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A new pharmacokinetic study model using simultaneous automated drug infusion/blood sampling system in freely moving rats

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Abstract

The present study aimed to investigate the advantages of automated dosing and blood sampler system over the traditional blood sampling techniques for determining the bioavailability of gabapentin. Jugular and gastric catheterizations were undertaken to administer gabapentin and blood samples were collected via the carotid artery. 10 mg/kg of gabapentin was administered with automatic drug infusing system, Empis™ (BASi), first intravenously and followed by same oral dose with the flush out period of 12 hours in freely moving SD male rats. 50 µl blood samples were collected serially with an automated blood sampler, Culex™ (BASi), and analyzed with a validated LC-MS/MS method. The determined pharmacokinetic (PK) parameters of gabapentin was found to be more accurate and logical including bioavailability in automated dosing/blood sampling system compared with traditional manual method. These results suggest that automated dosing/blood sampling system is highly beneficial for getting accurate and reliable outcomes for determining PK parameters than conventional animal models, even using small number of animals. The determined pharmacokinetic parameters of gabapentin was found to be more accurate and logical in automated blood sampler Culex™ (BASi) system compared with traditional manual method, it might be due to inaccuracy in time sampling and other intrinsic and extrinsic factors involved in manual system suggests that automated blood sampler is accurate, easier, convenient and more reliable system for determining pharmacokinetics parameter even with small or single number of animal.