EFFECTS OF POLLEN OXIDASES

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Abstract. A major role in the pathological lung diseases is caused by the disorders due to the free radicals. The body provides antioxidants systems having the protective role against the free radicals that being at the lung level, are located in mucus, in the epithelium fluid and in the pulmonary tissue, both intracellular and extracellular. The purpose of this work is to establish the effects of Graminaceae pollen upon the redoxe balance inside the body, watching the changes produced by the pollen on the lung, and observing the antioxidant effect of some antiasthmatic drugs.

Keywords: pathological lung diseases, free radicals, Graminaceae pollen.

AIMS AND BACKGROUND

Pollen exposure induces allergic airway inflammation in sensitised subjects1,2. Pollen extracts from weeds, trees, and grasses have intrinsic NADPH oxidase activity that induces ROS in airway epithelium within minutes3,4.

The pollen NADPH oxidases rapidly increased the levels of ROS in lung epithelium. ROS are formed when NADPH oxidases interact with cells lining the airways5,6.

EXPERIMENTAL

Materials and methods. The experiment was made in the bio-basical lab at Sanitary Veterinary and Food Safety Direction of Brasov (DSV), using 4 groups of white mice delivered by DSV Brasov. The study was made in agreement with the Ethic Comitte from DSV.

This experiment has been made on white mice being of 15 month, males and females, weighing about 25 g. The groups of mice have been kept in rages which had been signed for an easier identification in the same place, creating the same environment for all groups of mice.
During the experiment the temperature of the environment was unchanged – constant 22ºC, a humidity of 50% and a natural lighting of the room.

*Equipment and substances*. It has been used a colour hematoxilin-eozine and the readings have been made with the help of a microscope Leica. The images have been processed digitally with the help of the computer.

The following substances were used: Graminaceae pollen extract – purethal, aceticilcisteine (Siran 200 product, 600 mg/kg dose).

*Procedure*. The way of making evident the injuries made by the oxidative stress at the lungs level has been watched by making lots of morphopathological tests to the drawing lungs from the animals –white mice⁷⁻⁹.

The injuries have been treated with pollen extract of Graminaceae given with the aceticilcisteine at the same time. The study has been experienced on 20 white mice males and females, divided in 4 groups following this order:

Group 1: represented by 5 white mice, males and females that did not receive the pollen extract.

Group 2: have been got the therapeutical doses of pollen extract in a week period (doze 1=0.015 μg; doze 2=0.03 μg; doze 3=0.06 μg; doze 4=0.09 μg; doze 5=0.12 μg).

Group 3: have been got toxic doses of pollen extract in a week period (doze 1=0.15 μg; doze 2=0.3 μg; doze 3=0.6 μg; doze 4=0.9 μg; doze 5=1.2 μg).

Group 4: got toxic doses of purethal in a week period, under aceticilcisteine protection (doze 1=0.15 μg, doze 2=0.3 μg; doze 3=0.6 μg; doze 4=0.9 μg; doze 5=1.2 μg).

The animals have been sacrificed so they gave blood tests and lung necessary for making histopathological tests after having made an ether anaesthesia. The organ tests that have been taken have been processed in the anatomico-pathological lab of the DSV for some hystopathological tests. As soon as the organ pieces have been taken, these ones have been registered and given a number in the lab register and on a label that has joined the piece throughout the hystological process. The pieces have been fixed by dropping them and maintaining them in 10% formalin. After the dehydration and clearing process, the pieces have been dropped in paraffin.

The sections have been coloured with hematoxilin-eozine. Hematoxilin-eozine produces a selective colouring of the cells nucleus and shades the citoplasmatic basophiles giving them a pale blue colour.
RESULTS AND DISCUSSION

The chronic administration experienced in toxic dose of extract of purethal pollen led to important changes to the lung level. In group No 3 thicker cells are noticed at the lung level with broken walls (Figs 1–6). The infiltration area in cells walls alternates with massive breaking of the walls. There are macrophages with pollen granule.

In the case of administration of the acetalcisteine, at the same time, with toxic dose of pollen extract, the purethal product, we can notice the lack of pathological changes caused by the oxidative stress to lungs level.

![Fig. 1. Lot white mice No 3. The colouring hematoxilin-eozine O.B.40: tracheal ring with walls infiltrated with lymphocites](image1)

![Fig. 2. Lot white mice No 3. The colouring hematoxilin-eozine O.B.40: lung with thicker cells, with broken walls and emphysema](image2)
**Fig. 3.** Lot white mice No 3. The colouring hematoxilin-eozine O.B.40: lung oedema, macrophages with pollen granules.

**Fig. 4.** Lot white mice No 3. The colouring hematoxilin-eozine O.B.60: lung oedema, macrophages with pollen granules.

**Fig. 5.** Lot white mice No 3. The colouring hematoxilin-eozine O.B.40: the infiltration spots in the sells wall after massive breaking of the walls.
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