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Special Issue Reprint

Population Pharmacokinetics and Its Clinical Applications

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This Reprint presents recent advances in population pharmacokinetics, highlighting its expanding role in individualized pharmacotherapy. The collected articles demonstrate how pharmacometric approaches, therapeutic drug monitoring, pharmacodynamic biomarkers, and clinical decision-support tools can be integrated to optimize drug therapy across diverse populations and therapeutic areas. The contributions cover the development, evaluation, and application of population pharmacokinetic and pharmacokinetic–pharmacodynamic models, therapeutic-drug monitoring strategies, model qualification, biomarker-guided therapy, and simulation-based dose optimization. Studies encompass a wide range of therapeutic areas, including biologics, immunosuppressants, anti-infectives, oncology therapies, and central nervous system drugs. In addition, they address the sources of pharmacokinetic variability in pediatric patients, transplant recipients, individuals with inflammatory diseases, tuberculosis, glioblastoma, and rare diseases, emphasizing the importance of patient-specific factors in optimized dosing strategies. The Reprint also highlights advances in analytical approaches for therapeutic drug monitoring, pharmacodynamic monitoring, and digital tools that support the translation of pharmacometric models into clinical practice. These manuscripts emphasize the evolving role of pharmacometrics in translating quantitative approaches into improved patient care.

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