

The role of Common Environmental Pollutants in Arterial Hypertension: effects of Perfluoroalkyl Acids on Aldosterone Biosynthesis

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Abstract

Background: (max 50 words)

Nearly 10 years ago, environmental pollution by perfluoroalkyl substances (PFAS) became a major public-health issue in the Veneto Region of Italy. After exposure to PFAS through drinking water, over a million residents showed increased plasma levels of pentadecafluorooctanoic acid and perfluorooctanesulfonic acid with elevated prevalence of hypertension and cardiovascular disease.

Methods and Results: (max 100 words)

To explore the connection between PFAS and arterial hypertension, we investigated whether their increased presence in the circulation may stimulate the biosynthesis of the pressor hormone aldosterone. The human adrenocortical carcinoma cell line HAC15 was our experimental model. We demonstrated that cells treated with PFAS had increased aldosterone synthase (CYP11B2) gene expression and aldosterone secretion, both in basal condition and after stimulation with the aldosterone secretagogue Angiotensin II, and presented higher cellular and mitochondrial reactive oxygen species (ROS) production over controls. Moreover, we showed that treatment with the ROS scavenger tempol prevented the effect of PFAS on CYP11B2 gene expression.

Conclusions and Significance: (max 50 words)

Our results indicate that the concentrations of PFAS retrieved in human plasma of exposed individuals, act as endocrine disruptors and affect human adrenocortical cell function, which suggests they must be considered as contributing factors of the increased aldosterone production causing arterial hypertension.

Keywords: (max 5)

perfluoroalkyl substances; endocrine disruptors; arterial hypertension; aldosterone; reactive oxygen species

References: (max 5 relevant references)

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