

California Prune Board Nutrition Research Program

*IPA Conference
Agen, France
June 15, 2009*



Nutrition Research Discovers...

- **What's in prunes?**
Composition
- **What do these compounds do?**
Consumption
- **What can we say?**
Communication

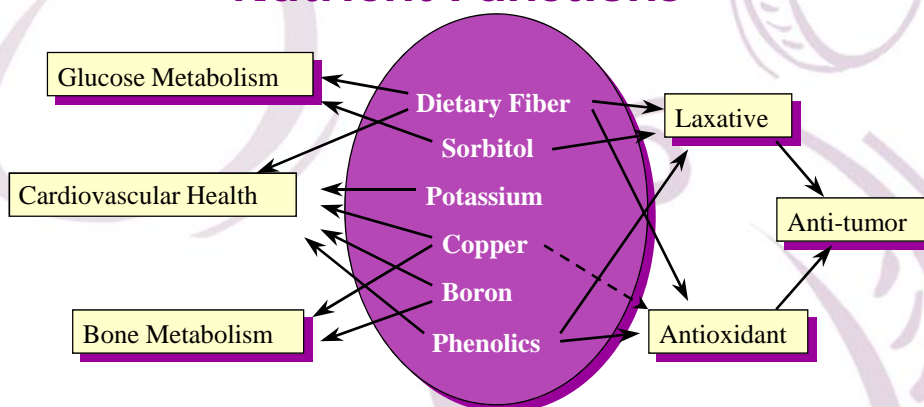


Composition Variety of Nutrients

- Dietary fiber: soluble and insoluble
- Potassium
- Other minerals: boron, copper
- No added sugar
- Low glycemic index
- No cholesterol
- Low in fat, *trans* fatty acids
- Low in sodium



Prunes' Web of Nutrient Functions



Stacewicz-Sapuntzakis. Critical Reviews in Food Science & Nutrition 2001; 41:4.

Over a Decade of Accomplishments

- Scientific Nutrition Advisory Panel
- 31 funded projects
- 19 publications/abstracts
- Several publications pending
- Several internal documents
 - Special carotenoid analysis
 - Glycemic index



Today's Presentation

- Digestive Health
- Hunger Management/Satiety
- Bone Health
- Heart Health



Digestive Health

- Tradition – used for constipation
- Need science
 - Compare prunes directly with popular fiber supplement (Metamucil) 6 g fiber
 - 50 g prunes 2x/day
 - 1 tbls Metamucil 2x/day
 - Food based, convenient and tasty alternative to laxatives and fiber supplements



Prunes in the Treatment of Adults with Constipation

**Satish S. C. Rao, MD,
PhD, FRCP**
University of Iowa Carver College
of Medicine
Iowa City, Iowa



Study Reported

- Number of bowel movements
- Relief of symptoms
- Palatability: taste and satiety
- Tolerability: fullness, bloating and distension
- Quality of Life questionnaire



Preliminary Findings

- Subjects significantly more 'regular' while on prunes compared to Metamucil and baseline
- More subjects reported relief of constipation symptoms while on prunes compared to Metamucil
- No significant differences in palatability and tolerability between prunes and Metamucil



Help Manage Hunger and Weight

- Snacking may control hunger and contribute to nutrient intake
- Can prunes help manage hunger and decrease amount of food eaten at another meal or over time?



Prunes for Promotion of Satiety, Weight Management Practices and a Healthful Diet

Mark Kern, PhD, RD
Department of Exercise and Nutritional Sciences
San Diego State University

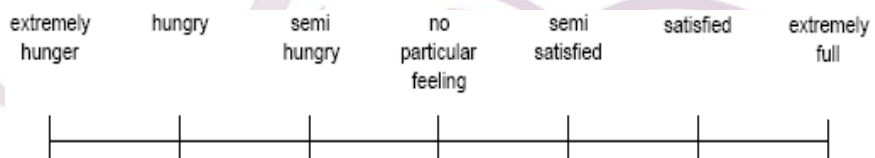


Prunes Compared to Low-fat Cookie

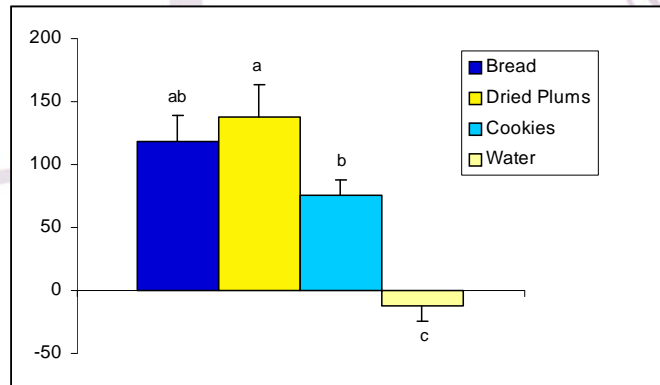
- Short term - intake at next meal
- Longer term - twice daily snack on diet quality, energy intake for 2 weeks
- Other measures of satiety and health



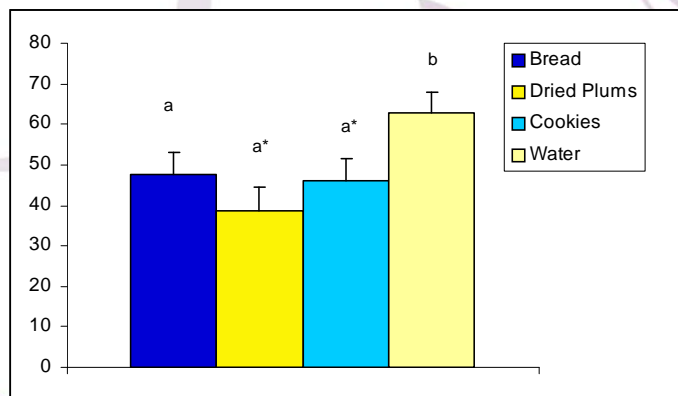
Hunger Scale



Prunes Rate Higher in Satiety



Wanted to Eat Less After Prune Snack

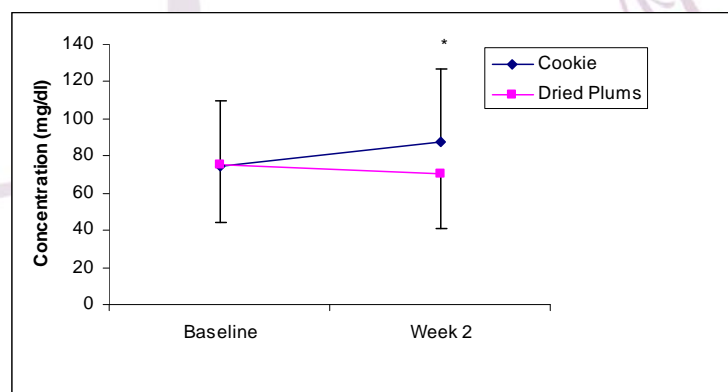


2 Week Study

- No change in body weight nor body composition
- But...



Lower Triglycerides



*P<0.05)

Improved Nutrient Intake

- Higher fiber, potassium, riboflavin, niacin and calcium
- Lower fat and cholesterol intake

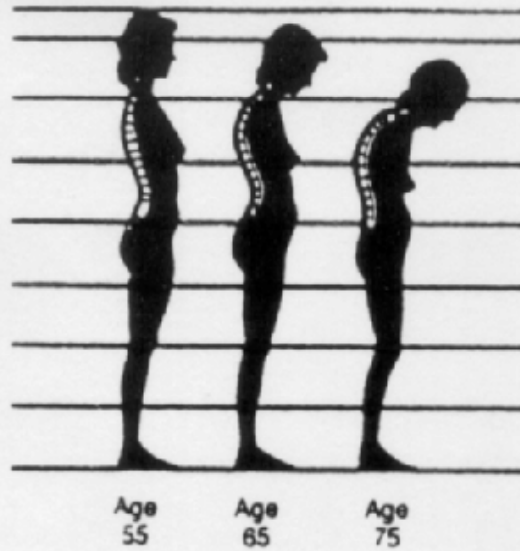


Bone Health

- Risk of hormone related osteoporosis
 - Women at menopause
 - Men with age and lower hormone levels



CLINICAL FEATURES OF OSTEOPOROSIS



Prunes Promote Bone Health

- **Bahram Arjmandi PhD, RD
and Team Florida State University
and Oklahoma State University**
 - Stopped and restored bone loss in male and female animal model of hormone deficient osteoporosis
 - Improved markers of bone formation postmenopausal women



Current Clinical Trial

- Can prunes restore bone loss in postmenopausal women?
 - 10 prunes daily for 1 year
 - Measure bone mineral density
 - Measure oxidative stress

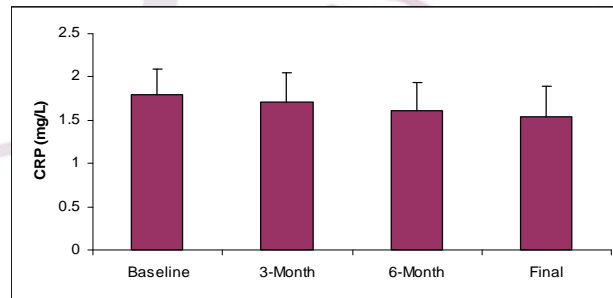


Mechanism to Promote Bone Health?

- Slow/stop bone breakdown
- Nutrients – potassium, vit. K, boron
- Phenolic compounds – function as antioxidants
- Anti-inflammatory?



Effect of Prunes on C-reactive Protein



N = 23 at each time point. C-reactive protein (CRP), a measure of inflammation was assessed in fasted blood



Arjmandi confidential preliminary data

Prunes Lower Inflammation

- CRP not very sensitive marker of inflammation
- Prunes can lower the serum level of CRP
- Inflammation **MAY** be a major reason for developing osteoporosis
- Prunes' bone protective effect **MAY** in part be due to its anti-inflammatory properties



Heart Disease

- Prunes/prune fiber lowered cholesterol levels in rats and humans
 - Cholesterol only a marker of heart disease
- Could prunes reduce heart *disease*?



Lower Risk of Heart Disease

- Daniel Gallaher, PhD,
University of Minnesota
British Journal of Nutrition
101:233-239, 2009

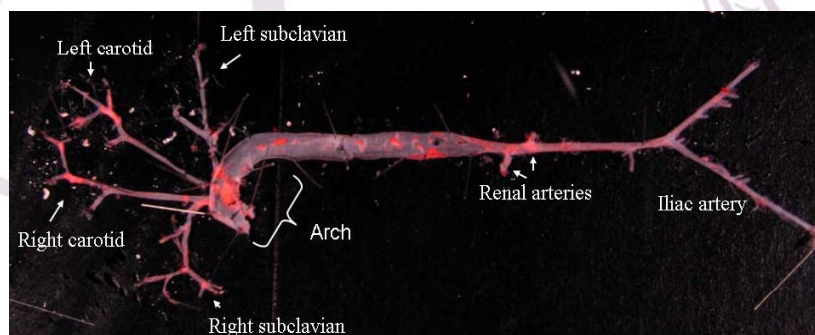


Lower Risk of Heart Disease

- Mice without the gene to handle cholesterol
- Equivalent of 10-12 prunes lowered lesions in the entire arterial system and in the aortic arch



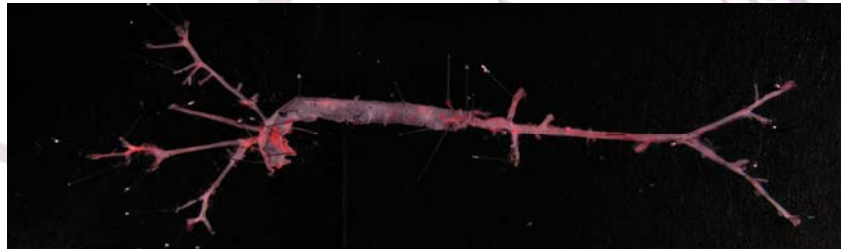
Atherosclerotic Lesions



**Arterial tree from mouse fed
the Basal + Cholesterol diet**



Prunes and Atherosclerotic Lesions



**Arterial tree from mouse fed
the 4.75% Dried Plum Diet**

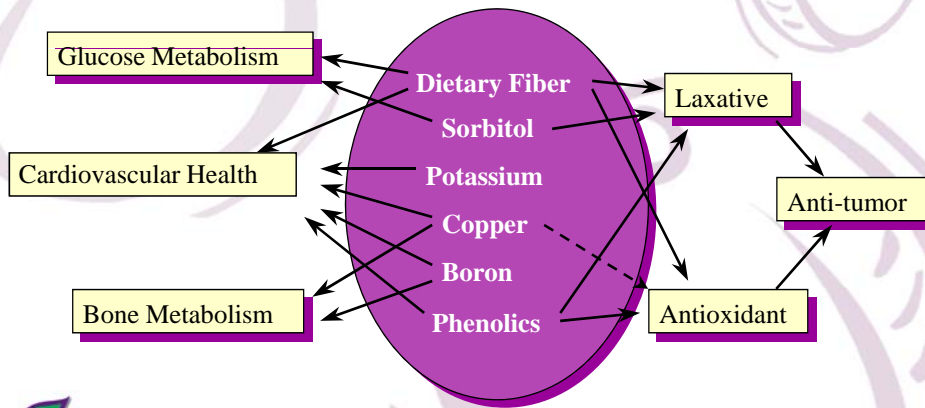


Communicating Prunes' Health Benefits....

- **Media and public relations**
- **Food-based approach to health**
 - Tasty, Convenient, Versatile, Nutritious
- **Inclusion in national dietary guidelines**



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Thank You
Merci!!!

