



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

Title of Research:

13_S03-01

Study on the mechanism of sick building syndrome and development of risk assessment system utilizing *Drosophila*

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Summary of Research:

The genome of *Drosophila melanogaster* has orthologues for 60% of human genes and 80% of human disease related genes, and the conservation of amino acid sequences between *Drosophila* and human is much higher than those of other model organisms like nematode and yeast. Therefore, *Drosophila* is believed to be a useful model organism of mammalian. The aim of this study is to reveal the mechanism of sick building syndrome and develop the risk assessment system utilizing *Drosophila*.

The proteins extracted from *Drosophila* after exposure to sick building syndrome causative agent were comprehensively analyzed by using two-dimensional electrophoresis followed by silver staining. The intensities of proteins on gel indicated that the exposure to formaldehyde or *o*-xylene caused the concentration changes of several proteins in *Drosophila*. The same tendency of the concentration change of proteins was observed between exposure to formaldehyde or xylene and aging. This may suggest the existence of the common mechanism between sick building syndrome and aging. Formaldehyde and *o*-xylene caused the concentration change in some common proteins, while concentrations of some proteins were changed by only exposure to xylene.

For identification, the proteins of which concentrations were changed by exposure to formaldehyde were analyzed by mass spectrometry after trypsin digestion. The candidates obtained by database search include the energy metabolism-related proteins. This might suggest the onset mechanism of sick building syndrome.

Timeline:

March 1, 2014 – February 28, 2015

Topics:

The 3rd Research Meeting of the New LRI of Japan Chemistry Industry Association, Tokyo, August, 2014. "Study on the mechanism of sick building syndrome and development of risk assessment system utilizing *Drosophila*", Poster presentation.



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