

S42-4 **Electroanalytical chemistry of lipids and its application to metabolic medicine**

○Hideki HAKAMATA¹, Fumiyo KUSU¹

¹Sch. of Pharm., Tokyo Univ. Pharm. & Life Sci.

High-performance liquid chromatography (HPLC) is a powerful tool to determine lipids in biological samples. The advance of HPLC techniques for lipids is mainly led by the development of a number of derivatization reagents and the application of LC-MS (or LC-MS/MS) to lipids. With the present situation in mind, we would propose that HPLC with electrochemical detection (HPLC-ECD) has a potential to be applicable to the lipid determination. To examine this possibility, the electrochemical behavior of cholesterol, which had been regarded to be electrochemically inactive, was studied. As a result of several experiments, we found that cholesterol was electrochemically oxidized in acetonitrile at a carbon electrode. The oxidation product was purified to elucidate its structure, showing the formation of cholesta-4,6-dien-3-one. This reaction could be applied to the determination of serum cholesterol by HPLC-ECD. Moreover, this reaction was also applicable to the determination of serum cholestanol. By this method, it was possible to monitor experimental hypercholestanolemia in mice fed a high-cholestanol diet, an animal model of cerebrotendinous xanthomatosis. Furthermore, a similar strategy succeeded in the development of a method for the determination serum phytosterols. In addition, oxysterols in oxidatively modified low density lipoprotein could be determined by HPLC-ECD. At the present, these developed methods are utilized to explore the mechanisms of diseases in the field of metabolic medicine.