

## S55-2 D-Amino acids as disease markers and construction of their detection system with microbial enzyme

○Tohru YOSHIMURA<sup>1</sup>, Tomokazu ITO<sup>1</sup>, Tomoko NAKA<sup>1</sup>, Hisashi HEMMI<sup>1</sup>

<sup>1</sup>Nagoya Univ. Grad. Sch. of Bioagricultural Sci.

Some of D-amino acids bear important physiological roles in human, and their behaviors correlate with physiological disorders. For example, D-serine acts as a co-agonist of *N*-methyl-D-aspartate receptor (NMDA), and its amount and relative ratio to (D+L)-serine are reported to significantly decrease in spinal fluid and serum of schizophrenia or Alzheimer's disease patients. An excess amount of D-serine is observed in the spinal fluid of amyotrophic lateral sclerosis (ALS) patients. These findings suggest that D-serine can be a diagnostic biomarker for such diseases. Currently, D-amino acids including D-serine are assayed with HPLC after the amino acids are derivatized to fluorescent diastereomers. The HPLC-method is highly sensitive and enables the comprehensive analysis of D- and L-amino acids. However, it is time-consuming, and requires expensive equipments and a proficient analyzer. We have therefore developed an enzymatic D-serine assay system with D-serine dehydratase, which we have found in *Saccharomyces cerevisiae*. In this system, pyruvate produced from D-serine with D-serine dehydratase is measured by the coupling methods with lactate dehydrogenase or pyruvate oxidase. We could assay 1 – 10  $\mu$ M D-serine by determining the amount of H<sub>2</sub>O<sub>2</sub> produced during the pyruvate oxidase reaction.