Food Science

Biology Group

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Activities of the Montville Laboratory

- Applications and mechanisms of **bacteriocins** (antimicrobial peptides) as anti-listerial and anti-botulinal agents
- **Bacillus anthracis**, heat resistance, growth characteristics, surrogates
- **Alicyclobacillus**, membrane fluidity, high pressure lethality
George M. Carman- *Membrane Phospholipid Synthesis and Lipid Metabolism in Yeast*

**Saccharomyces cerevisiae**  
(baker’s yeast)

- **Applications**  
  - Baking and brewing  
  - Pharmaceuticals
- **Biomedical Research**  
  - Obesity  
  - Cancer

- **Function of Membrane Phospholipids**  
  - Structural basis of the membrane bilayer  
  - Modulation of membrane enzyme activity  
  - Reservoir of lipid signaling molecules  
  - Regulates fat metabolism
Research Projects
(NIH Grants GM-28140 and GM-50679)

• Gene transcription is a mechanism by which phospholipid-synthesizing enzymes are regulated
  – Stress (nutrient deprivation)
    • CHO1 (PS synthase) - membrane synthesis
    • PIS1 (PI synthase) - membrane synthesis and lipid signaling
    • DPP1 (DGPP phosphatase) - vacuole function and lipid signaling
    • EKI1 (Ethanolamine kinase) - membrane synthesis
    • PAH1 (PA phosphatase) – fat metabolism

• Phosphorylation is a mechanism by which pathways of signal transduction mediate phospholipid synthesis
  – Phosphatidate phosphatase
  – CTP synthetase
  – Choline kinase

Regulates fat metabolism
Unregulated levels of these enzymes are common in human cancers
Schaffner Lab

• Understanding food microbiology problems through the application of mathematics and statistics

• Key features
  – Collaboration
  – Use of graduate and undergraduate students
  – Real world data
  – Math and statistics
  – Lab data
  – Practical application
  – Fundamental biology
Tots with sensitive taste buds eat fewer veggies

NEW YORK (Reuters) -- Preschoolers who are sensitive to bitter flavors may be especially likely to turn their noses up at vegetables, a new study shows.

Whether or not you can taste a bitter compound called 6-n-propylthiouracil (or PROP) may help Beverly Tepper, Ph.D., identify your risk for becoming obese and/or developing cardiovascular disease.
Chikindas Lab

• MOLECULAR FOOD SAFETY
  – Antimicrobial packaging material
  – Cell-cell signaling

• Bacteriocins - human health - Bacterial vaginosis
Dr. Quadro’s Laboratory Research Interest

Understanding the relationship between nutrients and human health, at different stages of the life cycle, through the use of genetically modified animal models. Special focus on pregnancy and development. Vitamin A and carotenoids serve as model nutrients to investigate this issue.

- Maternal-fetal transfer and metabolism of vitamin A and carotenoids.

- Mechanisms that maintain adequate levels of vitamin A in serum and tissues.

- Interactions between Conjugated Linoleic Acid (CLA) and vitamin A metabolism.
Matthews Lab

• Microbial Food Safety
  – Safety of fresh and fresh-cut fruits and vegetables
  • Foodborne pathogen-plant interaction
    – Bacteria and plant moieties involved in adherence, growth, survival
  – Natural antimicrobials
    • Plant antimicrobial peptides
      – Mode of action
      – Production
      – Application
  – Nanotechnology
    • Particles containing or coated with antimicrobial agent(s)
      – Activity, application
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