

The effects of endocrine disruptors on the in vitro AVP hormone regulation

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OBJECTIVES

Endocrine disruptor compounds (EDCs) are substances that interfere with the synthesis, secretion, transport, binding, action or elimination of natural hormones in the body that are responsible for development, behavior, fertility and maintenance of homeostasis⁽¹⁾. EDCs - as a part of the environmental load - are homeostatic disruptors can be found in the household, in the industry and in our environment⁽²⁾. Uron herbicides are persistent materials with resistance to the biotransformation and low hydrophilicity. Their occurrence are characteristics in the surface waters and in the articles of food.

AIM, METHODS

Our aim was to investigate the effects of EDCs featuring uron herbicides /fenuron (FU), monuron (MU), diuron (DU)/ on the normal endocrine regulation; particularly the monoamine activated arginine-vasopressin (AVP) release from neurohypophyseal cells.

The primary monolayer cell cultures were the neuroendocrine regulated models. These were prepared from the pituitary of normal Wistar rats (). The separated neurohypophysis (NH) tissues were dissociated by enzymatic (trypsin, collagenase, DNA-se I; II) and mechanic methods. The 14 days old cultures were standardized for cell-viability and AVP content in NH cultures. The NH cells were tested for functionally AVP hormone volume by aspecific osmotic stimulus 30 mMol [K⁺]. Untreated cultures were used as controls while further cultures were treated with:

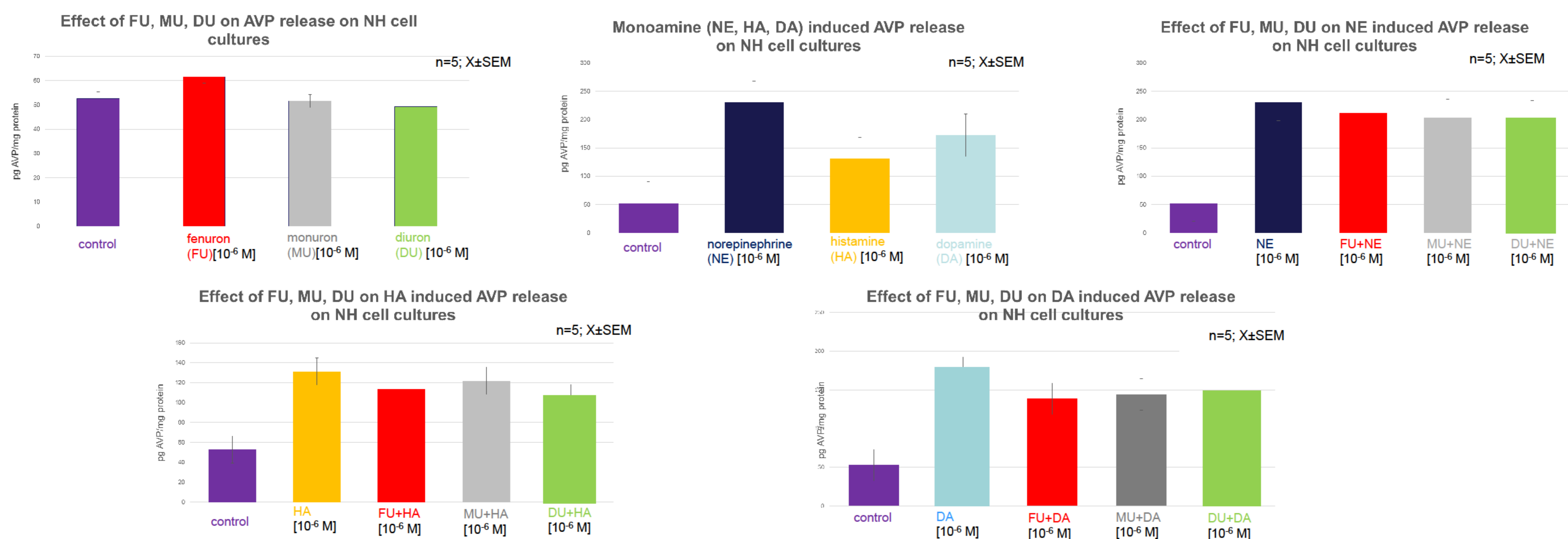
-I.: 1 hour 0,1 µg/ml EDCs: FU, MU, DU

-II.: 10⁻⁶M monoamines (norepinephrine (NE), dopamine (DA), histamine (HA)) alone

-III.: the monoamines agents with EDCs combined.

The AVP release was measured from supernatant media by RIA method.

RESULTS



CONCLUSIONS

The uron herbicides alone did not have effect on the AVP release on the NH cell cultures. The monoamine activated hormone release is strongly influenced by the EDCs. We proved the endocrine disruptor action of uron herbicides on the AVP mediated neuro-endocrine regulation in this manner. These substances originated from the environment as subtoxic, permanent and chronic allostatic load can effect as a stress factor to the psycho-neuro-endocrine-immune system and can lead to the development of different systemic diseases (e.g. atherosclerosis, hypertension, obesity, anxiety, depression) in connection with this complex network.

References:

1. International Programme on Chemical Safety (IPCS)-Global Assessment of the State of the Science of Endocrine Disruptors 2002
2. State of the Science of Endocrine Disruptor Chemicals. UNEP, WHO 2012

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