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A human health risk assessment of perfluorononanoic acid using a physiologically - based pharmacokinetic model

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Perfluorononanoic acid (PFNA) is a one of perfluoroalkyl and polyfluoroalkyl substances (PFASs) and is widely detected in the environment and humans. PFNA are known to effect on developmental toxicity and to associate with serum cholesterol, children's reading skill, and atopic dermatitis. The aim of this study was to develop and evaluate a physiologically-based pharmacokinetic (PBPK) model for PFNA in female rats, and apply to a human health risk assessment. The PBPK model of PFNA was established after the oral or intravenous administration of PFNA in female rats (at dose of 0.5-3 mg/kg). The biological samples (plasma, nine tissues, urine, and feces) were analyzed using ultra-liquid chromatography coupled tandem mass spectrometry. The tissue-plasma partition coefficient (Kp) was estimated as the ratio of concentration in tissue to that in plasma. The PBPK model of PFNA was fitted by WinNonlin (Ver. 6.4) and Berkeley Madonna software. The Kp values of PFNA in rats were increasing tendency in different tissues like spleen (0.025), heart (0.034), lung (0.056), kidney (0.247), liver (0.466) and other tissues were classified as rest of body. The key parameters were estimated at 800 μg/h of transport maximum, and 114428 μg/L of transport affinity constant. The PBPK model in rats was extrapolated to a human PBPK mode based on human physiological parameters. The reference dose of 4.5 μg/kg/day and external dose of 0.12 μg/kg/day for human risk assessment were estimated using Korean biomonitoring values. This study provides valuable insight into human health risk assessment regarding PFNA exposure.

Biography

Hea Young Cho is an Associate Professor of College of Pharmacy at CHA University. She received her PhD degrees in Biopharmaceutical Science from Chonnam National University. She had been served as a Postdoctoral fellow at the State University of New York at Buffalo, and Deputy Director of Clinical Trials Management Division at Korea Food & Drug Administration (KFDA). Her research interest involves the investigation about PK/PD modeling and ADMET. She is currently an Associate Editor of *Journal of Pharmaceutical Investigation* and a Scientific Chair of The Korean Society for Pharmaceutical Sciences and Technology.

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