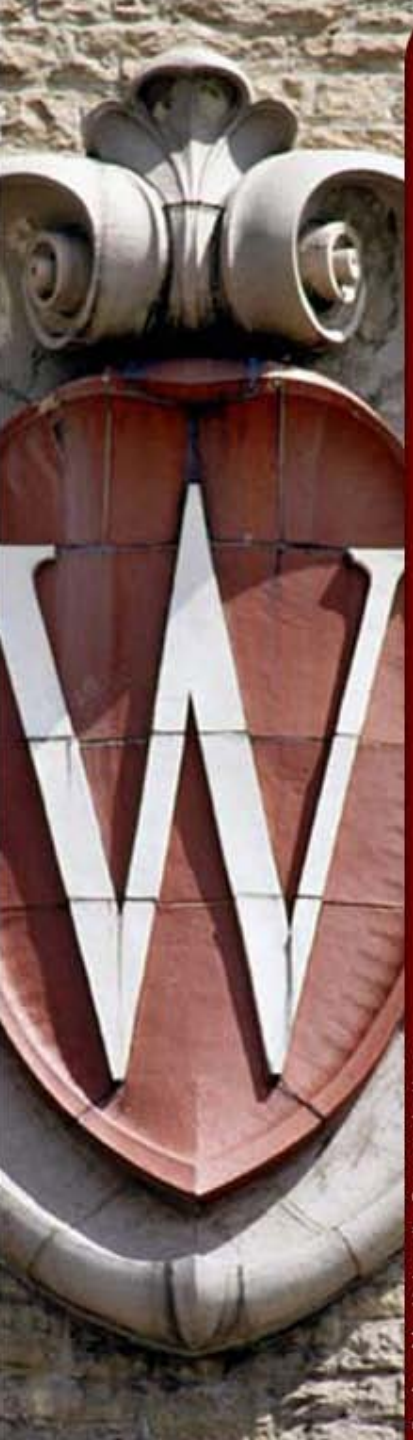

Produced by University Communications

Berry Polyphenols and Gut Health

Jess Reed

Reed Research Group
Cardiovascular • Mucosal Immunology • Phytochemistry

Complete Phytochemical Solutions
Authenticity • Standardization • Efficacy

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Health Benefits of Berry Polyphenols

- Inhibit oxidative damage to cells
- Inhibit cellular response to inflammatory agents
- Inhibit pathogenic microorganisms
  - Uropathogenic E. coli and cranberry “A-type” Proanthocyanidins

Health Benefits of Berry Polyphenols

- Decrease risk of disease
  - Cardiovascular
  - Cancer
  - Urinary tract infection/health
  - Dental
  - Ulcers (*H. pylori*)
  - Viral infection
  - Age related neurodegenerative diseases

Low Bioavailability of Berry Polyphenols

- Paradox in relation to health benefits
- Anthocyanins, flavonol glycosides metabolized in the gastrointestinal tract
  - Enterocyte metabolism
  - Microbial metabolism
- Tannins
  - Proanthocyandins and ellagitannins
  - Oligomers not absorbed from digestive tract
- Blood and tissue concentrations below bioactive levels in cell culture studies

Health Benefits of Berry Polyphenols

“The way to a man's heart is through his stomach.” Fanny Fern (1811-1872)
"Anybody who believes that the way to a man's heart is through his stomach flunked geography." Robert Byrne (1930 -)

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Implications

- Are effects in the gut responsible for health benefits of berry polyphenols?
- Direct effects
  - Effects of berry polyphenols on lipid oxidation, inflammation, immunity, and bacterial adherence and cell invasion in the gut
- Indirect effects
  - Immunity and gut associated lymphoid tissue

The Gastrointestinal Tract in Health and Disease

- Enterohepatic circulation
  - absorption, excretion and metabolism
- Enteric nervous system
  - “Second brain”
  - More neurons than the spinal cord
- Gut microbiota
  - Mutualism between host and microbe
  - Enteric and extra-intestinal pathogenic bacteria
- Effects on systemic immune disorders
  - Chronic inflammation in CVD, cancer and arthritis

The Gastrointestinal Tract in Health and Disease

- Gut associated lymphoid tissue (GALT)
  - largest immune tissue
  - 50% of immunity originates in the gut
  - GALT dysfunction and chronic inflammatory diseases

Tannins and Gut Associated Lymphoid Tissue

- Microbial anti-adherence
  - protection from enteric pathogens
  - E. coli, Salmonella, Listeria, Heilicobacter pylori, and peirdontal pathogens
- Anti-oxidant
  - Lipid oxidation in food and gut increases oxidized lipoproteins in serum
  - Causative factor in atherosclerosis and cardiovascular disease
- Anti-inflammatory
  - inflammatory bowl disease, Crohn's disease, food allergies and colon cancer

Systemic Immune Disorders

- Chronic inflammation
  - Cardiovascular disease
  - Cancer
  - Arthritis
  - Alzheimer's disease
  - Obesity and metabolic syndrome
  - Extra intestinal inffections
- Effects of berry polyphenols in the GI tract influence the etiology of all of these diseases

Health Benefits of Berry Polyphenols

“The way to a man's heart is through his stomach.” Fanny Fern (1811-1872)
"Anybody who believes that the way to a man's heart is through his stomach flunked geography." Robert Byrne

Fanny’s right because: Berry polyphenols decrease risk of (cardiovascular) disease by indirect effects mediated through the gut microbiota and gut associated lymphoid tissue.

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