Identification of new DNA damages by DNA adductome analysis

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Outline of survey

Cellular DNA is always exposed by various DNA damaging agent such as UV light, ionizing radiation and environmental carcinogens. Endogenous reactive oxygen species, reactive nitrogen species and lipid peroxide also cause DNA damage. DNA damages cause gene mutation, development of cancer and aging. We developed an analytical method "DNA adductome" that can detect unknown DNA damages by using Liquid chromatography tandem mass spectrometry (LC/MS/MS). Preliminary experiment revealed that there were many unknown DNA damages in human DNA. Among these, there should be some important DNA damages closely correlated with carcinogenesis and aging. In this study, we will identify the chemical structure of those unknown DNA damages and examine their mutagenisity and DNA repair mechanisms.

Expected results

In this study, we will identify some new DNA damages present significant amount in our body. This study will contribute to find out some important mechanisms for development of cancer and aging. Also, this study may contribute to prevent cancer and aging. We will collect chemical standards of DNA adducts as much as we can, and construct a database for DNA adducts. This database also will help many researchers in this area.

References by the principal researcher

M. Yasui, S. Matsui, Y.R. S. Laxmi, N. Suzuki, S. Y. Kim, S. Shibutani, and T. Matsuda: Mutagenic events induced by 4-hydroxyequilin in *supF* shuttle vector plasmid propagated in human cells, ***Carcinogenesis***, 24(5), 911-917, 2003

T. Matsuda*, I. Terashima, Y. Matsumoto, H. Yabushita, S. Matsui, S. Shibutani : Effective utilization of N^2-ethyl-2'-deoxyguanosine triphosphate during DNA synthesis catalyzed by mammalian replicative DNA polymerases, ***Biochemistry***, 38, 929-935, 1999

Term of project   FY2006 2010 | **Budget allocation 34,200,000 yen**

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