2-S23-1

Microsensing systems using diamond electrode for *in vivo* and *in vitro* detection of drug kinetics

Hiroshi Hibino

Div. Global Pharmacol., Dept. Pharmacol., Grad. Sch. Med., Osaka Univ.

High-speed and accurate measurement of drug kinetics in *in vivo* microenvironment or small aliquot of biological sample is crucial for basic and applied researches in pharmacology. To address this issue is challenging with conventional methods. We developed two different microsensing systems using diamond electrode, a state-of-the-art material for electrochemistry. First technique targets local area of a few organs in live animals. The analytical platform harbors a drug monitoring microsensor composed of needle-type diamond electrode and a glass microelectrode that detects cellular and tissue electrical activities. For test analytes an ototoxic loop diuretic and an antiepileptics lamotrigine were selected; pharmacokinetics and pharmacodynamics of the systemically administrated compounds were measured in real time in the inner ear and brain of rodents, respectively. In each case, the behavior of the drug concentration clearly differed from change of the electrical signals. Second, we described a procedure to rapidly and easily determine drug concentrations in $\sim 100\ \mu\text{L}$ blood sample. With the package of this micro-measurement, we quantified pazopanib, a multi-kinase inhibitor—all the processes were completed in 10 min. The strategies shown here would contribute to advances in drug development and accelerate tailored medicine.