

下垂体原発の腫瘍などで見られる ACTH 過剰分泌は副腎皮質の束状体と網状体の過剰形成を生じさせる。しかし、今回の形態学的並びに生理学的方法では、副腎の束状体と網状体並びに血中の糖質コルチコイドに何らの変化を見出すことは出来なかった。すなわち、今回のホルムアルデヒド曝露は、視床下部-下垂体-副腎軸の内、視床下部室旁核の CRH ニューロンと下垂体 ACTH 細胞にまず影響を与えたと考えられる。しかし、視床下部と下垂体のどちらが先に影響を受けたか更に副腎がどのように影響を受けるか研究を続ける必要がある。しかしながら、本方法によるホルムアルデヒド曝露は、ストレスの病因の一つになりうると考えられる。

7. 結論

ホルムアルデヒド曝露は、マウスの視床下部室旁核の CRH ニューロンと下垂体 ACTH 細胞に影響を与えている。すなわち、本方法によるホルムアルデヒド曝露は、ストレスの病因の一つとなりうると考えられる。

8. 引用文献

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9. Abstract

Influences of the exposure of formaldehyde during a long period (3 months) on the brain-nerve system —A morphological study on the hormone synthesis in the hypothalamus and pituitary gland—

Fumihiko Sasaki (Osaka Prefecture University, Osaka 598-8531 Japan)

The influences of the exposure of formaldehyde during a long period (3 months) on the adrenocorticotrophin-releasing-hormone (CRH) neurons in the paraventricular nucleus of the hypothalamus and on the adrenocorticotrophin (ACTH) cells of the adenohipophysis in mice were analyzed using immunocytochemical and RT-PCR methods. Mice were divided into two groups (A and B groups): A group was subdivided into A-0, A-80, A-400, and A-2000 subgroups, exposed with formaldehyde at 0, 80, 400, and 2000 ppb, respectively; B group was subdivided into B-0, B-80, B-400, and B-2000 subgroups, each of which was exposed 0, 80, 400, and 2000 ppb formaldehyde as well as in A group, though such mice were pre-administrated formaldehyde intra-peritoneally.

There were a few CRH immunoreactive neurons in the paraventricular nucleus in A-0 group. In A-80 group, the immunoreactive neurons showed few differences in number compared with those in A-0 group, but they increased clearly in number in A-400 and A-2000 groups.

Furthermore, CRH immunoreactive neurons of four subgroups in B group were more numerous than those in each subgroup in A group. ACTH immunoreactive cells in the adenohipophysis showed few morphological changes by the exposure of formaldehyde, but ACTH-mRNA expression in the gland was up-regulated with a dose response manner to formaldehyde exposures. B group expressed more strongly ACTH-mRNA than A group.

Thus, it is suggested that the formaldehyde exposure may have some potential effects on CRH neurons and ACTH cells as an etiology of the stress.

Table 1. Body and adrenal weights of adult mice.

Groups	BW (g)	AW (mg)	AW/BW ($\times 10^{-4}$)
A-0	27.26 \pm 0.48	8.55 \pm 0.90	3.17 \pm 0.38
A-80	27.76 \pm 0.61	7.22 \pm 0.43 ^a	2.63 \pm 0.19 ^a
A-400	26.72 \pm 0.36 ^a	8.78 \pm 0.57 ^b	3.29 \pm 0.22 ^b
A-2000	26.64 \pm 0.28 ^c	8.78 \pm 0.40 ^b	3.31 \pm 0.17 ^b
B-0	28.08 \pm 0.39 ^{bd}	8.47 \pm 0.71	3.03 \pm 0.27
B-80	27.40 \pm 0.65	8.20 \pm 0.57	2.99 \pm 0.20
B-400	27.76 \pm 0.67	9.51 \pm 0.90 ^b	3.41 \pm 0.29 ^b
B-2000	26.74 \pm 0.39	7.91 \pm 0.65	2.96 \pm 0.24

Values are mean \pm S.E.

BW: Body weight, AW: Adrenal weight,

AW/BW: Adrenal weight/Body weight.

a V.S. b; P<0.05, c V.S. d; P<0.01 by Student's t-test.

The number of mice in each group is 10.