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SEMINAR

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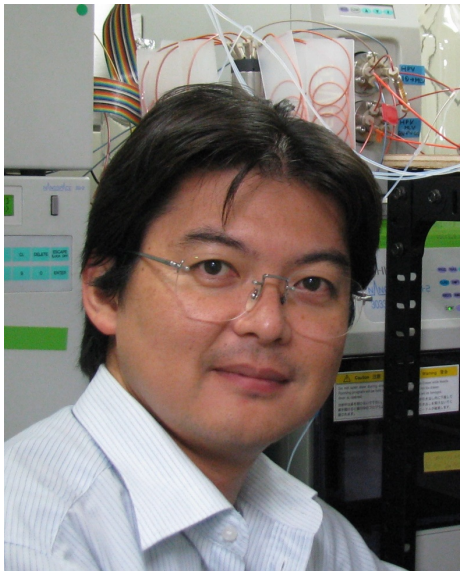
Hosted by Prof Kini R Manjunatha



Chiral amino acid analysis for new drug discovery and diagnosis

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It is long believed that all amino acids in higher animals are L-forms and the enantiomers (D-forms) are not present at least as biologically active substances. However, along with the progress in analytical technologies, several D-amino acids were found in mammals including humans both in the free form and in the protein bound form (D-amino acid residues). The distribution and regulation of these D-amino acids are clearly different from those of L-amino acids, and they are increasingly gathering attention as new drug candidates and biomarkers. However, the amounts of these D-amino acids in higher animals are usually trace, and uncountable known/unknown interfering substances are present in real world matrices. In the present talk, design and development of multi-dimensional HPLC systems combining reversed-phase, anion-exchange/mixed-mode and enantioselective columns will be introduced. Applications using various clinical samples, foods/beverage and extraterrestrial samples will also be shown. For example, in the sera of patients with chronic kidney disease, the amounts of D-Ala, D-Asn, D-Pro and D-Ser are higher than those in healthy volunteers, and their amounts are closely correlated with the kidney function. In the fermented foods/beverages, relatively high amounts of D-amino acids, such as D-Ala, D-Asp, D-Glu and D-Ser, were found and some of the D-amino acids have clear physiological functions in mammals. The present multi-dimensional HPLC platform is useful for the D-amino acid researches, and further applications are currently ongoing.