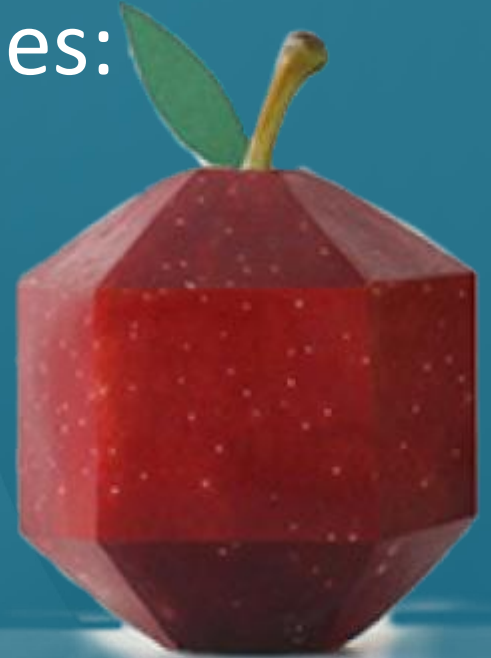
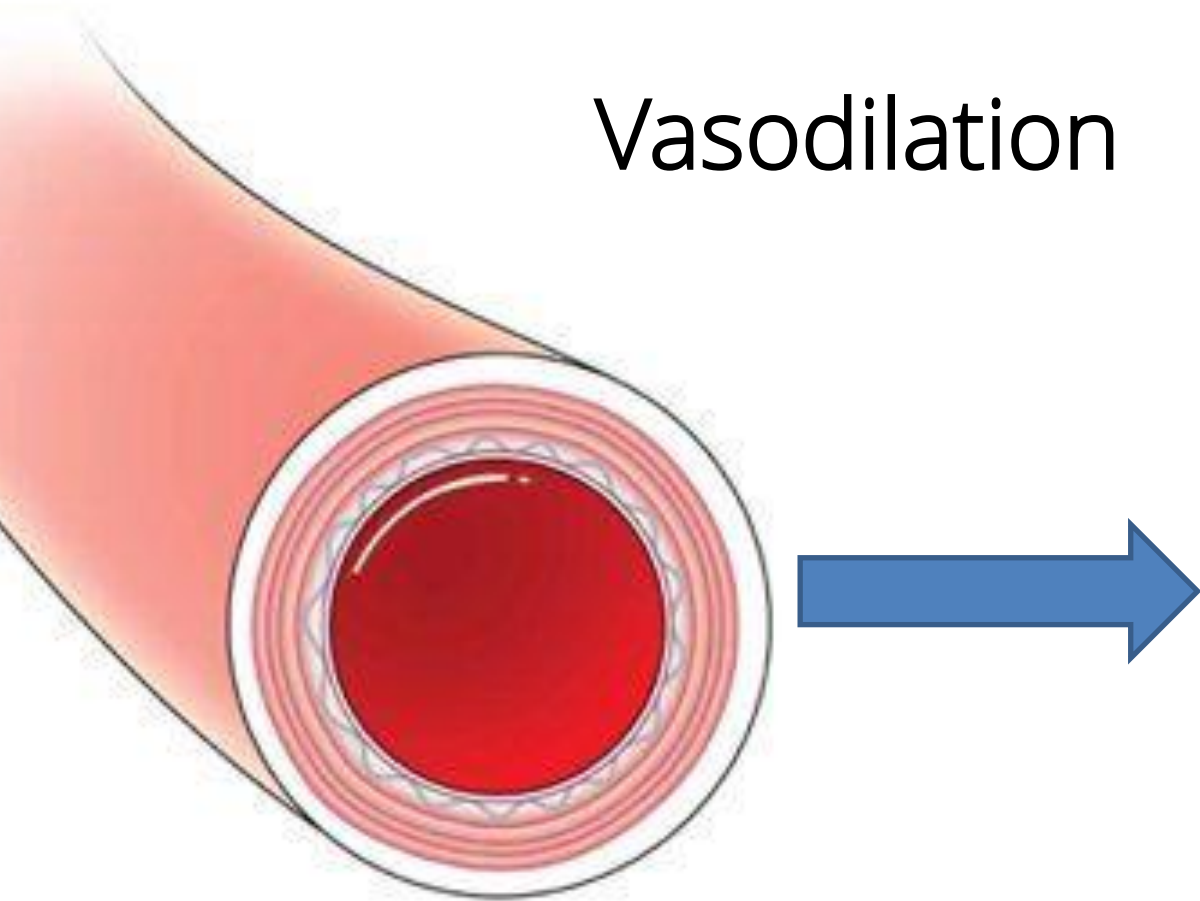


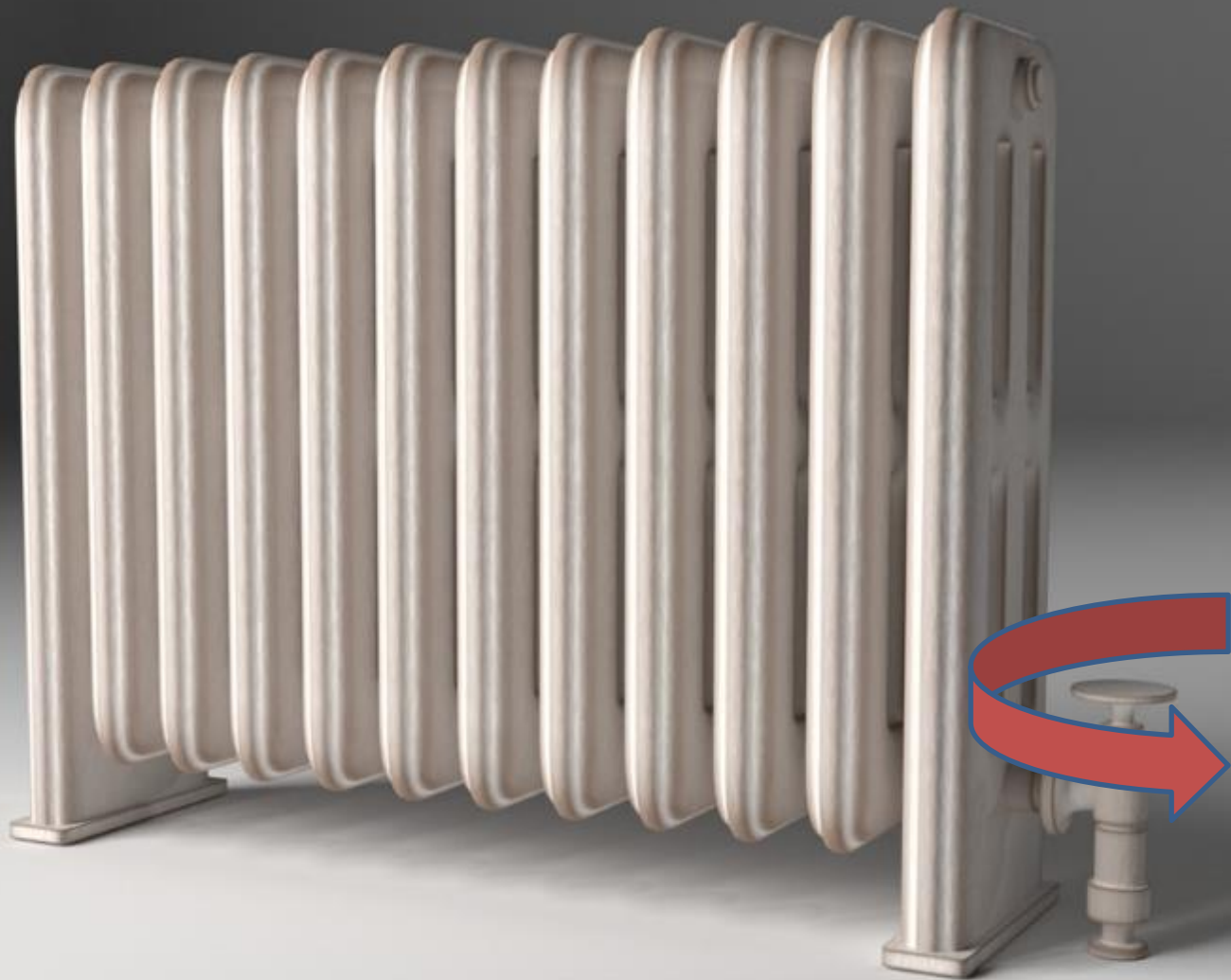
# Dietary Treatment for Hot Flashes: An Alternative to Hormones?

Neal D. Barnard, MD, FACC

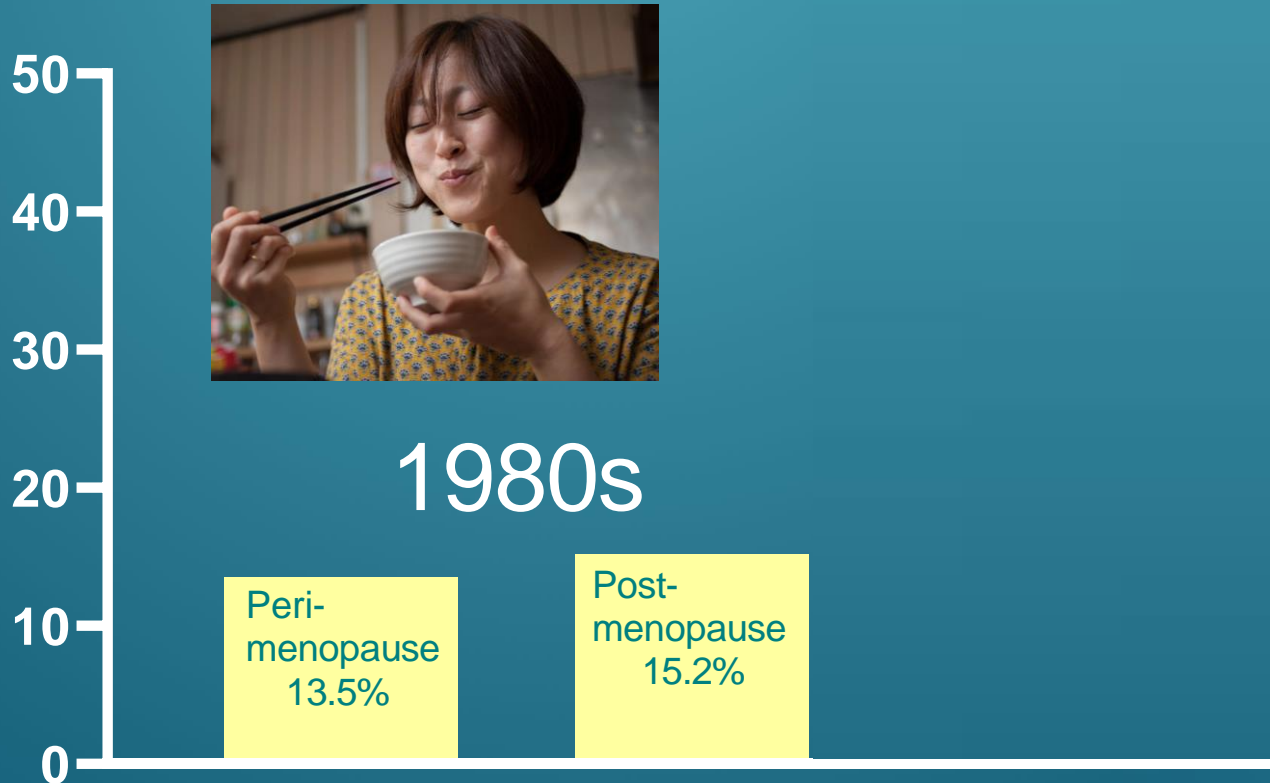


# Vasodilation





# Hot Flashes in Japan



Lock M. Menopause: lessons from anthropology. *Psychosomatic Med.* 1998;60:410-9.

Melby MK, Lock M, Kaufer P. Culture and symptom reporting at menopause. *Human Reproduction Update.* 2005;11:495-512.

# China, 1992-1996

China Study of Midlife Women

156 women, pre-, peri-, and postmenopausal

Hot flashes in preceding 2 weeks: **13.5%**

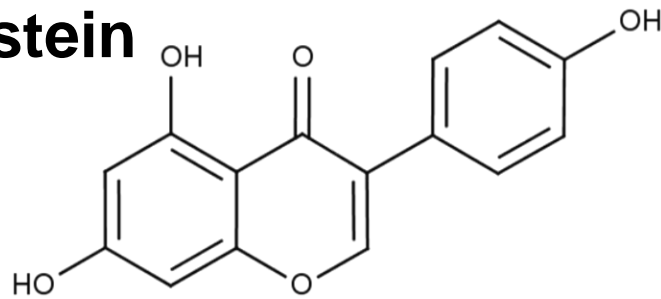
Shea JL. Cross-cultural comparison of women's midlife symptom-reporting: a China study. *Culture, Medicine and Psychiatry*. 2006;30:331-62.



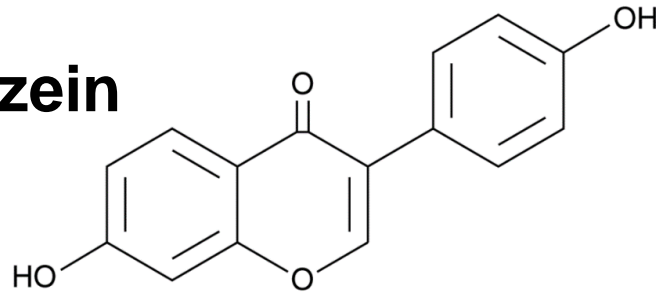


# Isoflavones

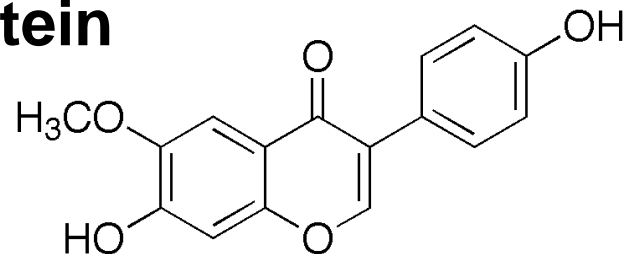
**Genistein**



**Daidzein**



**Glycitein**





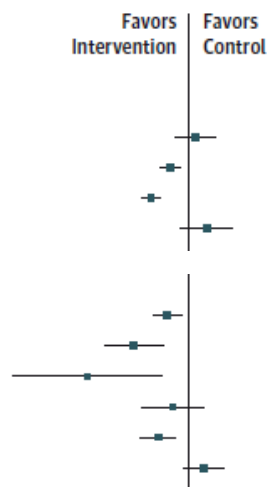
## Original Investigation

# Use of Plant-Based Therapies and Menopausal Symptoms

## A Systematic Review and Meta-analysis

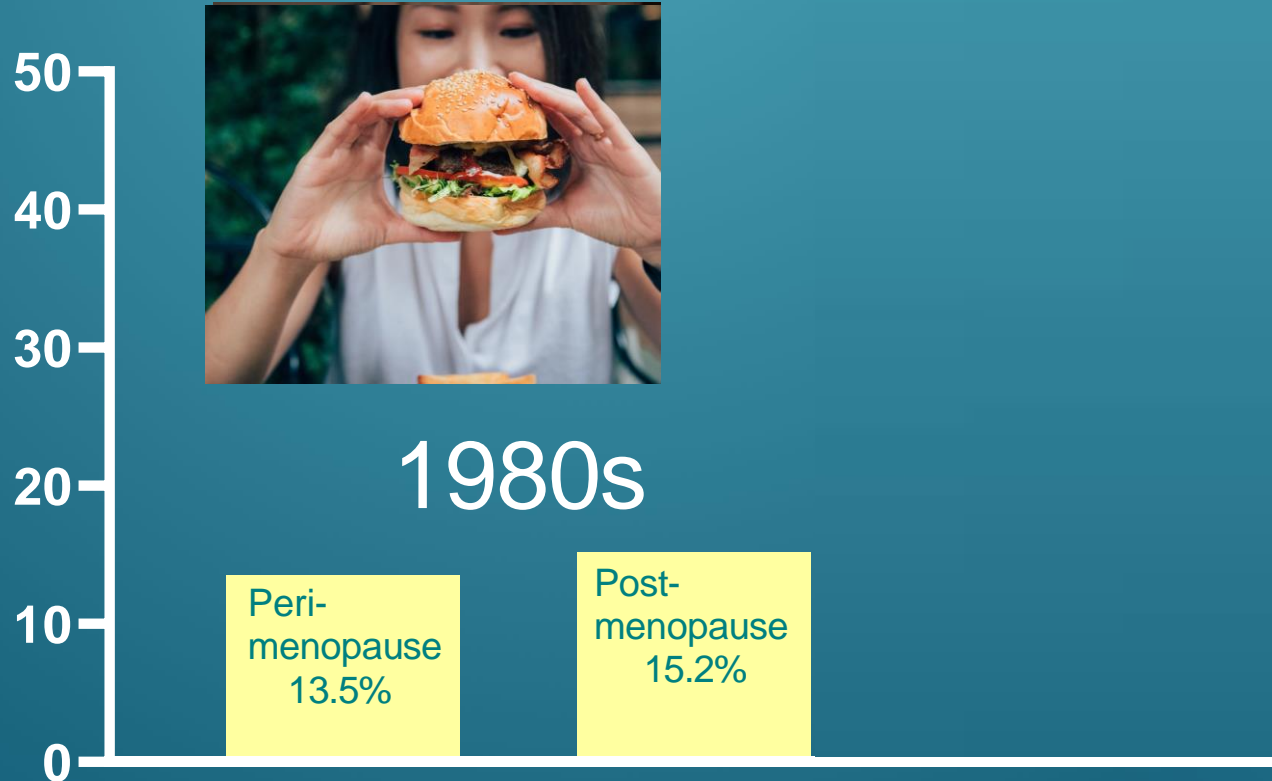
Figure 2. Meta-analysis of Randomized Clinical Trials on the Associations Between Use of Phytoestrogen Supplementation and Menopausal Symptoms

Source	No. of Participants		Change, Mean (95% CI) <sup>a</sup>		Difference, Mean (95% CI) <sup>b</sup>
	Intervention	Control	Intervention	Control	
<b>No. of Hot Flashes in 24 Hours</b>					
<b>Dietary soy isoflavones</b>					
Lewis et al, <sup>47</sup> 2006	33	33	-0.71 (-3.79 to 2.37)	-0.93 (-4.67 to 2.81)	0.22 (-0.62 to 1.06)
Cheng et al, <sup>33</sup> 2007	30	30	-0.80 (-2.47 to 0.87)	0.0 (-1.37 to 1.37)	-0.80 (-1.19 to -0.41)
Albertazzi et al, <sup>26</sup> 1998	51	53	-5.01 NR	-3.42 NR	-1.59 (-1.95 to -1.20)
Van Patten et al, <sup>59</sup> 2002	78	79	-1.8 (-7.01 to 3.41)	-2.5 (-10.4 to 5.40)	0.70 (-0.37 to 1.77)
<b>Supplements and extracts of soy isoflavones</b>					
Aso et al, <sup>28</sup> 2012	77	83	-1.9 (-5.43 to 1.63)	-1 (-4.92 to 2.92)	-0.90 (-1.49 to -0.31)
Nahas et al, <sup>51</sup> 2007	40	40	-6.5 (-11.4 to -1.64)	-4.2 (-10.0 to 1.60)	-2.30 (-3.50 to -1.10)
Faure et al, <sup>39</sup> 2002	39	36	-6.4 (-18.6 to 5.83)	-2.2 (-16.3 to 11.9)	-4.20 (-7.26 to -1.14)
Penotti et al, <sup>52</sup> 2003	28	34	-5.3 (-10.6 to 0.01)	-4.6 (-9.30 to 0.10)	-0.70 (-1.98 to 0.58)
Ferrari et al, <sup>40</sup> 2009	85	95	-3.7 (-8.8 to 1.40)	-2.4 (-7.01 to 2.21)	-1.30 (-2.03 to -0.57)
Hachul et al, <sup>41</sup> 2011	19	19	-4.33 (-6.92 to -1.74)	-4.9 (-7.41 to -2.39)	0.57 (-0.26 to 1.40)



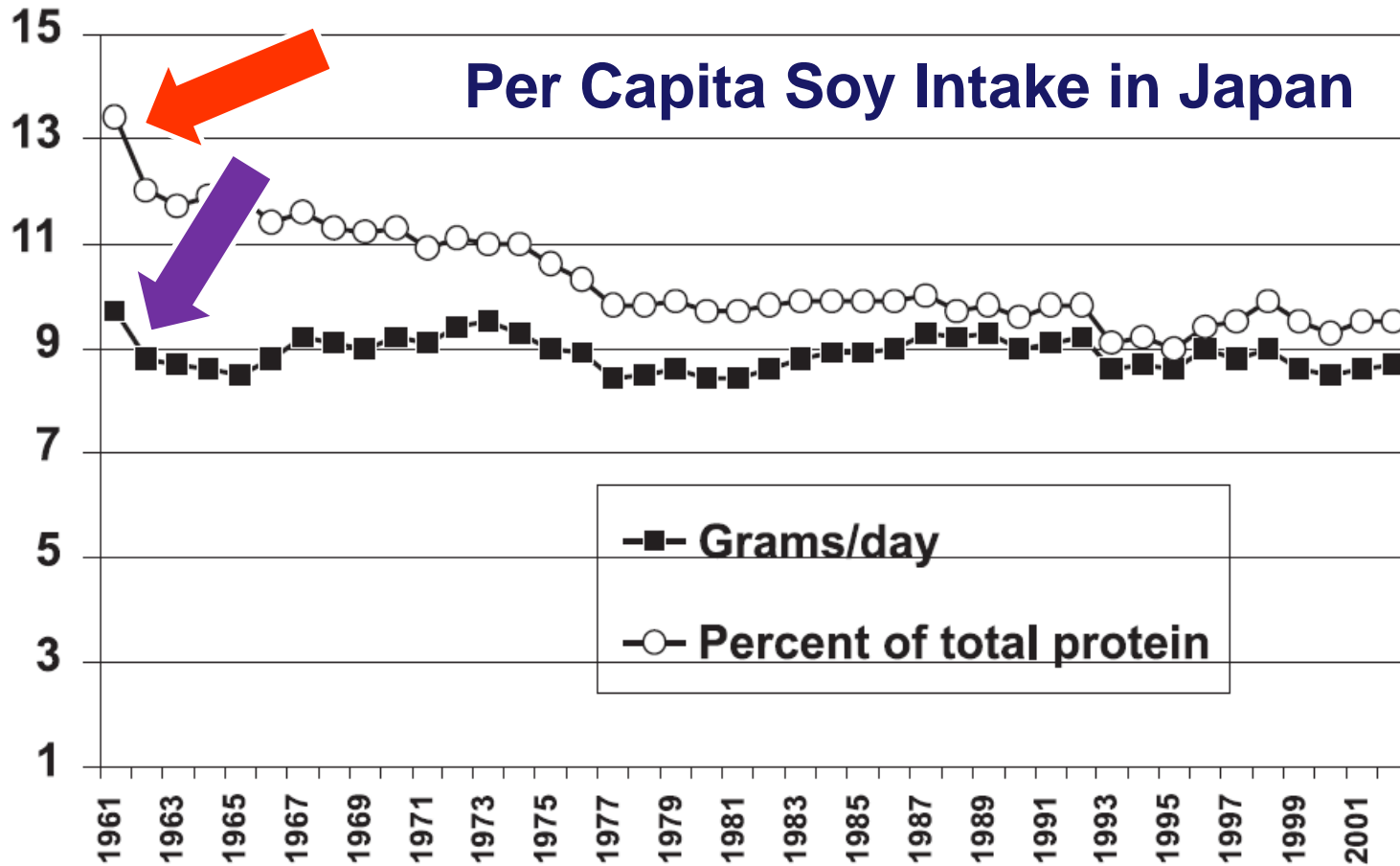


# Hot Flashes in Japan

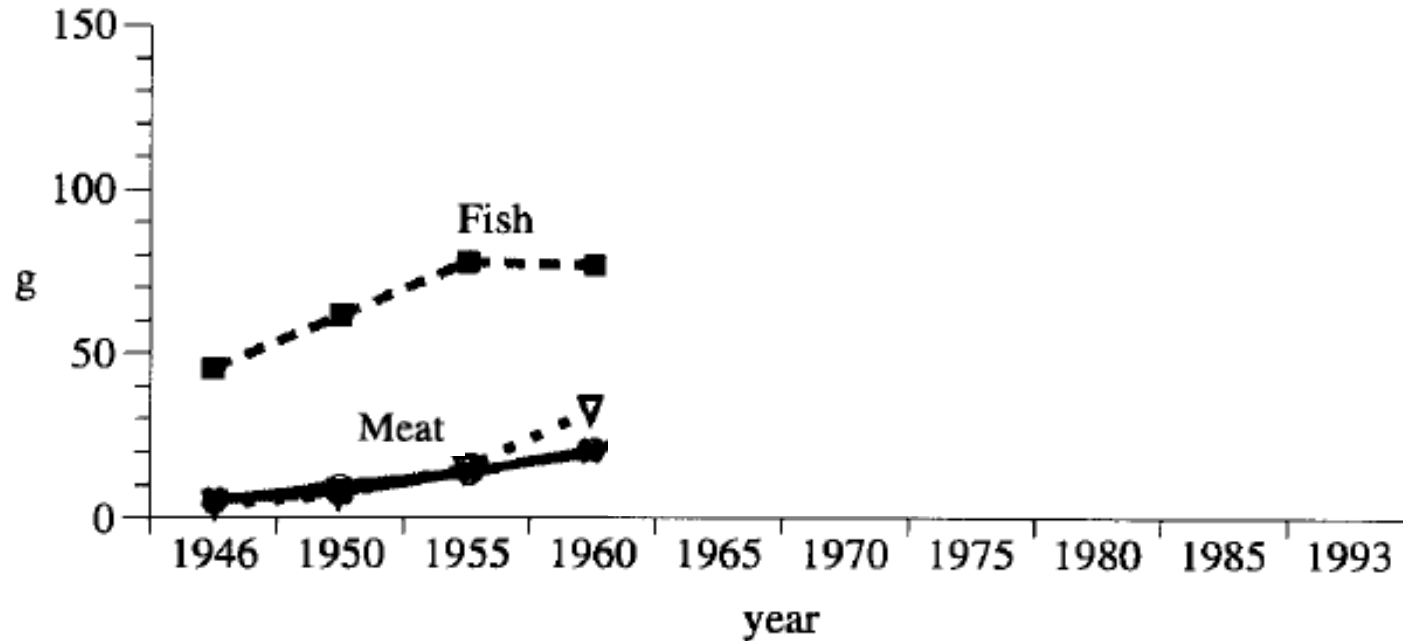


Lock M. Menopause: lessons from anthropology. *Psychosomatic Med.* 1998;60:410-9.

Melby MK, Lock M, Kaufer P. Culture and symptom reporting at menopause. *Human Reproduction Update.* 2005;11:495-512.

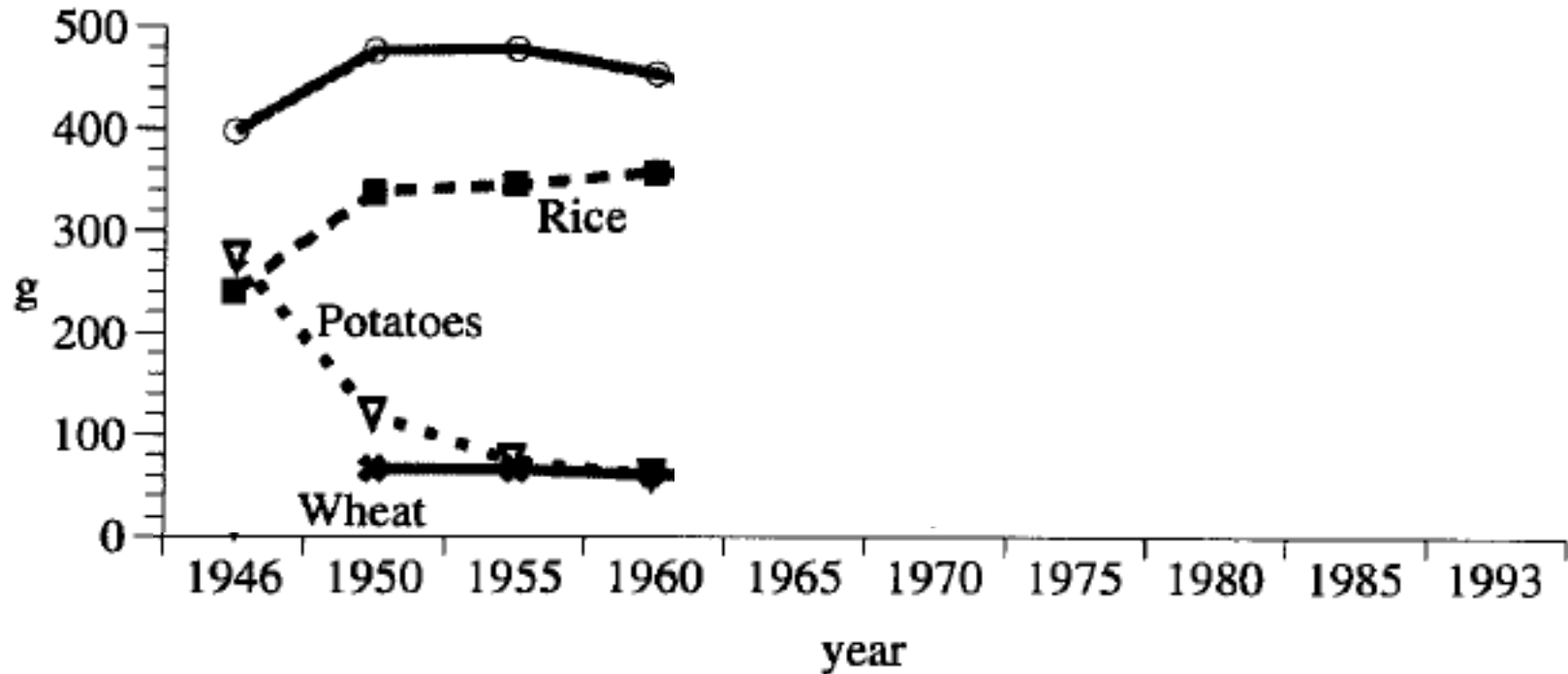


# National Nutrition Survey in Japan



Yoshiike N, Matsumura Y, Iwaya M, Sugiyama M, Yamaguchi M. National Nutrition Survey in Japan. *J Epidemiol.* 1996;6:SS189-S200.

# National Nutrition Survey in Japan



Yoshiike N, Matsumura Y, Iwaya M, Sugiyama M, Yamaguchi M. National Nutrition Survey in Japan. *J Epidemiol.* 1996;6:SS189-S200.

# Yucatan Peninsula

Valladolid & Chichimila,  
Mexico

118 postmenopausal  
Mayan women



Beyenne Y, Martin MC. Menopausal experiences and bone density of Mayan women in Yucutan, Mexico. *Am J Human Biol.* 2001;13:505-11.

# Yucatan Peninsula

“None of the women reports symptoms of hot flashes, and none recalls any history of significant symptoms associated with the menopausal transition.”

Beyenne Y, Martin MC. Menopausal experiences and bone density of Mayan women in Yucutan, Mexico. *Am J Human Biol.* 2001;13:505-11.











# Women's Health Initiative

17,473 women reported vasomotor symptom data

Ages 50-79, no hormone medications

Diet: reduced fat, increased fruit, vegetables, and whole grains

# Women's Health Initiative

Odds of becoming *free of hot flashes* at 1 year:

Losing 10% of body weight: ↑ 23% (OR=1.23; 1.05 – 1.46)

Diet intervention: ↑ 14% (OR = 1.14 1.01-1.28)

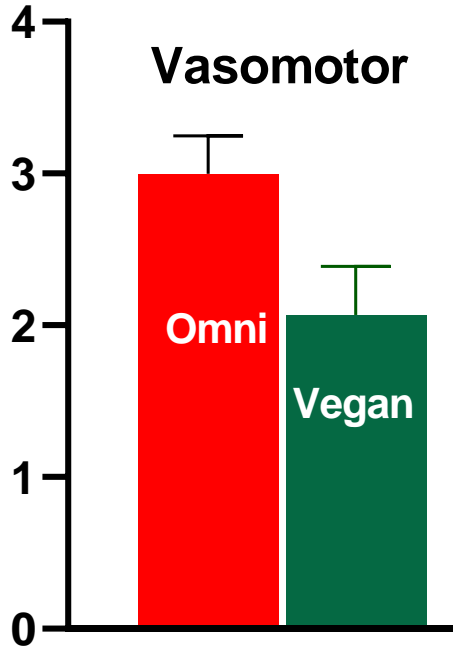
# Women's Health Initiative

“The dietary intervention seemed to ameliorate symptoms over and above the effect of weight change.”

# Cross-Sectional Study of Individuals Following Omnivorous or Vegan Diets

Benedictine University, Lisle, IL

## Peri-Menopausal



Beezhold B, Radnitz C, McGrath RE, Feldman A. Vegans report less bothersome vasomotor and physical menopausal symptoms than omnivores. *Maturitas*. 2018 Jun;112:12-17.

**The plot thickens....**

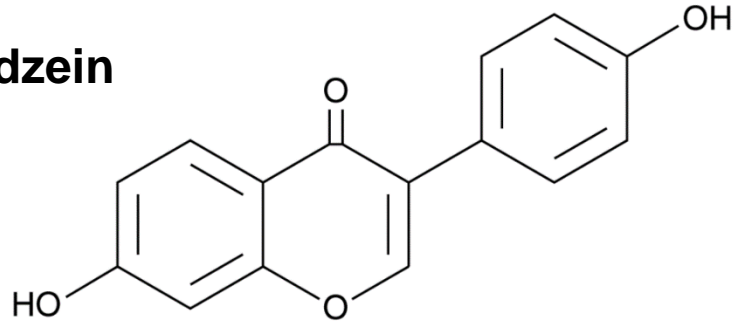
**The diet affects the gut microbiome.**

**And the microbiome alters  
isoflavones.**

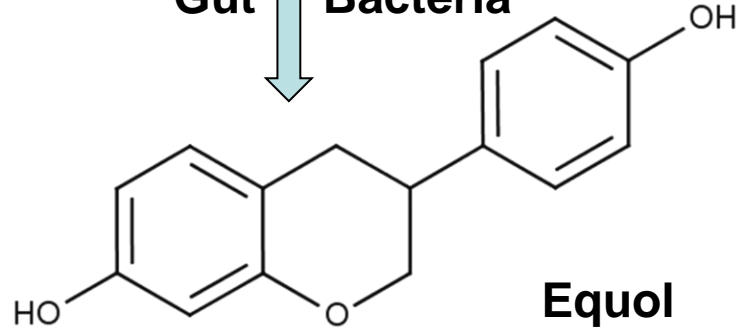




**Daidzein**



**Gut** ↓ **Bacteria**



# Diet and Equol Production

Western adults: 20-30% produce equol

Asian adults: 50-60% produce equol

Setchell KDR, Cole SJ. Method of defining equol-producer status and its frequency among vegetarians. *J Nutr* 2006;**136**:2188-2193.

# Diet and Equol Production

Test of 41 adults, Australia:



12 nonvegetarians: 25% produced equol

29 vegetarians: 59% produced equol

Setchell KDR, Cole SJ. Method of defining equol-producer status and its frequency among vegetarians. *J Nutr* 2006;**136**:2188-2193.

# Diet and Equol Production

Test of 31 adults, U.S.:



16 nonvegetarians: 0% produced equol

15 vegans: 40% produced equol

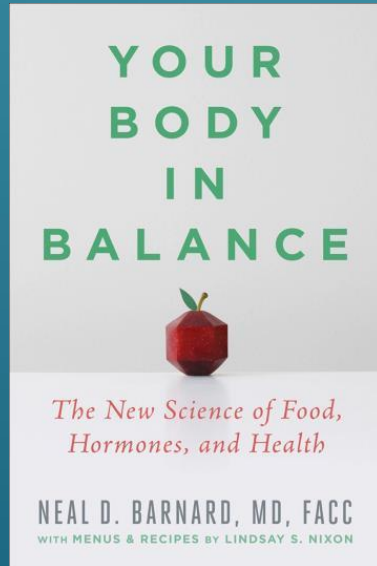
Wu GD, Compher C, Chen EZ, et al. Comparative metabolomics in vegans and omnivores reveal constraints on diet-dependent gut microbiota metabolite production. *Gut* 2016;65:63-72.

# Hypothesis:

To treat hot flashes:

- ✓ Soybeans
  - ✓ No animal products
  - ✓ Minimize oils
- } Provide isoflavones  
Promote weight loss & isoflavone conversion

2020



Reader comment:

Hot flashes gone in 5 days

Really? How?

1. Vegan diet
2. Very low in fat
3. Whole soybeans
  - a. Laura brand nonGMO
  - b. Instant Pot
  - c. ½ cup per day

# Women's Study for the Alleviation of Vasomotor Symptoms (WAVS)





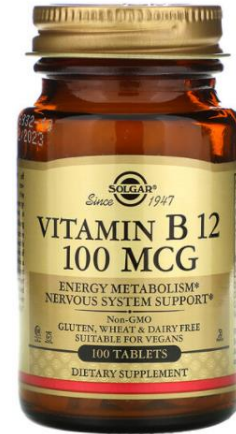
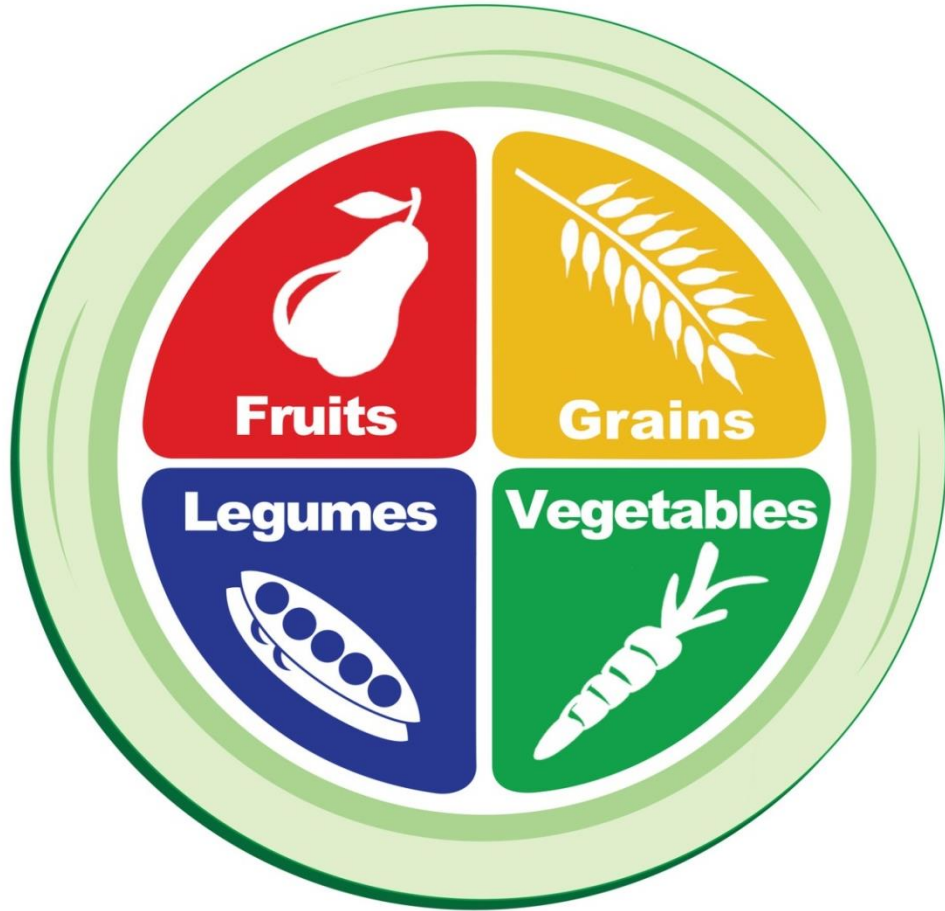
# Women's Study for the Alleviation of Vasomotor Symptoms (WAVS)

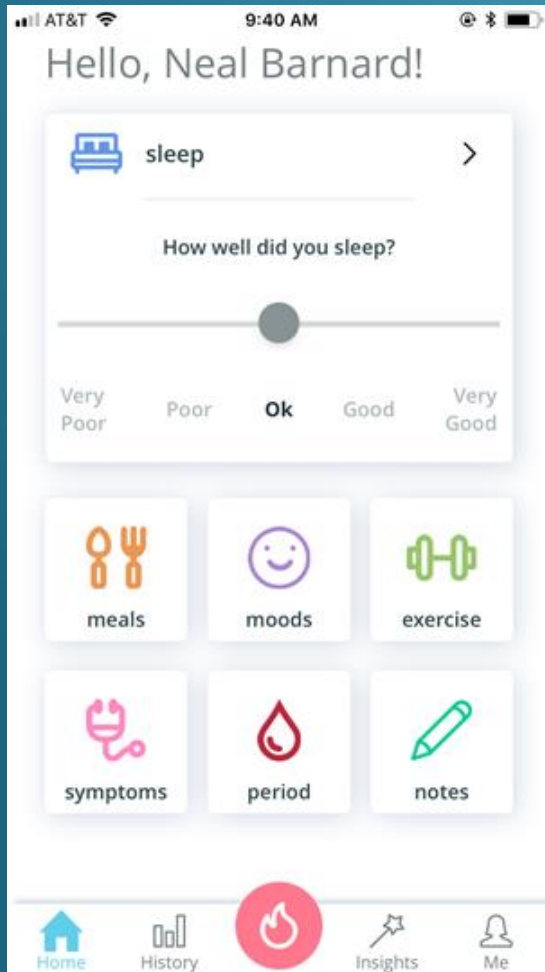
Diet Intervention (12 weeks):

No animal products

Minimize oils

½ cup soybeans daily





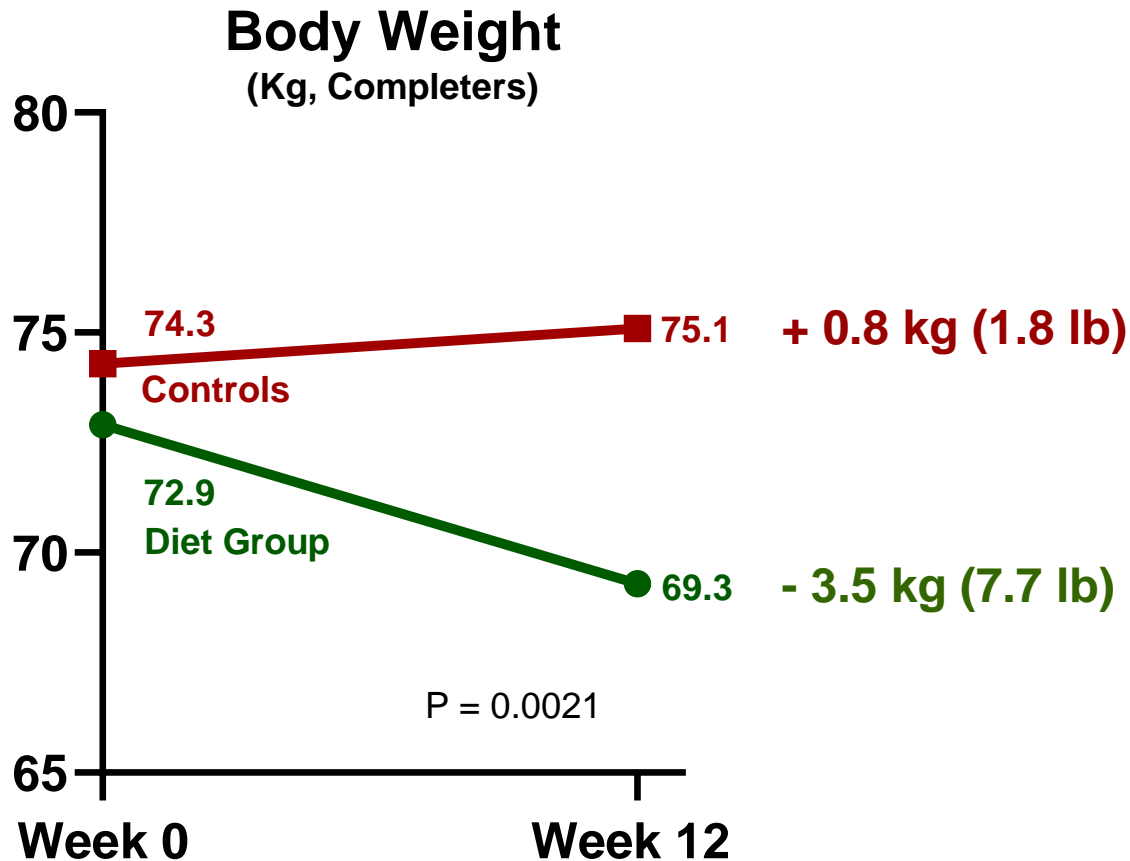
# My Luna

- Frequency
- Intensity
- Duration
- Day vs night



# Participant Demographics

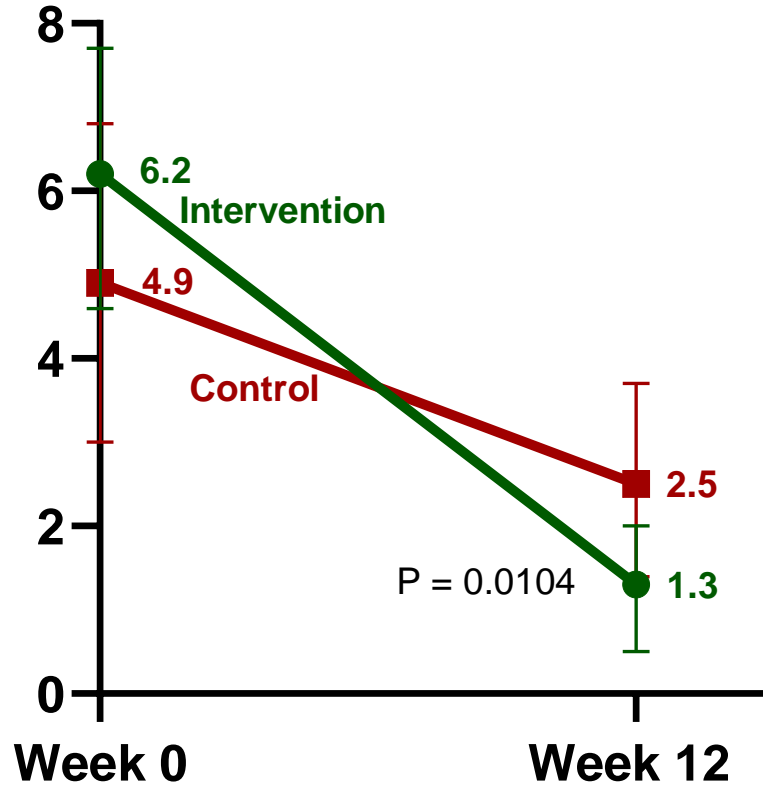
	Intervention n = 19	Control n = 19
Age	53.3	55.5
Race		
Black	2	4
Native American	1	0
White, nonHispanic	15	14
White, Hispanic	1	1
BMI	26.8	27.4
Years since menopause	3.7	5.6



Barnard ND, Kahleova H, Holtz DN, et al. The Women's Study for the Alleviation of Vasomotor Symptoms (WAVS): A randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. Menopause 2021, in press.

# Total Hot Flashes

(Per Day, with 95%CI, Completers)

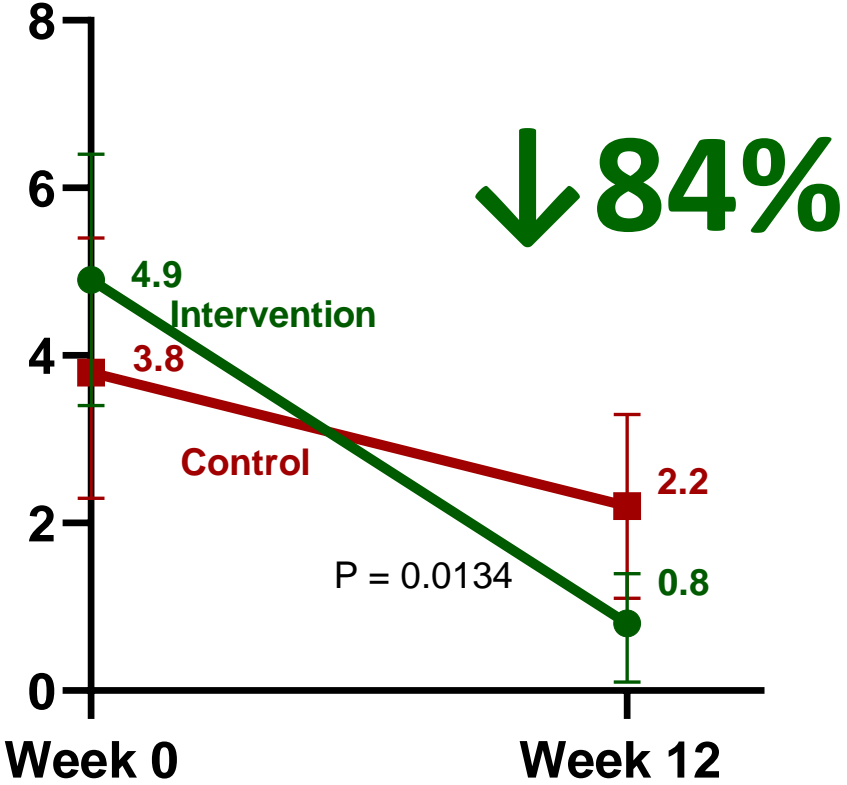


Barnard ND, Kahleova H, Holtz DN, et al. The Women's Study for the Alleviation of Vasomotor Symptoms (WAVS): A randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. Menopause 2021, in press.



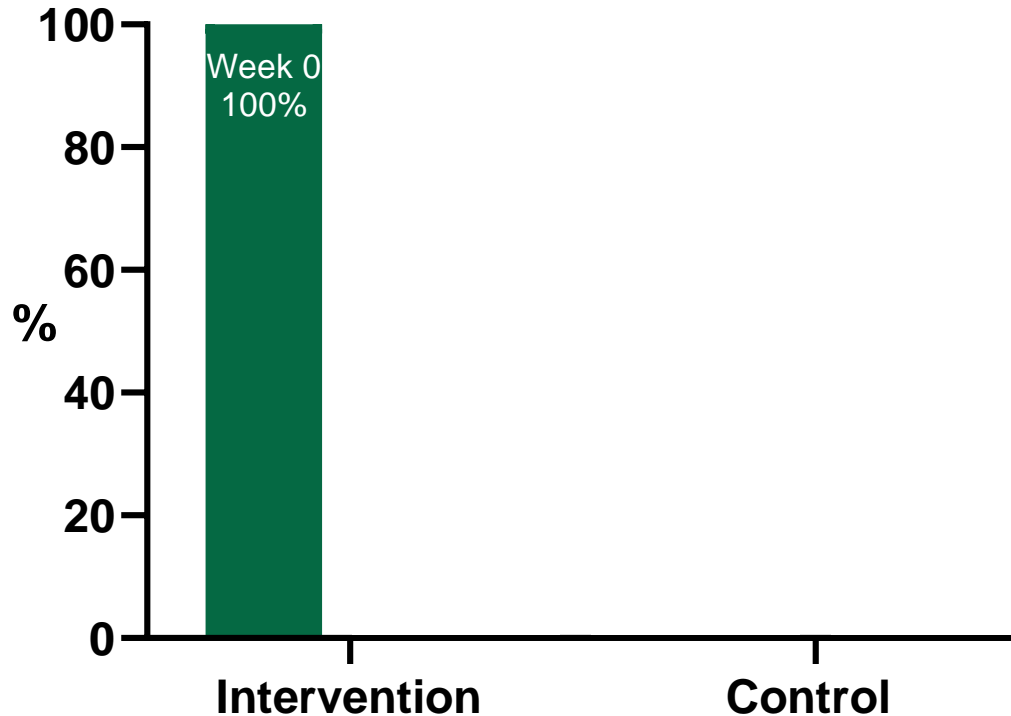
# Moderate-to-Severe Hot Flashes

(Per Day, with 95%CI, Completers)



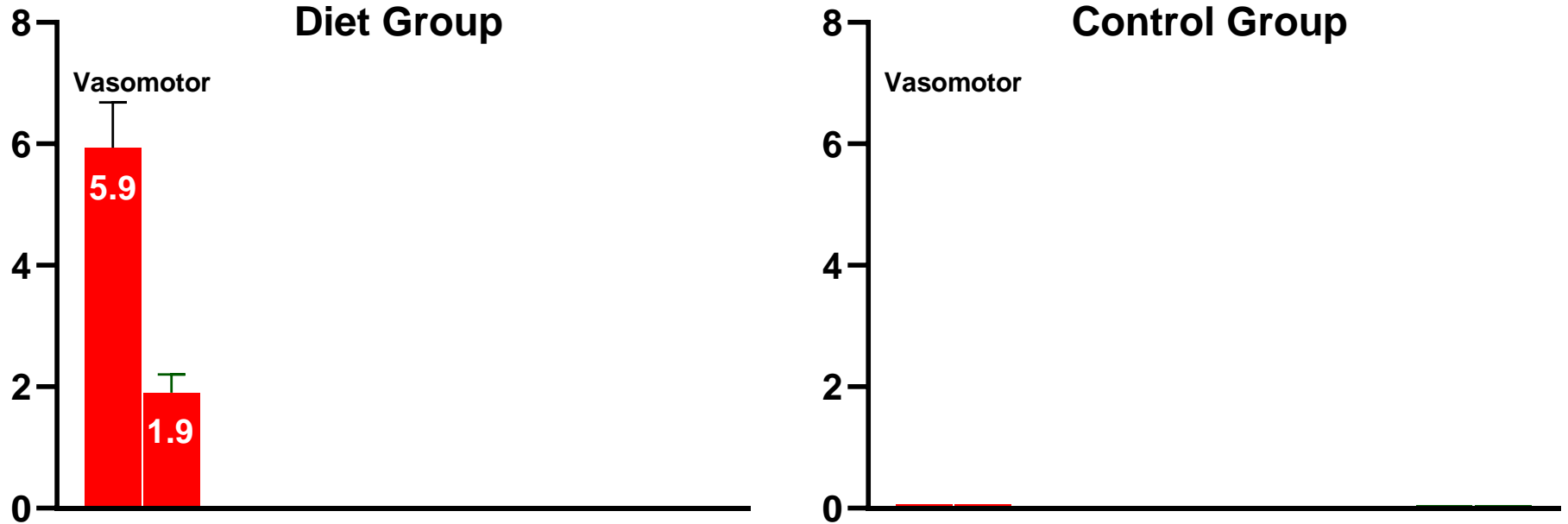
Barnard ND, Kahleova H, Holtz DN, et al. The Women’s Study for the Alleviation of Vasomotor Symptoms (WAVS): A randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. Menopause 2021, in press.

# Percentage of Women Reporting Any Moderate-to-Severe Hot Flashes



Barnard ND, Kahleova H, Holtz DN, et al. The Women's Study for the Alleviation of Vasomotor Symptoms (WAVS): A randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. *Menopause* 2021, in press.

# Quality of Life (MENQOL)

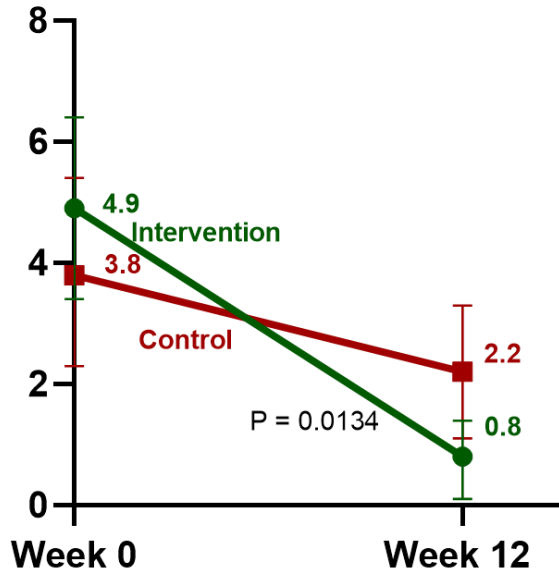


Barnard ND, Kahleova H, Holtz DN, et al. The Women's Study for the Alleviation of Vasomotor Symptoms (WAVS): A randomized, controlled trial of a plant-based diet and whole soybeans for postmenopausal women. *Menopause* 2021, in press.

# What about the controls?

## Moderate-to-Severe Hot Flashes

(Per Day, with 95%CI, Completers)



## Possibilities:

1. Normal changes over time
2. Cooler weather
3. Diet changes

# Soy and Breast Cancer

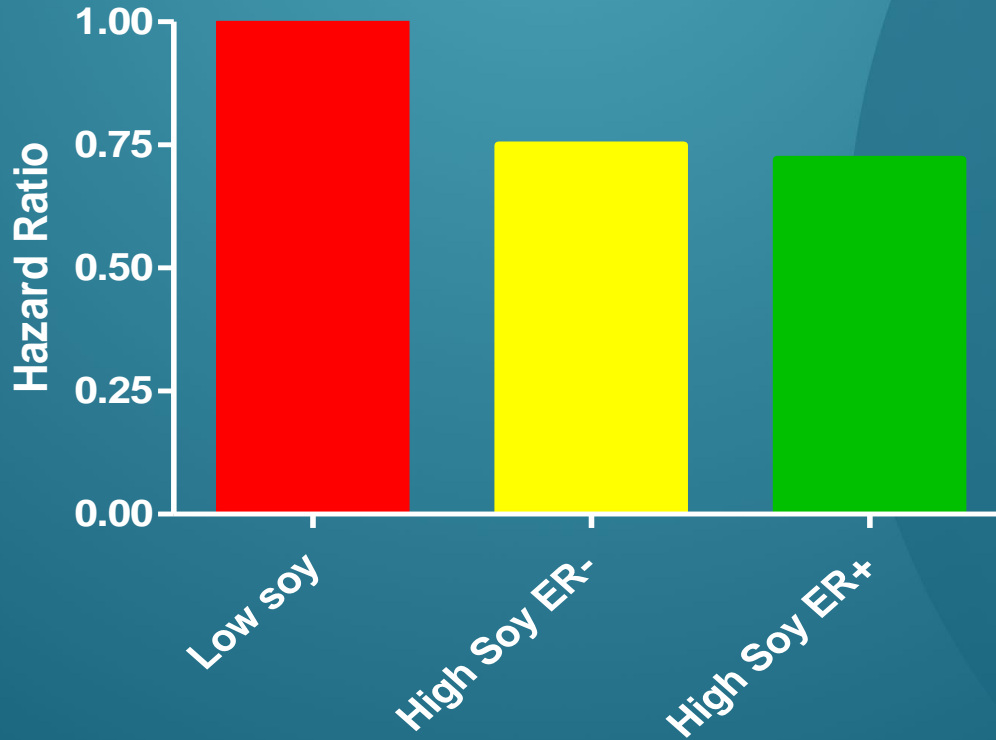
2008 meta-analysis of 8 studies in Asians and Asian Americans:

High soy intake: 29% ↓ risk of breast cancer.



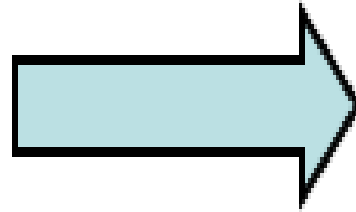
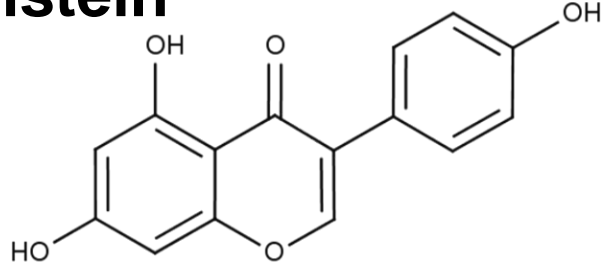
Wu AH, Yu MC, Tseng CC, Pike MC Epidemiology of soy exposures and breast cancer risk. Br J Cancer. 2008;98:9-14.

# Soy and Cancer Mortality



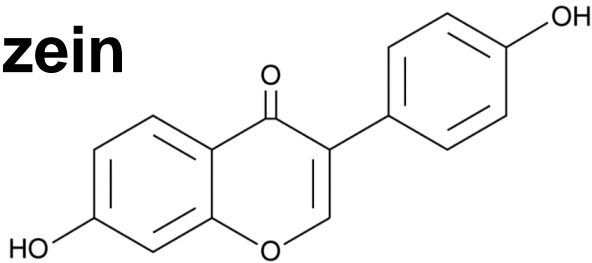
Meta-analysis of 5 cohort studies, 11,206 participants.  
Chi F. Asian Pacific J Cancer Prev. 2013;14:2407-2412.

## Genistein

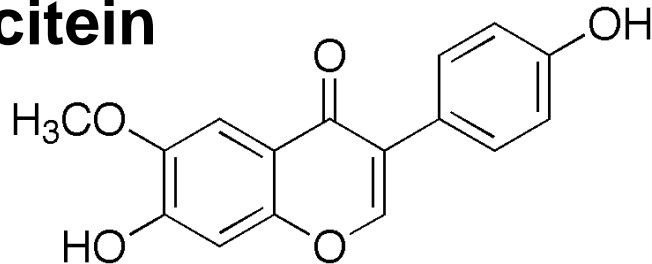


**ER $\alpha$**   
breast  
uterus

## Daidzein



## Glycitein



**ER $\beta$**   
bone  
urogenital system  
vasculature

# Starting a Healthful Diet

Step 1. “Check out the possibilities”



## Foods to Try this Week

Breakfast

Lunch

Dinner

Snack

# Healthy Breakfasts



# Lunches and Dinners





# Italian Cuisine



# Latin American Cuisine



# Chinese Cuisine





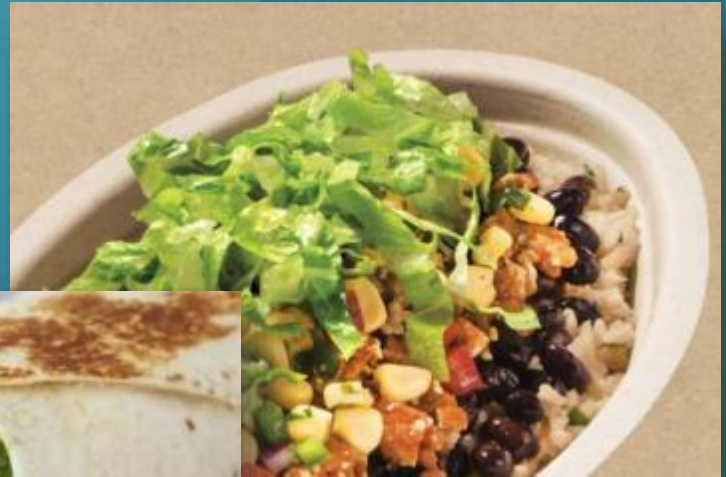
# Japanese Cuisine



# Fast Food Options



Veggie sub



Chipotle bowl



Bean burrito



## Foods to Try this Week

### Breakfast

- Cornflakes with almond milk
- Oatmeal with blueberries
- Veggie sausage
- Scrambled tofu w/ mushrooms

### Lunch

- Veggie sub
- Split pea soup
- Black bean chili

### Dinner

- Angel hair pasta arrabbiata
- Veggie burger
- Cucumber sushi (at restaurant)

### Snack

- Bananas, apples, oranges
- Papayas, mangos
- Low-fat hummus w/ crackers



# Beginning a Healthful Diet

Step 1. “Check out the possibilities”

Step 2. A 3-week “test drive”

# Preparing soybeans









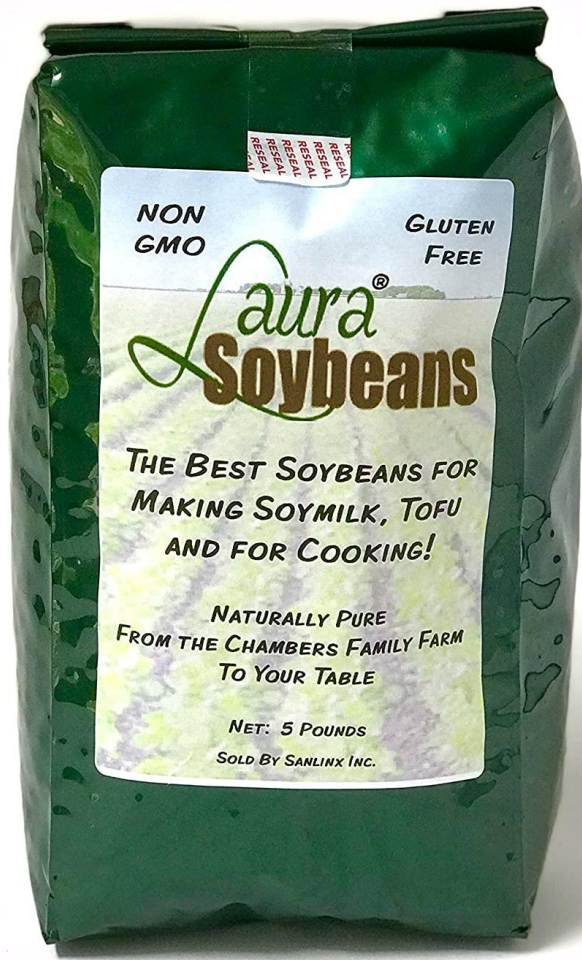
**Be Still Farms**  
Real, Fine Organics

[www.BeStillFarms.com](http://www.BeStillFarms.com)

**Organic Soy Beans**

Nutritious, delicious, organic Soy Beans. These tasty little beans are good roasted for a snack, added to rice to make a complete protein or added to any dish for fiber, protein, calcium and iron.

Net Wt. 500g (1 1/2 lbs)  
USDA Organic



NON GMO GLUTEN FREE

**Laura<sup>®</sup> Soybeans**

**THE BEST SOYBEANS FOR MAKING SOYMILK, TOFU AND FOR COOKING!**

**NATURALLY PURE FROM THE CHAMBERS FAMILY FARM TO YOUR TABLE**

**NET: 5 POUNDS**  
**SOLD BY SANLIX INC.**



## Preparing Soybeans

Pressure cook 40 minutes.

### Stovetop method:

Soak overnight.

Rinse, and boil for 60 – 90 minutes.





Plain

In salads or soups

Roasted



# Roasting Soybeans

**1. Pressure cook**



**2. Spread on parchment-coated baking sheet**



**3. Bake at 350° for 60 minutes**



**4. Season as desired\***



**\*salt, cayenne, garlic powder, basil, oregano, etc.**



# Tosteds

Roasted soybeans sold  
in bulk

[LauraSoyBeans.com](http://LauraSoyBeans.com)

# Isoflavones in Soy Products

You'll find 50 to 60 grams of isoflavones in:

Soybeans, boiled	½ cup
Soybeans, green, boiled (edamame)	1 ¾ cup
Soybeans, dry roasted	1.6 ounces
Soy yogurt	1 ⅓ cups
Tofu, firm	8.6 ounces
Tempeh, raw	3 ounces
Tempeh, cooked	5.5 ounces
Soy protein concentrate, aqueous washed	2 ounces
Soy protein concentrate, alcohol washed	16.75 ounces
Miso	½ cup
Soy milk, low-fat	8 ½ cups

Thank you!