Roadmap Target #3:
Medium-Throughput Screening (MTS) and Omics

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NIEHS
The National Institute of Environmental Health Sciences
The National Institutes of Health
The Department of Health and Human Services

NTP
The National Toxicology Program
The Department of Health and Human Services

Roadmap Target #3:
Medium-Throughput Screening (MTS) and Omics

General Issues:

- Need to reliably predict adverse human effects
- Need to define HTS vs. MTS vs. LTS
- MTS includes both mammalian and non-mammalian *in vivo* models
- Relationship of MTS to HTS
  - Sequential vs. parallel use
  - Selection of assay depends on goal
- Adjunct to traditional approach vs. replacement

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Roadmap Target #3: MTS and Omics

Disease

Cancer

Repro/development

Immuno

Metabolic disorders

Respiratory (asthma)

Neuro

Mode of Action

Endocrine dysfunction

Cell Proliferation

Apoptosis

Oxidative Stress

Membrane Injury

Receptor Binding

DNA damage/repair

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Roadmap Target #3: Activity and Timeline for Medium-Throughput Screening (MTS)

Target Date: Short-Term (2004-2006)

Activities:

1. Define goals and objectives
   - Prioritization for testing
   - Mechanistic Information
2. Catalog available and identify additional MTS assays
3. Workshop for partnerships and communication
4. Criteria for selection of assays and compounds for proof of principle studies
5. Data infrastructure and management tools

Roadmap Target #3: Activity and Timeline for Medium-Throughput Screening (MTS)

Target Date: Mid-term (2007-2009)

Activities:

1. Update catalog and develop new assays to address gaps
2. Conduct proof of concept studies for known compounds
3. Evaluate and communicate findings from proof of concept studies
4. Enhance partnerships to expand capabilities
5. Determine need for validation and design inter-laboratory studies if necessary

Roadmap Target #3: Activity and Timeline for Medium-Throughput Screening (MTS)

Target Date: Long-term (2010…….)

Activities:

1. Utilize MTS assays to define mechanisms/modes of action for unknown compounds and mixtures
2. Utilize MTS to prioritize compounds for toxicity testing and assess toxicity
3. Evaluate findings for human relevance
4. Develop new techniques to address specific diseases
5. Strive for regulatory acceptance
6. Validate predictive models to allow reduction, refinement and replacement of animal models

Roadmap Target #3: Activity and Timeline for Omics

Target Date:Short Term (2004-2006)

Activities:

1. Define goals for Omics assays
   - Mechanisms of action
   - Prioritize chemicals
2. Evaluate utility and applicability of Omics (T, P, M)
3. Public Workshop for data sharing and best practices
4. Refine approach for Omics studies
5. Proof of principle studies with known compounds
6. Expand target tissues, develop repository

Roadmap Target #3: Activity and Timeline for Omics

Target Date: Mid-Term (2007-2009)

Activities:

1. Assess data and technologies to address modes of action
2. Workshop on results of proof of principle studies
3. Enhance partnerships to expand scope
4. Determine if validation is necessary
5. Develop Communication Strategy
    1. Interagency and international partners
    2. Medical and scientific communities
    3. General public

Roadmap Target #3: Activity and Timeline for Omics

Target Date: Long-term (2010……)

Activities:

1. Routine use to determine modes of action for unknown compounds and mixtures
2. Utilize Omics to prioritize compounds for toxicity testing and assess toxicity
3. Determine human relevance of findings
4. Develop approach for specific diseases vs mode of action
5. Strive for regulatory acceptance
6. Validate predictive models to allow reduction, refinement and replacement of animal models