Latin American Journal of Pharmacy
(formerly *Acta Farmacéutica Bonaerense)*
Lat. Am. J. Pharm. **37** (12): 2345-51(2018)

Received: July 7, 2018
Revised version: September 16, 2018
Accepted: September 18, 2018

Pharmacokinetics of Acetaminophen in the Hypothalamus of Rats Based on *In Vivo* Microdialysis

Yue ZHU [1] #, Zhangqing MA [1] #, Shouyun HE [2] #, Yalan WANG [1] & Zongyuan HONG [1] *

[1] *Laboratory of Quantitative Pharmacology, Department of Pharmacology, Wannan Medical College, Wuhu 241002, China.*

[2] *Department of Pharmacy, the Second People's Hospital of Wuhu, Wuhu 241002, China*

***SUMMARY*. To explore the studying method for pharmacokinetics in the target site of drugs, the pharmacokinetic process of acetaminophen in the hypothalamus of rats was investigated. Male Sprague-Dawley rats were anaesthetized and a microdialysis probe was implanted into the hypothalamus and perfused with artificial cerebrospinal fluid. Adaptation for 1 h, rats were administrated with acetaminophen (150 mg/kg, i.p.) and microdialysates were collected continuously at 12 min intervals for 6 h. The acetaminophen concentrations in microdialysates were determined by HPLC-Ultraviolet detection, and the concentration-time profile and pharmacokinetic parameters of acetaminophen were calculated by DAS software. The results showed that the concentration-time curve of acetaminophen in the hypothalamus of rats was fitted to a one-compartment open model. The main pharmacokinetic parameters of $t_{1/2}$, T_{max}, C_{max} and AUC_{inf} were (1.95 ± 0.59) h, (1.26 ± 0.22) h, (11.39 ± 2.17) *μ*g/mL and (58.04 ± 18.39) *μ*g·h/mL, respectively. In conclusion, by *in vivo* microdialysis approach, the pharmacokinetic process of acetaminophen in the hypothalamus of rats is investigated and an experimental method for studying pharmacokinetics of drugs in the target site is established, which is simple, feasible and reliable.**

RESUMEN. Para explorar el método de estudio de la farmacocinética en el sitio objetivo de los fármacos, se investigó el proceso farmacocinético del paracetamol en el hipotálamo de ratas. Se anestesiaron ratas macho Sprague-Dawley y se implantó una sonda de microdiálisis en el hipotálamo y se perfundió con fluido cerebroespinal artificial. Luego de 1 h de adaptación, a las ratas se les administró paracetamol (150 mg/kg, i.p.) y los microdializados se recogieron de forma continua a intervalos de 12 min durante 6 h. Las concentraciones de acetaminofeno en microdializados se determinaron por detección HPLC-ultravioleta, y el perfil de concentración-tiempo y los parámetros farmacocinéticos de paracetamol se calcularon mediante el software DAS. Los resultados mostraron que la curva de concentración-tiempo de paracetamol en el hipotálamo de ratas se ajustó a un modelo abierto de un compartimiento. Los principales parámetros farmacocinéticos de $t_{1/2}$, T_{max} y AUC_{inf} fueron (1.95 ± 0.59) h, (1.26 ± 0.22) h, (11.39 ± 2.17) *μ*g/mL y (58.04 ± 18.39) *μ*g·h/mL, respectivamente. En conclusión, mediante el enfoque de microdiálisis *in vivo,* se investiga el proceso farmacocinético de paracetamol en el hipotálamo de ratas y se establece un método experimental para estudiar la farmacocinética de fármacos en el sitio diana, que es simple, factible y confiable.

KEY WORDS: acetaminophen, HPLC, *in vivo* microdialysis, pharmacokinetics, rats.

# These authors contributed equally to this work.
Author to whom correspondence should be addressed. *E-mail:* zyhongwnmc@aliyun.com

ISSN 0326 2383 (printed ed.)
ISSN 2362-3853 (on line ed.)