

# Assuring the Safety of the Food Supply: Science, Public Policy, and Politics

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# FOOD SAFETY

A RELATIVE CONCEPT INVOLVING A CONTINUUM BASED ON SCIENCE WHOSE EXACT POSITION ON THE CONTINUUM IS DETERMINED BY NONSCIENTIFIC ISSUES, SUCH AS POLITICS, ECONOMICS, AND SOCIAL VALUES.

IT IS AN INTELLECTUAL CONCEPT, NOT AN INHERENT BIOLOGICAL PROPERTY OF A SUBSTANCE.

# MODIFIED RISK ASSESSMENT PARADIGM



[1] Includes: Hazard Identification; Dose Response; Exposure Estimation

[2] Includes: Risk Characterization; Economic and Social Studies

[3] Includes: Regulation; Communication; Legislation

# RELATIVITY

- **EINSTEIN'S PHYSICS**

$$E = MC^2$$

- **MILLER'S FOOD SAFETY (An Analogous Equation)**

$$S = C(R^{-u})^3$$

*Where:*

S = food safety

C = a collective for socio-cultural functions,  
e.g., economics, politics, cultural  
dynamics, statutory restraints

R = risk science

U = uncertainty, a negative function

# GOAL OF FOOD SAFETY SCIENCE

***TO CLEARLY IDENTIFY HAZARD AND ACCURATELY ESTIMATE RISK***

**TO REACH THIS GOAL REQUIRES THE INTEGRATION OF:**

- **NUTRITION**
- **MICROBIOLOGY**
- **TOXICOLOGY**
- **MOLECULAR BIOLOGY**
- **GENETICS**
- **FUNCTIONAL BIOLOGY**
- **FOOD SCIENCE**

**IN OTHER WORDS, A NEW ACADEMIC DISCIPLINE**

# **“WITHER GOEST WE”**

## **NEEDS FOR ASSURING A SAFE FOOD SUPPLY:**

- A. IDENTIFICATION OF HAZARD**
- B. SURVEILLANCE MODELS**
- C. RISK SCIENCE**
- D. PREVENTION**
- E. POLICY DEVELOPMENT AND EXECUTION**
- F. IMPACT OF POLITICS**

# RESEARCH PRIORITIES FOR FOOD SAFETY SCIENCE

1. GENOMICS  
EXPRESSION (ARRAY ANALYSIS)
2. PROTEOMICS  
TRANSLATION  
REGULATION  
STRUCTURE  
"GLYCOMICS"

# RESEARCH PRIORITIES FOR FOOD SAFETY SCIENCE (continued)

## 3. "METABOLOMICS" (METABOLIC MARKERS)

ENZYME ACTIVITY  
DYNAMICS AND KINETICS

## 4. "FUNCTIONOMICS"

CELLULAR  
ORGAN

## 5. "INTEGRATIVE BIOLOGY"

("IN VIVO" PARADIGMS)

NUTRITION  
TOXICOLOGY  
PHYSIOLOGY  
ETC.

# RESEARCH PRIORITIES FOR FOOD SAFETY SCIENCE MICROBIOLOGY

## *GENOMICS*

- EMERGING FOOD PATHOGENS

## *PROTEOMICS*

- ANTIBODIES TO PATHOGENIC SURFACE RECEPTORS
- RAPID PATHOGEN BIOMARKERS
- REAL-TIME MONITORING OF FOOD PROCESSING

## *FUNCTIONAL BIOLOGY*

- GENERIC AND SPECIFIC VACCINES FOR FOOD PATHOGENS
- RAPID FIELD ASSAYS
- DOSE/RESPONSE CURVES
- EXPOSURE ESTIMATES

# **FOOD SAFETY PREVENTION STRATEGIES**

## **INACTIVATION OF MICROORGANISMS IN FOOD:**

- 1. HIGH INTENSITY PULSED ELECTRICAL FIELDS**
- 2. OSCILLATING MAGNETIC FIELDS**
- 3. IRRADIATION**
- 4. HIGH INTENSITY PULSED LIGHT**
- 5. ULTRASOUND**
- 6. OZONATION**
- 7. BACTERIOCENS**
- 8. NANOTECHNOLOGY**

# **FOOD SAFETY MODELS**

- A. ESTABLISHING PRIORITIES**
- B. THREATS AND RESPONSES**
- C. DYNAMIC VS STATIC MODELS**
- D. RISK MANAGEMENT**

# **FOOD SAFETY, POLICY DEVELOPMENT, AND EXECUTION**

- A. STRUCTURE**
- B. MODELS**
- C. ASSURING TRANSPARENCY**
- D. COMMUNICATION**
- E. REDUCTION OF BARRIERS TO RAPID  
RESPONSE**

# **FOOD SAFETY POLICY**

## **A. AGENCY STRUCTURE**

- 1. SINGLE AGENCY VS MULTIPLE AGENCY RESPONSIBILITY**
- 2. CONGRESSIONAL OVERSIGHT**

## **B. INCREASED STATE AND LOCAL ROLE**

- 1. INTEGRATION**
- 2. FUNDING**

# **POLITICIZATION OF FOOD SAFETY DECISIONS**

**A. *EX PARTE***

**B. BUDGET**

**C. PERSONNEL SELECTION,  
APPOINTMENT, AND PROMOTION**

**D. *AD HOMINEM***

*Thank You!*



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