



Research on the effects of chemical substances on children, elderly people, and those with gene disorders

Title of Research:

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Study on pathogenic mechanism of sick building syndrome by utilizing *Drosophila* and development of evaluation system of causative materials

Principal Investigator:

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Summary of Research:

This study aims to elucidate the mechanism of onset of sick building syndrome using *Drosophila* and to develop a risk assessment method of causative substances. Based on the results of previous studies, we have reported that the exposure to formaldehyde gas and *o*-xylene gas causes the change in the concentrations of several proteins in *Drosophila* and that and that similar change are induced by aging. These results suggest that biological reactions due to gas exposure may be related to aging.

In this study, we have revealed that the exposure to formaldehyde gas or *o*-xylene gas shortens the life span of *Drosophila*. The expression of aging marker molecules increased in *Drosophila* by 20-days exposure. Analysis of insulin signal also showed the possibility that anti-aging system was suppressed by exposure to gas.

We analyzed the effects of formaldehyde gas exposure or *o*-xylene gas exposure on the oxidative stress, since oxidative stress is considered to be the cause of accelerated aging. The results indicated that the oxidative stress might be increased in the initial stage of exposure. However, the long-term exposure led to no significant difference in oxidative stress from non-exposed group. The reason for this is unknown, but some adaptation by *Drosophila* is considered. It is necessary to analyze more details.

We have reported that expression of actin decreases due to formaldehyde gas exposure. In this study, we examined the *Drosophila* carrying a GFP gene downstream from the promoter of actin 88F as a formaldehyde evaluation system. We obtained the results suggesting that the recombinant *Drosophila* used is useful as a simple formaldehyde evaluation system by the observation of the pupa under the fluorescence microscope.

Timeline:

March 1, 2016 – February 28, 2017

Topics:

Drosophila is well known as a model for human disease. In this study, we found that the life time of *Drosophila* was shorten by exposing formaldehyde gas or *o*-xylene gas. We showed that the gas exposure may suppress the anti-aging system in *Drosophila*.

Publications:



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