Clinical Application of *in Vitro* Pharmacokinetic Studies on Individualized Pharmacotherapy

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Recently we have experienced a case illustrating a drug interaction between transdermally administered fentanyl and rifampicin resulting in the loss of the analgesic effect of fentanyl. Although fentanyl toxicity caused by coadministration of CYP3A4 inhibitors has been reported, little is known about CYP3A4 inducer. Based on the therapeutic drug monitoring, we followed serum concentrations of fentanyl throughout the hospitalization. With the introduction of rifampicin, the C/D ratio decreased to 20-50% of the baseline values, indicating that enhanced clearance had occurred. Even after a dose of fentanyl titration up to 7.5 mg every 3 days (from the initial dose, 1.67 mg every 3 days) and coadministration of loxoprofen 180 mg/day, the patient still complained of moderate pain. In order to understand (or predict) background of this case, in vitro pharmacokinetic studies, which can clear clinically important issues for pharmacotherapy such as metabolic enzymes involved in both drugs, are essential. I will present the importance of in vitro pharmacokinetic studies on pharmacotherapy based on current findings from drug metabolic studies.