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BOOK OF ABSTRACTS

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Multi-layer, Nonlinear

PHARMACOKINETICS/PHARMACODYNAMICS MODELING AND SIMULATION WITH MATLAB

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Abstract

Population pharmacokinetics has taken off with an exponential increase in published papers in the last decade. This has revolutionized how data from clinical studies is analyzed. Population pharmacokinetics methods are used almost exclusively for phase II and III studies and to summarize data across a drug development program. Advances in pharmacokinetic and pharmacodynamic modeling will allow fewer, more focused and informative clinical trials, and lead to significant cost savings. However, despite these advances, population methods are not routinely easy to employ. A major hindrance to implementing population methods is that it is mathematically and statistically complex. Hence, in this study, we have used MATLAB computer program to obtain information on effective dosage regimens of doripenem by a modeling and simulation approach based on pharmacokinetic (PK)/pharmacodynamic (PD) theory. We have introduced a modification to the PK/PD model which explains in-vitro bactericidal kinetics of doripenem for several Pseudomonas aeruginosa strains. Time-course profiles of bacterial counts in patients infected with P. aeruginosa were simulated for typical clinical dosage regimens considering the variability of PK and the patients' backgrounds by a Monte Carlo simulation. Moreover, time-course profiles of probability achieving the criterion ($\log(CFU/mL) < 0$) were predicted for the evaluation of antibacterial efficacy by renal function. The in-vitro bacterial profiles at various dosage regimens could be well explained by the PK/PD model. The simulations suggested the dependence of antibacterial efficacy on the frequency of administration, indicating time-dependent antibacterial activity. It was also [illegible] showed significant bacterial reduction in patien[illegible] d[illegible] ities in two weeks after the start of treatment. Our approach to [illegible] counts should be useful for determining and [illegible] in drug development.

examining effective dosage regi... ...luding the treatment period in drug development.

Keywords: PK/PD model, MATL AB ...mputer program, doripenem, Monte Carlo simulation, development.

SIMULATION OF SATELLITE INTERACTIONS WITH SOLAR FLARES USING ANALYSIS SYSTEM (ANSYS) SOFTWARE

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Abstract

Solar flares produce high-energy particles and radiation that are dangerous to living organisms. The x-rays from flares are stopped by our atmosphere well above the Earth's surfac... However, they do disturb the Earth's ionosphere, which in turn disturbs some radio communications. Along with energetic ultraviolet radiation, they heat the Earth's outer atmosphere, causing it

NUMERICAL SIMULATION OF SILICIDE GROWTH NEAR AN INSULATOR WITH TIN OXIDE THIN FILMS DEPOSITION

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Abstract

Silicide films have received much recent attention because of their practical applications in VLSI technologies. Titanium silicide is among the most common silicides employed in the semiconductor industry because it can be self-aligned, has low resistivity and is stable at temperatures consistent with device fabrication processes. However, with scaling to submicron dimensions and polycide/salicide technology development, computer simulation and models that could handle complicated geometrical movements of multi-layer materials, coupled with defects injection and impurity redistribution at the moving interfaces or inside the materials layers are required for the development of improved silicide processes. Hence, this study is based on numerical simulation of silicide growth near an insulator in tin dioxide with COSMOL multiphysics software. The result showed that at constant temperature change of 0.0513^{0}C to 0.753^{0}C in the time range of 0-30sec, 0-60sec, 0-240sec and 0-960sec. The