

**New Drug Development:
Problems and Possibilities**

International Society for Anesthetic Pharmacology Meeting
October 12, 2012

Anne Zajicek, MD, PharmD
Chief, Obstetric and Pediatric Pharmacology Branch

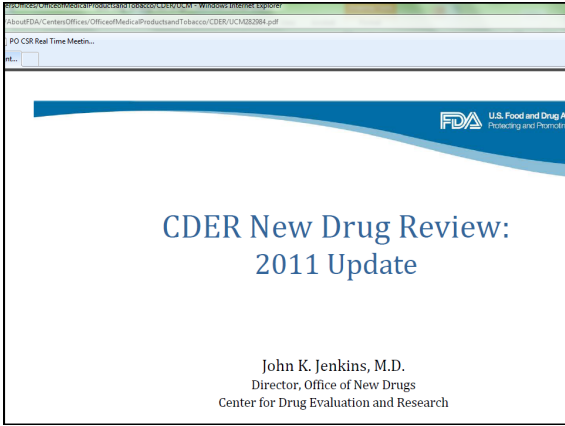


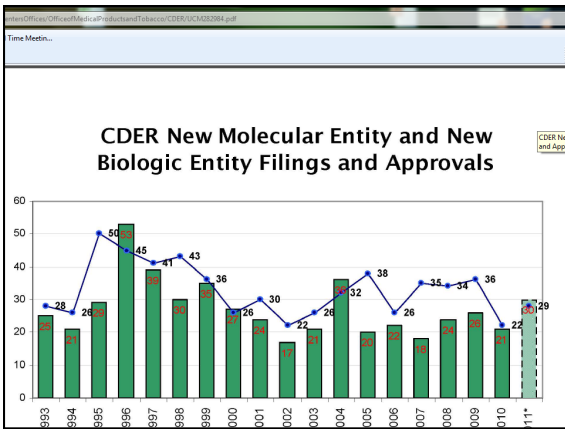
Summary

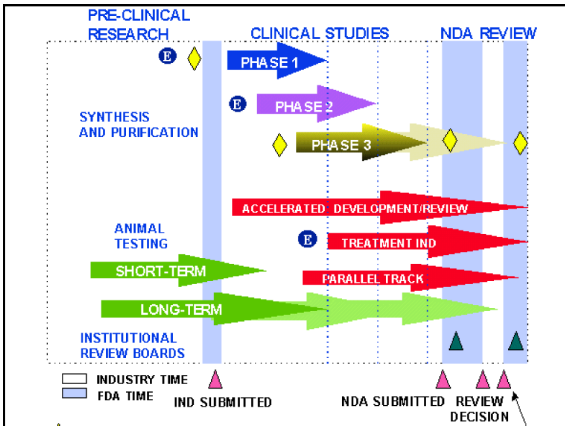
- ▶ Market
- ▶ Biomarkers

New Drug Development

- ▶ Me-too drugs
- ▶ New Chemical Entities/ New Class







Time Course of New Drug Development

- ▶ Drug Target identification
- ▶ Small molecule identification to fit target, optimization
- ▶ Scale-up
- ▶ Pre-clinical testing: efficacy, safety
- ▶ IND
- ▶ Phase 1 (dosing, safety, prelim efficacy)
- ▶ Phase 2 (small scale efficacy, safety)
- ▶ Phase 3 (larger scale efficacy, safety)
- ▶ NDA, post-marketing safety

Cost of New Drug Development

Desirable Properties of Anesthetics

- Safe
- Effective: Short onset/offset
- Reversal agent?

Safety

- ▶ Problems with current drugs
- ▶ Neurotoxicity?
 - Extrapolation
 - How to measure?
 - How long?
 - In what populations? Who is going to pay?
 - Registry vs RCT

Biomarkers

- ▶ Need for biomarkers for
 - Safety
 - Pre-clinical: neuroapoptosis and neurocognitive deficits?
 - Efficacy
 - Depth of anesthesia
 - Extrapolation from animal to human

FDA Guidance on Qualification of Drug Development Tools

- ▶ Biomarkers:
 - A characteristic that is objectively measured and evaluated as an indicator of normal biologic processes, pathogenic processes, or biological responses to a therapeutic intervention
 - Changes following treatment may predict or identify safety or efficacy/benefit
 - Provide quantitative predictions about drug performance
- ▶ Patient-reported Outcome Measures

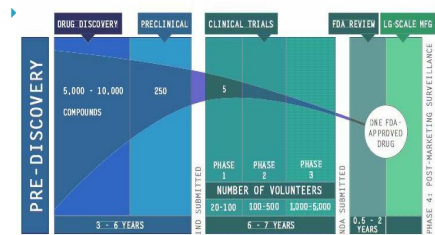
Biomarkers

- ▶ Prognostic
- ▶ Predictive
- ▶ Pharmacodynamic
 - BP, cholesterol, HbA1C, Radiographic measures, CRP

Biomarkers

- ▶ Validation of biomarkers that can be extrapolated from pre-clinical to clinical
 - Reduce drug failure from Phase 1 to Phase 2

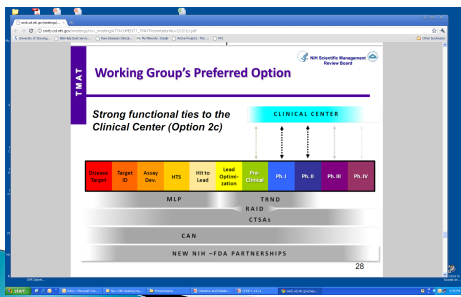
Alzdiscovery.org



National Center for Advancing Translational Science (NCATS)

- ▶ The mission of the National Center for Advancing Translational Sciences (NCATS) at the National Institutes of Health (NIH) is to catalyze the generation of innovative methods and technologies that will enhance the development, testing and implementation of diagnostics and therapeutics across a wide range of human diseases and conditions.

National Center for Advancing Translational Science (NCATS)



Obstetric and Pediatric Pharmacology Branch Program Announcements

- ▶ **Translational Research in Pediatric and Obstetric Pharmacology**
PAR 09-154/155/156
- ▶ **Developmental Pharmacology**
PAR 08-215/216
- ▶ **Mechanisms of Adverse Drug Effects in Children**
PAR 08-248/249
- ▶ **Biomarkers: Bridging Pediatric and Adult Therapeutics**
PAR 11-322/323/324

Contact Information

- ▶ Anne Zajicek, MD, PharmD
- ▶ 301-435-6865
- ▶ zajiceka@mail.nih.gov
