

A microsensing system using needle-type of boron-doped diamond microsensor for the *in vivo* real-time drug monitoring.

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To understand the action and efficacy of a drug *in vivo*, monitoring the concentration of the compound in the target cell group and its functional response is necessary. However, in such a local region, conventional methods never allow us to measure both the pharmacokinetics and pharmacodynamics over time with high spatio-temporal resolution. We developed a microsensing system using a conductive diamond, a state-of-the-art material. This system is composed of a "needle-type diamond microsensor" for tracking drug concentration and a glass microelectrode for detecting cellular electrical activity. We tested bumetanide, an inhibitor for Na⁺,K⁺,2Cl⁻-cotransporter, and lamotrigine, a blocker for Na⁺ channel in the local space of the cochlea and brain, respectively. This technique may be applicable to a variety of drugs *in vivo* and contribute to promoting pharmacological researches. In this session, we will show experimental results, set-up, and procedures. We will also talk about the recent technical improvement of the system.