

Course Learning Objectives

10/3/2019: Ontogeny of Drug Biotransformation

Lecture Speaker: Jean Dinh

Learning Objectives:

- Review basic concepts relevant to a discussion of drug biotransformation in a pediatric context
 - Developmental trajectories
 - Regulation of endogenous molecules during growth and development
- Discuss specific Phase 1 and Phase 2 pathways
 - CYP2D6
 - CYP3A4
 - CYP2C19
 - CYP2B6
 - UGT2B7
- Present a basic strategy for investigating a specific drug or drug-related event in children

10/16/2019: Ontogeny of Transporters

Lecture Speaker: Saskia deWildt

Learning Objectives:

- Explain the clinical relevance of membrane transporters in pediatric drug therapy and discuss several examples
- Describe transporter specific developmental patterns
- List research approaches for studying pediatric drug transporters
- Identify major challenges in elucidating the human ontogeny of drug transporters

10/23/2019: Influence of Physiologic Changes in The Developing Gastrointestinal Tract on Drug Absorption & Disposition in Children

Lecture Speaker: Valentina Shakhnovich

Learning Objectives:

- Review developmental changes in the maturing pediatric digestive tract
 - Extrahepatic focus
 - Influence on peroral drug absorption/disposition
 - Implications for rectally-administered drugs
- Discuss influences of diet, disease and the microbiome on drug absorption/disposition
- Provide clinical examples and identify gaps in knowledge

10/30/2019: Pharmacokinetics and Pharmacodynamics of Protein Therapeutics

Lecture Speaker: Bernd Meibohm

Learning Objectives:

- Understand the mechanistic basis for drug disposition of therapeutic proteins and how it differs from traditional small molecule drugs
- Appreciate the impact and challenges of drug-target interaction on drug disposition
- Explain the impact of immunogenicity on the pharmacokinetics (PK) and pharmacodynamics (PD) of therapeutic proteins
- Identify factors in the PK and PD of therapeutic proteins that are modulated by childhood development

11/6/2019: Optimal Study Design in Clinical Pharmacology Research

Lecture Speaker: Gilbert Burckart

Learning Objectives:

- List enrichment strategies that have been utilized in pediatric drug development studies
- Discuss the placebo effect in pediatric patients and why this is a problem in drug development
- Explain how decisions regarding age group breakdown should be made and supported in a drug development program
- Discuss pediatric extrapolation and its role in study planning
- List the major reasons for pediatric study failures and ways to avoid these pitfalls

11/13/2019: Clinical Applications of Pharmacometrics: Care at the Patient Level

Lecture Speaker: Sander Vinks

Learning Objectives:

- Appreciate that the current drug development process results in doses for average patients but that individualized dosing strategies of drugs in neonates, infants and children are imperative to improve therapeutic response and/or lowering the risk of adverse events.
- Have a better understanding of how state-of-the-art decision support using model-informed precision dosing may improve treatment outcomes by identifying the optimal dose for each individual patient.
- Identify examples of ongoing model-informed precision dosing studies and development in the pediatric community and at Cincinnati Children's.

11/20/2019: Role of Bioinformatics in Pediatric Clinical Pharmacology

Lecture Speaker: Anil Jegga

Learning Objectives:

- Introduce and give an overview of some of the state-of-art databases and servers that can be used for pharmacogenomics research and drug discovery
- Explain how existing data can be harnessed to “guide” or “inform” translational medicine
- To provide examples of the application of data repurposing for drug discovery

12/4/2019: Developmental Pharmacodynamics

Lecture Speaker: Greg Kearns

Learning Objectives:

- Acquire a working understanding of where developmental PD is today and why it must be advanced if we are to improve pediatric therapeutics
- Conceptually understand the framework of experimental approaches used to undertake pediatric PD research
- Understand opportunities for support of research in pediatric PD

12/11/2019: Metabolomics: Enabling Tools for Precision Medicine

Lecture Speaker: Rima Kaddurah-Daouk

Learning Objectives:

- Understand the role of the metabolome in monitoring health
- Understand tools for precision medicine to optimize treatment outcomes

1/8/2020: Pharmacometabolomics: Implications for Clinical Pharmacology

Lecture Speaker: Richard Weinshilboum

Learning Objectives:

- To briefly introduce the techniques used in metabolomics as applied to Clinical Pharmacology
- To provide examples of the application of metabolomics to drug response phenotypes
- To outline the use of metabolomic data to “guide” or “inform” genomic studies

1/15/2020: Combining "Bedside" and Clinical Research Data to Inform Disease Progression and Outcomes/Biomarker Selection – Learning and Confirming

Lecture Speaker: Diane Mould

Learning Objectives:

- Understand the concept of disease progression versus disease activity
- Review the pharmacology of biologic agents and some of the issues associated with dosing metrics as applied to pediatric patients
- Understand the relationship between PK and PD commonly seen with biologic agents used to treat inflammatory disease
- Understand the concept of using Bayesian adaptive dosing and monitoring of individual PK parameters as a metric of disease activity for biologics

1/22/2020: The Power of PK/PD and Monte Carlo Simulation (MCS): Pediatric Antimicrobial Drug Development and Recommendations for Clinical Use

Lecture Speaker: John Bradley

Learning Objectives:

- Review the various pharmacodynamic metrics for antibiotic activity
- Understand the rationale behind High/Infrequent dosing (aminoglycosides) and Low/Frequent dosing (beta-lactams)
- The antibiotic exposure needs to occur at the site of infection, and can vary tremendously from the serum concentration (e.g., CSF concentrations vs urine concentrations for aminoglycosides)
- Realize the "all susceptibilities are local" and the dosing/exposure need to match the susceptibilities in the institution of the clinician
- Consider how important, in children, it is to achieve the desired exposure, and what risk of failure are you willing to accept for a particular infection?

1/29/2020: Successes and Limitations of Antiviral Therapy in Pediatrics

Lecture Speaker: Stephen Spector

Learning Objectives:

- Identify the potential targets for antiviral drugs
- Learn the clinical indications for the use of currently available antivirals
- Review the pharmacokinetics and relevant approaches to administering commonly used antivirals
- Review the risk and mechanism(s) of antiviral resistance

2/5/2020: Mechanisms and Limitations of Current Approaches to Treat Antibiotic Resistant Bacterial Infections in Pediatrics

Lecture Speaker: Victor Nizet

Learning Objectives:

- Learn the history and limitations of current antibiotic testing performed in bacteriologic media. Understand how certain antibiotics lacking activity in standard testing can provide pharmacological benefit in vivo through synergy with the innate immune system.
- Consider identification and targeting of bacterial virulence factors as an alternative to broad spectrum antibiotics, with the potential for more specific pathogen targeting and less unwanted damage to the normal human microbiota.
- Consider how pharmacological boosting of innate immune cell function could represent an adjunctive therapy to treatment of multidrug-resistant bacterial infections.

2/12/2020: Pharmacotherapy of Pediatric Hypertension

Lecture Speaker: Stephen Daniels

Learning Objectives:

- Understand the indications for initiation of antihypertensive drug therapy in children
- Understand dose response relationships in antihypertensive drug therapy

- Recognize potential adverse effects of drug therapy for hypertension in children

2/19/2020: Pharmacotherapy of Pediatric Cancer: Cytotoxic Chemotherapy

Lecture Speaker: Peter Adamson

Learning Objectives:

- Understand principles of cytotoxic chemotherapy
- Understand mechanisms of action of cytotoxic drugs

2/26/2020: Pharmacotherapy of Pediatric Cancer: Targeted New Agents

Lecture Speaker: Michael Ferguson

Learning Objectives:

- Review genetics of tumors
- Explain Precision Medicine (Precision Oncology/Precision Genomics/Personalized Medicine)
- Learn about different sequencing companies/techniques
- Garner knowledge about newer targeted therapy
- Apply new knowledge to case examples

3/4/2020: Developmental Pharmacology: Something Old, Something New

Lecture Speaker: John van den Anker

Learning Objectives: Pending from speaker.

- Understand the impact of growth and development on absorption, distribution, metabolism and excretion of frequently used drugs in neonates, infants and children
- Learn about new developments such as the creation of the International Neonatal Consortium to improve the pharmacotherapy of newborn infants

3/11/2020: Neonatal Pharmacology: Drug Dosing Challenges in Newborns

Lecture Speaker: Jack Aranda

Learning Objectives: Pending from speaker

3/25/2020: Pathophysiology, Phenotypes and Biomarkers Related to Pediatric Asthma

Lecture Speaker: Stanley Szeffler

Learning Objectives:

- Discuss the natural history of asthma in children.
- Identify mechanisms and endotypes associated with asthma phenotypes.
- Indicate how the interaction among academics, industry and regulatory bodies has led to the ongoing development of our currently available asthma medications.

4/1/2020: Pharmacotherapy of Pediatric Asthma

Lecture Speaker: Anne Fitzpatrick

Learning Objectives:

- Understand the indications for initiation of medications in children with asthma
- Discuss the mechanism of action of medications currently used in the treatment of asthma in children
- Identify side effects and other age-related issues that impact the selection of asthma medications

4/8/2020: The Impact of the Opioid Epidemic on America's Children: How Can We Stop the Cycle?

Lecture Speaker: Jonathan Davis/Sharon Levy

Learning Objectives:

- Understand how antenatal exposure to opioids and other psychotropic substances impact the fetus and newborn.

- Identify optimal treatment approaches.
- Describe the longer-term impact on these infants and ways to improve outcomes.
- Describe why normal brain development during adolescence makes teens particularly vulnerable to initiating psychoactive substance use
- Identify key primary care practice parameters needed to support substance use treatment integration

4/15/2020: Pharmacotherapy of Pain in Pediatrics

Lecture Speaker: Charles Berde

Learning Objectives:

- Improve understanding of the development of pain pathways and analgesic actions in newborns, infants, and children
- Increase knowledge of age-related changes in PK and PD for several commonly used classes of analgesics and implications for dose selection and assessment of benefits and risks
- Appreciate the challenges inherent in pediatric analgesic clinical trials and awareness of ongoing efforts to improve on pediatric analgesic study designs
- Appreciate the status of several areas of active research on pediatric pain and analgesic pharmacology

4/22/2020: Pediatric Psychopharmacology: Review of Stimulants, Antidepressants, and Antipsychotics in Youth with Mental Disorders

Lecture Speaker: Adelaide Robb

Learning Objectives:

- Understand general concepts of pediatric psychopharmacology such as dosing, safety-side effect profiles from neurodevelopmental perspective, concentration-effect outcomes
- Understand the three main classes of psychotropics used in youth: stimulants, antidepressants, antipsychotics
- Describe key studies which illustrate the utility of psychotropics in children and youth

4/29/2020: Pediatric Formulations – Past, Present, and Future

Lecture Speaker: Karen Thompson

Learning Objectives: Pending from speaker

5/6/2020: Informed Consent

Lecture Speaker: Donna Snyder

Learning Objectives:

- Understand elements of informed consent
- Understand reasonably foreseeable risks
- Understand obtaining informed consent/assent from vulnerable subjects
- Understand regulations governing informed consent

5/13/2020: Role of Adolescence in Drug Distribution and Effect

Lecture Speaker: Michael Reed

Learning Objectives:

- Describe the impact of adolescence/puberty on drug disposition and effect
- Identify sources of variability in drug disposition and effect during adolescence
- Apply principles of drug PK-PD to determining optimal drug dosing in the adolescent patient

5/20/2020: Product Development for Rare Neurogenetic Disorders

Lecture Speaker: Mustafa Sahin

Learning Objectives:

- Review basic principles of pediatric and rare disease product development, with emphasis in neurodevelopmental disorders.
- Review recent advances in our understanding on rare neurodevelopmental disorders such as Tuberous Sclerosis, Rett Syndrome and Fragile X.
- Discuss scientific, clinical and regulatory hurdles to overcome in order bring therapies to the clinic in these rare disorders.