine consequences of chronic exposure of male Wistar rats to subtoxic doses of endocrine disruptor chlorobenzenes. *PHYSIOLOGY AND BEHAVIOR* 103:(5) pp. 421-430. (2011)

Supported by: TÁMOP 4.1.1.C-12/1/KONV; TÁMOP-4.2.2.A-11/1/KONV-2012-0035; TÁMOP-4.2.4.A/2-11/1-2012-0001

## References

