Today’s Speakers

Taylor C. Wallace, PhD, CFS, FACN

Alex Caspero MA, RD, CLT, RYT
Learning Objectives

• Identify the properties of polyphenols and the food sources where you can find them

• Articulate the research behind the health benefits of foods delivering polyphenols, like anthocyanins

• Help families get more purple-hued foods and beverages into their diets with culinary tips and tools
Polyphenols Behind the Power of Purple Foods

Taylor C. Wallace, PhD, CFS, FACN
Disclosures

- Think Healthy Group, Inc.
- George Mason University
- Journal of the American College of Nutrition
- Dr. Taylor Wallace – Food & Nutrition Blog
- Tone Media and NBC Universal
Presentation Outline

• Nutrition Facts Panel
• Polyphenols
• Anthocyanins – My Love in Life!
• Health Benefits of Foods that Deliver Anthocyanins
  – Case Study: The Concord Grape
Nutrition Facts Panel

- Lists amounts of essential nutrients by law.
- No labeling of bioactives (i.e., phytonutrients) like polyphenols.
- Supplements can label the amount of a bioactive present.

**Current and New Food Label from FDA Website.**
Dietary Bioactive Compounds

- Often referred to as phytonutrients.
- Compounds that are constituents in foods and dietary supplements, other than those needed to meet basic human nutritional needs, which are responsible for changes in health status.

  - Examples include carotenoids, polyphenols, sulfonamides, glucosinolates and etc.
Polyphenols

• Abundant bioactives (i.e., phytonutrients) found in plants.
  – Flavonoids are a major class of polyphenols (over 7,000 identified).

• Their ring structure gives them the ability to promote overall health.

• The gut microbiota often ferment or metabolize polyphenols into smaller compounds that have health promoting properties.
Polyphenols in Plants

Polyphenols

- Hydroxy-benzoic Acids
- Hydroxy-cinnamic Acids
- Flavonoids
- Stilbenes
- Lignans

  - Flavonols
  - Flavones
  - Isoflavones
  - Anthocyanins
  - Flavanones
  - Flavanols

  Proanthocyanidins
Anthocyanins

- The orange-red to blue-violet pigments in many plants (anthos = flower; kyanos = blue)
Anthocyanins

- Plant compounds formed in response to environmental stress.
  - UV light
  - Frost
  - Soil acidity
  - Deter insects
  - Pollination attractants
Anthocyanins

- Members of the **flavonoid family.**
  - (C6-C3-C6) skeleton
- Positive charge allows them to **absorb light** in the visible region.
- Their ring structure enables them to **promote health.**
Anthocyanins\textsuperscript{1}

- > 700 anthocyanins identified
  - 96% are glycosylated
  - Approximately 50% are acylated

- 27 anthocyanidins (aglycons)
  - 6 are predominant in nature and make up 90% of those identified
Anthocyanins\textsuperscript{1,2}

- **Stomach** is major absorption site.
  - Anthocyanins tightly bind to proteins like bilirubin.

- Anthocyanins and their breakdown/metabolic products can be found in vascular tissue and cross the blood-brain barrier.
Anthocyanins

- Average intake of anthocyanins by U.S. adults is estimated to be **11.6 mg/d**
  - 31% of adults have zero intake.
- Top sources of purple foods in the U.S. diet include:
  - Berries
  - Wine
  - Grapes
  - Purple Vegetables
  - 100% Grape Juice
## Anthocyanins and Heart Health

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Median Intake of Anthocyanins (mg/d)</th>
<th>Men</th>
<th>Women</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.8 (&lt;5.5)</td>
<td>1.00 (-)</td>
<td>1.00 (-)</td>
<td>1.00 (-)</td>
</tr>
<tr>
<td>2</td>
<td>6.8 (5.5-8.1)</td>
<td>0.83 (0.70, 0.97)</td>
<td>0.79 (0.67, 0.94)</td>
<td>0.77 (0.69, 0.87)</td>
</tr>
<tr>
<td>3</td>
<td>9.8 (8.2-11.4)</td>
<td>0.82 (0.71, 0.96)</td>
<td>0.73 (0.62, 0.88)</td>
<td>0.77 (0.68, 0.86)</td>
</tr>
<tr>
<td>4</td>
<td>13.7 (11.5-16.6)</td>
<td>0.78 (0.67, 0.91)</td>
<td>0.67 (0.56, 0.80)</td>
<td>0.74 (0.66, 0.83)</td>
</tr>
<tr>
<td>5</td>
<td><strong>22.2 (&gt;16.7)</strong></td>
<td>0.72 (0.62-0.84)</td>
<td>0.72 (0.61, 0.86)</td>
<td>0.72 (0.64, 0.80)</td>
</tr>
<tr>
<td>P-trend</td>
<td>0.0002</td>
<td>0.002</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
</tbody>
</table>
Anthocyanins and Heart Health

• Systematic Review\textsuperscript{5}

  – Healthy individuals experienced \textit{consistent but non-significant improvements} in total cholesterol, LDL-cholesterol, HDL-cholesterol and triglycerides across studies.

  – Hyperlipidemic individuals experienced \textit{consistent and significant decreases in LDL-cholesterol} with consistent but non-significant improvements in total cholesterol, HDL-cholesterol and triglycerides.

  – No effect of on blood pressure.

  – \textit{\~30-35 mg/d} seems to be the sweet spot.
Anthocyanins and Heart Health
(LDL-Cholesterol)\(^5\)

**Kianbakht et al. 2014**

**Qin et al. 2009**

**Soltani et al. 2014**

**Zhu et al. 2013**

<table>
<thead>
<tr>
<th>Percent Change</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Anthocyanins and Heart Health

- Anthocyanins repaired damage induced by adding an inflammatory agent to human endothelial cells.\(^5\)
Case Study: The Concord grape

- Thick skin
- Crunchy seeds
- Bold flavor
- In season 4-6 weeks in fall
- Can be hard to find fresh
- Used in 100% grape juice
Polyphenols in Concord Grapes

- Three classes of polyphenols are in the Concord grape:
  - Phenolic Acids
  - Flavonoids
    - Anthocyanins
    - Proanthocyanidins
  - Stilbenes
Squeezing the Goodness of the Grape

• 100% grape juice maximizes the polyphenol potential of the Concord grape.
  – Whole Concord grapes are crushed – skin, seeds and all – and heated to help release polyphenols.
Heart-Health Benefits of Concord Grapes

• Studies indicate Concord grapes may:
  – Help support flexible arteries to promote healthy blood flow.
  – Have an anti-clotting effect like red wine.
  – Play a role in healthy blood pressure in certain populations.

• Nearly 20 years’ worth of research indicates that, thanks to the Concord grape, 100% grape juice helps support a healthy heart. 6-18
100% Grape Juice: Helps Support Healthy Circulation

Research has shown how the Concord grape benefits heart health by promoting healthy circulation.⁷,⁸,¹⁰,¹³,¹⁸,¹⁹

- Studies indicate that Concord grapes may stimulate nitric oxide (NO) production.⁷,¹⁰,¹⁹
  - Increased NO leads to vasodilation, or the widening of the arteries.

- A new study showed that circulation was improved when healthy men and women drank 100% grape juice each day for 4 weeks vs. when they drank a sugar sweetened beverage (placebo).¹⁸
Emerging Research: Concord Grapes & Cognitive Health

Preliminary research suggests Concord grapes may help promote a healthy cognition.\textsuperscript{20-25}

- A pilot study of 12 older adults with early memory impairment found that \textit{daily Concord grape juice consumption resulted in improved verbal learning and memory measures}.\textsuperscript{20}

- Another study showed that \textit{Concord grape juice drinkers had increased blood flow} in two regions of the brain involved in working memory, compared to a placebo.\textsuperscript{21}
New Concord Grape Science: Cognitive Health in Younger Adults

Study Design:

- **Subjects:** 25 healthy, 40- to 50-year-old working women with pre-teen children
- **Test beverages:** 12-oz./day of Concord grape juice and a placebo (grape-flavored, added sugar drink)

Key Outcomes:

- Significant improvement in **immediate spatial memory and driving performance** were seen when moms drank grape juice daily vs. placebo.
- This shows for the first time that grape juice’s early cognitive benefits may extend beyond older adults.
To Summarize

- Polyphenols are plant nutrients that you won’t find on a Nutrition Facts Panel.
- Anthocyanins are a class of polyphenols that give foods their purple hue.
- 100% grape juice made with Concord grapes is a convenient way to get anthocyanins and other polyphenols.
- 100% grape juice can help support a healthy heart and may offer other health benefits.
Thank You!

Taylor C. Wallace, PhD, CFS, FACN
Phone: 270-839-1776
Email: taylor.wallace@me.com
Website: www.thinkhealthygroup.com
Harnessing the Power of Purple in the Diet

Alexandra Caspero, MA, RD, CLT, RYT
Disclosures

- PBH *Everyday Chef*
- Welch’s
- Other commodity/produce clients
Produce Trends

• Overall, fruit & vegetable consumption low and on the decline\textsuperscript{26}
Fruit Intake in America

Families Are Not Meeting Fruit Group Goals

- The average American consumes only 1 cup, or 50%, of recommended fruit servings each day, including 100% fruit juice

- Children ages 1-8 are the only population meeting fruit recommendations – in part, because they are enjoying all forms
  - 100% juice accounts for 40% of their total fruit intake

- The percent of children and teens meeting fruit goals (based on whole fruit alone) is low and decreases with age
Fruit Intake & 100% Fruit Juice

100% Fruit Juice Helps Fill the Gap

• When 100% fruit juice is added to whole fruit intake, the proportion of children and teens meeting recommended goals doubles, and triples for some age groups\(^27\)

• Adding all forms to the diet can help children and teens meet fruit goals and establish healthy habits that track into adulthood
Amount *and* Variety Matters

- Variety of colorful produce = variety of plant nutrients
- 2015-2020 Dietary Guidelines for Americans call attention to dark green and red/orange vegetables, but *all colors*, of both fruits *and* vegetables are important
Variety of Color Matters

- Encourage a variety of colors since each offers various plant nutrients which are linked with different pigments, for example:\(^{30,31}\)
  - **Red**: Lycopene
  - **Orange/Yellow**: Beta-carotene
  - **Green**: Lutein
  - **Blue/purple**: Anthocyanins
Many Americans Know They Should Care About Color but…

- Only 32% often seek to include colorful produce in their diet.

- **Why?** It could be because 44% don’t know or aren’t sure that specific colors of produce offer unique health benefits.

- When it comes to purple, although 73% of Americans know purple produce is an option, only 18% can name more than three purple fruits or vegetables.
Blue/Purple Color Group

• Only 3% of produce intake comes from the blue/purple group.\textsuperscript{33}

• Purple has unique plant nutrients to benefit health.
  
  – Purple is a cue that fruits and vegetables – in all of their forms – have certain polyphenols that can help promote health, especially heart health.

  – In general, the darker the purple hue the more polyphenols you’ll find.
How Can We Boost Intake of Purple?

• Focus on whole fruit and vegetables

• Look for fresh Concord grapes, if you can find them!
  - Short growing season, a few weeks in the fall
  - Grow only in certain microclimates
  - Very delicate, don’t ship easily
  - **100% grape juice is a convenient, year-round way to get the goodness of Concord grapes**
    - Just 4 oz. of 100% grape juice counts as one serving (1/2 cup) of fruit
    - Contains no added sugar; all sugars come straight from the grape
And don’t forget: **All Forms Matter!**

- In addition to fresh fruits and vegetables (and their juices), **all forms of produce** can add purple to the plate
  - Frozen
  - Dried
  - Canned
- Look for **no added sugars** in the ingredient list or Nutrition Facts label
RD Tips to Get More Purple

• Use purple cabbage as a slaw or lettuce replacer

Spicy + Sweet Cabbage & Radish Slaw with Yuzu Citrus Dressing
Gabriella Vitere, RDN
Macrobalanced.com

Sunflower Tacos in Collard Leaves
Mandy Enright, MS, RDN, RYT
NutritionNuptuals.com
RD Tips to Get More Purple

- Embrace eggplant

Spicy Miso Eggplant
Jessica Cording, MS, RD, CDN
jessicacordingnutrition.com

Quinoa Crusted Eggplant Chickpea Patties
Roxana Begum, PhD, RD
thedeliciouscrescent.com
Tips for Cooking Eggplant

• Eggplant contains saponins
• Fine line between tender and oily when it comes to cooking eggplant
• Grill or pan-fry by brushing eggplant with oil right before cooking
• Grill or bake whole eggplant for use in dips or to add body to pasta sauces, meatloaf or veggie burgers
RD Tips to Get More Purple

• Dress up greens with purple

Grape and Ginger Braised Kale
Lindsey Janiero, RDN, LDN, CLC
nutritiontofit.com

Brussels Sprouts with Grape-Honey Glaze
Amy Gorin, MS, RDN
amydgorin.com
RD Tips to Get More Purple

- Boost flavor with 100% grape juice and figs in smoothie bowls

**Pumpkin Fig Smoothie Bowl**
Karman Meyer  
thenustrationadventure.com

**Purple Power Smoothie Bowl**
Liz Weiss, MS, RD  
lizshealthytable.com
More Tricks for Pumping Up Purple

- Swap in 100% grape juice for a flavor and color punch
  - Replace water or milk in overnight oats and chia
  - Use instead of honey or other liquids in salad dressing

Roasted Fennel, Pear and Arugula Salad with Balsamic-Grape Dressing
welchs.com/recipes

Grape Juice Chia Cups
welchs.com/recipes
More Tricks for Pumping Up Purple

• Get saucy!
  – Reduce 100% grape juice to use as a syrup or sauce in savory dishes
  – Create a tasty dip or side

Spiced Salmon Filets with Grape Juice Glaze
welchs.com/recipes

Poached Pears in Grape Juice
welchs.com/recipes

Thai Spring Rolls with Sweet & Spicy Grape Dipping Sauce
Jessica Patel, RDN, LDN
Wellfednutrition.co
More Tricks for Pumping Up Purple

- Make it an easy, everyday habit
  - Keep frozen fruits, cooked veggies or 100% grape juice on hand for quick smoothies
  - Stock up with pouches of purple pureed fruits for on-the-go snacks
  - **Freeze cubes of 100% grape juice made with Concord grapes**; plunk into water or unsweetened iced tea for a refreshing drink with no added sugars

Concord Grape Ice Cubes
welchs.com/recipes
More Tricks for Pumping Up Purple

• Experiment with new trends
  − Make purple zoodles or ribbons with purple carrots or eggplant
  − Switch out a bun or tortilla for a purple “cabbage wrap”
  − Create your own healthy veggie chips by slicing and baking purple vegetables (carrots, purple potatoes)
Summary

• Getting enough and a variety of colorful produce is important.

• Only 3% of produce intake comes from the blue/purple group.

• Purple foods and beverages have health benefits, and polyphenols are behind their natural benefits and purple hue.

• 100% grape juice is the best way to get the purple power of the Concord grape.

• From sweet to savory, there are many ways to creatively pump up the purple in your diet.
Thank You

Alexandra Caspero, MA, RD
Email: alexandra.caspero@gmail.com
Website: delishknowledge.com
Social Media: @delishknowledge
Questions?

Taylor C. Wallace, PhD, CFS, FACN
taylor.wallace@me.com

Alex Caspero MA, RD, CLT, RYT
alexandra.caspero@gmail.com
References

References, cont.


References, cont.


32. Welch’s Heart Health Survey, fielded December 17, 2016 by ORC International.