# FDA REGULATION OF NANO MATERIALS AND REGULATORY POSTURE

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# *Regulating Nanotechnology & FDA*

- Level of familiarity with nanomaterials and the risks or hazards they may pose
- Implications of pre-market authorization versus post-market and other regulatory oversight
- Variations among FDA regulatory authorities
- July 2007 FDA Nanotechnology Task Force Report (http://www.fda.gov/nanotechnology/taskforce/report2007.html)

- FDA Mission and regulatory areas
- FDA Nanotechnology Task Force Report
- Research, data development, and international coordination
- Conclusions

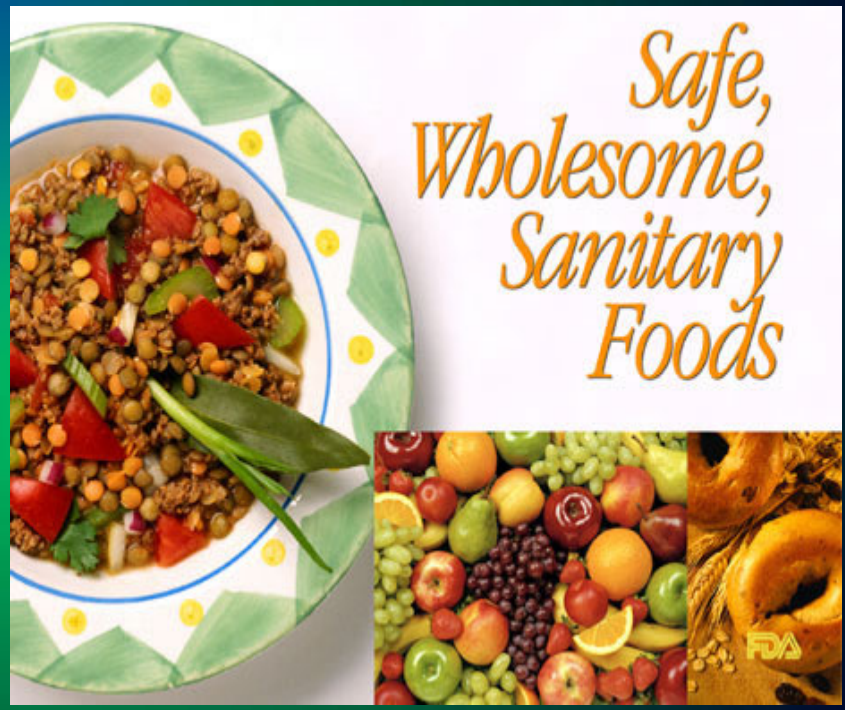
# FDA Mission

The FDA is responsible for ***protecting the public health*** by assuring the safety, efficacy, and security of human and veterinary drugs, biological products, medical devices, our nation's food supply, cosmetics, and products that emit radiation.

The FDA is also responsible for ***advancing the public health*** by helping to speed innovations that make medicines and foods more effective, safer, and more affordable; and helping the public get the accurate, science-based information they need to use medicines and foods to improve their health.

# FDA Regulated Products

- Food
  - for humans (generally not meat and poultry)
  - Animal feed
- Food additives (including containers)
- Color additives (may be used in medical products too)
- Cosmetics
- Dietary Supplements



- Drugs for humans and animals
- Devices
- Biological products
  - Vaccines
  - Blood products
  - Tissues
- Combination products (drug-device, biologic-drug, etc)
- Radiation emitting electronic products (including consumer products)

# *Nanoscale Materials & FDA Regulation*

- Regulation specific to product classes (drugs, devices, foods . . .)
- Range of regulatory authorities and approaches
  - Pre-market authorization
    - of individual product (e.g., “new” drugs, devices)
    - of class (e.g., monograph over-the-counter drugs, food and color additives)
  - No pre-market authorization (e.g., cosmetics, dietary supplements)
  - Post-marketing oversight and notification requirements

# *Nanoscale Materials & FDA Regulation*

- Review of products, not technology
- Adaptability: new knowledge may lead to new approaches
- Product assessment challenges (for FDA and regulated entities)

# *FDA Nanotechnology Task Force*

- Enable development of safe and effective products
- Address knowledge or policy gaps
- Guide science and technology
- Assess current state of science
- Strengthen collaboration with federal agencies
- Prepare a report

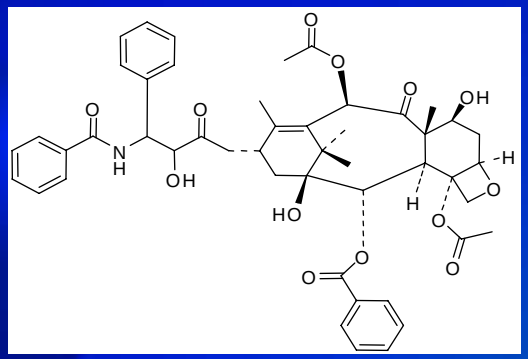
# *Nanotechnology Task Force Report Bottom Lines*

1. Nanoscale materials could be used in most types of products regulated by FDA
2. Nanoscale materials present challenges similar to other emerging technologies
3. The fact that safety and efficacy can vary with size can complicate the challenges
4. Not apparent that nanoscale materials as a group would have more inherent hazard than other materials as a group
5. Steps should be taken to better inform FDA reviewers and industry about what is known, needed, and expected

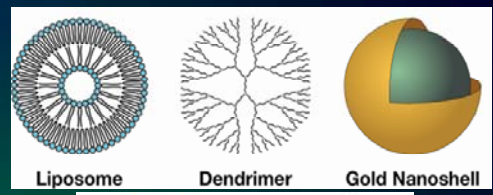
# *Size can complicate challenges*

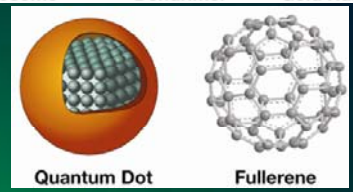
- Measurement
  - What to measure
  - How
- Product consistency
- Assays
  - Validity
  - Utility
- Definition of impurity

# Physical Characterization



Small molecules




Nanomaterial

**Physicochemical Parameters**

- **Composition**
- **Physical properties**
- **Chemical properties**
- **Identification**
- **Quality**
- **Purity**
- **Stability**

Same parameters – different/additional characterization methods

(Source – NCI/NCL)

# *Definitions*

- No definition offered or used in FDA Task Force report
- Broad inclusive approach taken
- Continue to consider importance of material size and state of the science
- At some point, it may be productive to tailor definitions to specific product areas

# *Science Issues Addressed by the FDA Task Force Report*

- Understanding Interactions with Biological Systems
- Adequacy of Testing Approaches for Assessing Safety and Quality

# Science Recommendations

***Understanding biological interactions***

- Promote/participate in developing more knowledge about
  - biological interactions
  - detection and measurement
- Build in-house expertise and infrastructure to share and leverage knowledge
- Ensure Agency-wide regulatory-science coordination for nanoscale materials

# Science Recommendations

***Adequacy of testing approaches***

- Evaluate adequacy of testing approaches to assess safety, effectiveness, and quality of products with nanoscale materials
- Promote/participate in the development of
  - characterization methods and standards for nanoscale materials; and
  - models for the behavior of nanoscale particles in-vitro and in-vivo.

# *Regulatory Policy Issues Addressed by the FDA Task Force Report*

- Ability to Identify Products that Contain Nanoscale Materials
- Authority Regarding Evaluation of Safety and Effectiveness
- Permissible and Mandatory Labeling
- National Environmental Policy Act

# *Identification of Products Containing Nanomaterials*

FDA's authority to obtain information about particle size varies

- Comprehensive for products subject to premarket authorization
- More limited for products not subject to premarket authorization
- For some product categories, information requirements can vary (e.g., over-the-counter drugs, food and color additives)

# *Identification of Products Containing Nanomaterials*

Recommendations

- Issue guidance recommending that sponsors identify particle size of small particle materials in submissions for products subject to premarket authorization or to notice requirements
- When warranted, request data on particle size for over-the-counter drugs and food and color additives

# *Product Safety and Effectiveness*

FDA's oversight authority for product safety and effectiveness varies

- Most comprehensive for products subject to premarket authorization
- Less comprehensive for products not subject to pre-market authorization
  - But manufacturers still responsible for ensuring the safety of their products
- Presence of nanoscale materials may change regulatory status

# *Product Safety and Effectiveness*

Recommendations

- Issue calls for safety and effectiveness data
- Issue guidance on
  - Manufacturing
  - GRAS (“generally recognized as safe”) food ingredients
  - Food and color additives
  - Devices
  - Cosmetics
  - Dietary supplements

# *Labeling*

- Labeling of FDA-regulated products must be truthful and not misleading, and contain material information
- As with any product, FDA does not require the inclusion in labeling of information that is not material nor permit the inclusion of information that would make the labeling false or misleading
- Current state of the science does not indicate unique safety concerns

# *Labeling*

- Recommendation
  - Address on a product-by-product basis whether labeling must or may contain information on the use of nanomaterials

# National Environmental Policy Act (NEPA)

- NEPA requires federal agencies to consider the environmental effects of proposed major actions
- Agencies can establish categorical exclusions for categories of actions that do not have a significant effect on the environment
- But procedures must be established to recognize extraordinary circumstances when a normally excluded action may have a significant environmental effect

# *NEPA*

Recommendations

- Consider on a product-by-product basis whether an FDA-regulated product containing nanomaterials qualifies for an existing categorical exclusion or whether extraordinary circumstances exist
- Designate a lead to coordinate the agency's approach to its obligations under NEPA regarding nanotechnology

# *Research/data development*

- FDA research database
- National Toxicology Program
- Participation in White House National Science and Technology Council's research priorities effort
- Participation in Organization of Economic Cooperation and Development working parties' data development
- Alliance for NanoHealth – FDA workshop on critical path issues

# *Bilateral Cooperation on Nanotechnology Issues*

- FDA cooperates bilaterally with many foreign regulatory partners
  - see http://www.fda.gov/oia/default.htm
  - often supported by confidentiality arrangement allowing the sharing of non-public information
- FDA works with various European Union entities:
  - DG (Directorate General)-Enterprise, DG-SANCO (for health and consumer protection), DG-Research, the European Food Safety Authority (EFSA) and the European Medicines Agency (EMEA)
- Transatlantic Economic Cooperation agreement includes nanotechnology
  - focus on communication and research

# *Multilateral Cooperation on Nanotechnology*

- OECD
  - Working Party on Manufactured Nanomaterials
  - Working Party on Nanotechnology
- ISO TC229

# Conclusions

- FDA regulates a range of potential nanoscale material products using various authorities
- Premarket authorization provides comprehensive approach to evaluating safety, effectiveness, quality of products
- Less information available to FDA and more limited oversight for products not subject to premarket authorization

# *Conclusions (cont'd)*

- Task force recommends issuing guidance and requesting data with public input
- FDA continues to stress the importance of early communication with industry
- FDA is seeking to increase data availability and expertise to facilitate review of products
- FDA will continue to work with foreign counterparts and through multilateral efforts

# *Final thoughts*

**Playing an active role**

- Avoid delay and surprises
- Come in early and often
- Provide data
- Participate in research planning
- Engage in international harmonization and coordination efforts

# *Thank you*

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