

Symposium 14: Applying Pharmacometrics to Precision Dosing in the Lifecycle of Long-acting Injectable Products: Drug Development, Regulatory Approval & Clinical Practice

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Long-Acting Injectable Products

- Long-acting injectable (LAI) products are formulated to achieve extended drug release from days to years when administered via intramuscular (IM) or subcutaneous (SC) routes.
- LAI products are used in therapeutic areas where patients are non-adherent to oral formulations such as schizophrenia.

Challenges in Product Lifecycle

- The slow drug release characteristics of LAIs lead to time consuming and resource-intensive clinical pharmacokinetic (PK) studies in new and generic drug development.
- In real-world practice, given the long time required to achieve steady-state drug levels, it is difficult for clinicians to titrate LAI doses or regimens based on changes in symptoms and side effects, for a variety of nonadherent dosing scenarios.

Objectives

- Describe the complex pharmacokinetic characteristics of LAI products that lead to both challenges and opportunities in applying model-informed approaches in development, regulatory approval and clinical dosing practice
- Apply a novel quantitative framework for identifying the dose and formulation that maximize the benefit-risk ratio using in vitro/in vivo correlation
- Describe the need and approaches for individualized dosing of antipsychotics and discuss the challenges of translating them to a product or tool adopted by healthcare providers in clinical practice
- Describe how receptor pharmacology, pharmacokinetics and pharmacodynamics of antipsychotics are combined to optimize clinical outcomes of antipsychotics and apply the proposed thought flow to other disease areas with target-mediated therapy

Speakers

- **Clinical Application of Pharmacometrics in Dosing Management of Long-acting Injectable (LAI) Antipsychotics** (Hong Lu, PhD, Scientific Director, Takeda Pharmaceuticals USA Inc)
- **Convolution-based Approach for Modeling, Establishing In Vitro/In Vivo Correlation & Optimizing the In Vivo Drug Release Properties of LAI Products** (Roberto Gomeni, PhD, President, PharmacoMetrica & Adjunct Professor, Pharmacotherapy & Experimental Therapeutics, Univ of North Carolina Eshelman School of Pharmacy)
- **Generating Model-integrated Evidence for Developing & Approving Complex Generic LAI Products** (Liang Zhao, PhD, Director, Quantitative Methods & Modeling, Research & Standards, Office of Generic Drugs, CDER, FDA)
- **Role of Pharmacometrics in Guiding Clinical Practice Dosing of LAI Products** (Yaning Wang, PhD, Director, Pharmacometrics, Clinical Pharmacology, OTS, CDER, FDA)
- **Receptor Occupancy & Clinical Effects: A Review** (Ariel Graff, MD, PhD, Head, Multimodal Imaging Group, Campbell Family Mental Health Research Inst)