

**Building a Foundation for Closing the Dietary Fiber Gap:  
Improving Gut Health through a Diverse Diet**

April 22, 2021

Presenter:  
**Henry J. Thompson, PhD**  
Professor  
Director of the Cancer Prevention Laboratory  
Colorado State University

Moderator:  
Barbara J. Ivens, MS, RDN, FADA, FAND

Approved for 1 CPE (Level 2) by the Commission on Dietetic Registration

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**Bean Academy** webinars

The Michigan Bean Commission (MBC) is pleased to offer a series of free accredited webinars, many with a plant-forward eating focus, that cover a broad range of contemporary nutrition and food topics.

Webinars are a blend of research, science and practice to help nutrition professionals stay informed on recent developments on relevant topics.

Webinars are funded as part of a 2020-2021 USDA grant to the Michigan Bean Commission.

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**Webinar logistics**

- A Handout of the slides presented today is available at: <https://MichiganBean.com/hp-webinar-thompson-presn>
- The Continuing Education Credit certificate is available to download after the webinar: <https://MichiganBean.com/hp-webinar-thompson-ceu>
- The presenter will answer questions at the end of this webinar. Please submit questions by using the 'Q&A' feature on your computer screen.

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**Today's Faculty**

- Henry J. Thompson, Ph.D.**
  - Professor, Nutrien Distinguished Scholar of Agricultural Sciences in the College of Agricultural Sciences, Colorado State University
  - Director of the Cancer Prevention Laboratory, Colorado State University

Moderator:  
Barbara J. Ivens, MS, RDN, FADA, FAND – Consultant, Michigan Bean Commission


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**Learning Objectives**

Upon completion of this webinar participants will be able to:

- Describe what pulses are and how to properly categorize them
- Discuss the health benefits of pulse consumption
- Explain what critical thinking is and how to use the process to develop workable solutions to health improvement via increased pulse consumption




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**Building a Foundation for Closing the Dietary Fiber Gap: Improving Gut Health through a Diverse Diet**

Henry J. Thompson  
Cancer Prevention Laboratory  
Colorado State University, Fort Collins, CO  
[henry.thompson@colostate.edu](mailto:henry.thompson@colostate.edu)


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### Learning Objectives

Upon completion of this webinar participants will be able to:

- Describe a framework for assessing plant food diversity of the diet.
- Discuss what pulses are, how to properly categorize them, and the health benefits of pulse consumption.
- Explain what critical thinking is and how to use the process to develop workable solutions to health improvement via increased pulse consumption

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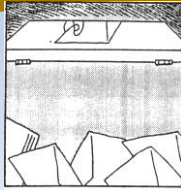
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### Let's build your tool kit What is the future of dietary diversity, gut health, and human health & wellness?



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### What is Critical Thinking?

Take unstructured information; Structure that information; Do something with it.

**Dietary diversity; Dietary Fiber; Gut Health; Obesity**

Making **Distinctions** – which consist of an *identity* and an *other*: What is \_\_\_\_\_? What is not \_\_\_\_\_?

Organizing **Systems** – which consists of *part* and *whole*: Does \_\_\_\_\_ have parts? Can you think of \_\_\_\_\_ as a part?

Recognizing **Relationships** – which consist of *action* and *reaction*: Is \_\_\_\_\_ related to \_\_\_\_\_? Can you think of \_\_\_\_\_ as a relationship?

Taking **Perspectives** – which consist of *point* and *view*: From the perspective of \_\_\_\_\_, [insert question]? Can you think about \_\_\_\_\_ from a different point of view?

Derek Cabrera: <https://www.youtube.com/watch?v=dUgRTWCdXt4>

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## What does Gut Health look like?

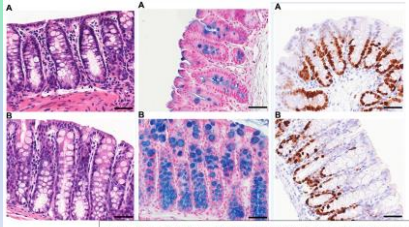


Figure 1. Panel A, control; Panel B, bean. Bar is 50  $\mu$ M.

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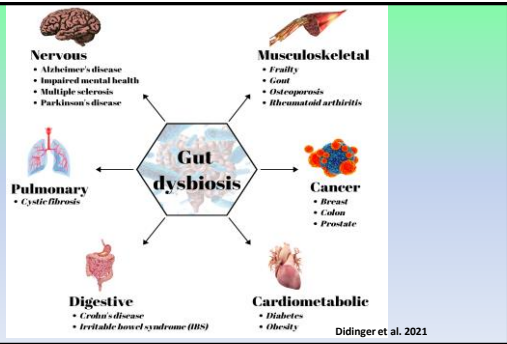
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Didinger et al. 2021

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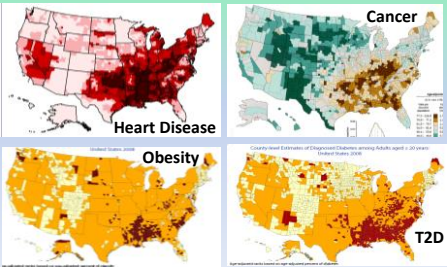
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## The Inter-Relatedness of Chronic Diseases




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## Improved gut health via pulse consumption: on relationships



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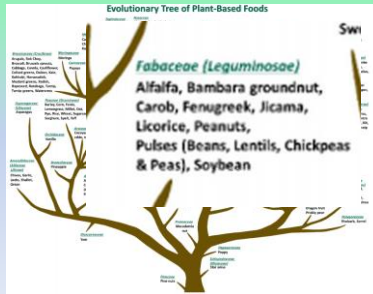
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## Mom was right, but what did she mean?




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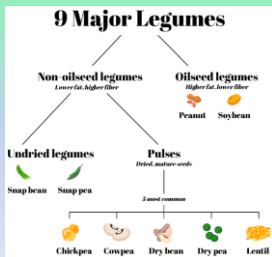
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## What are pulses?




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## What distinguishes pulses from other legumes?

Table 1. Nutritional analysis of 100 kilocalorie portions of the predominant pulses, undried legumes, and oilseed legumes.

	Chickpea	Compea	Dry Bean	Snap Bean	Dry Pea	Green Pea	Snap Pea	Lentil	Peanut	Soybean	Edamame
Approximate Amount	-1/3 cup	-1/2 cup	-1/2-1/3 cup	-3 cups	-1/2 cup	-1 cup	-2.5 cups	-1/2 cup	-2 Tbs	-1/3 cup	-1/2 cup
Protein (g)	5.4	6.7	6.7	5.4	7.2	6.4	5.7	7.8	4.6	10.6	7.8
Total Lipid (g)	1.6	0.5	0.4	0.8	0.3	0.3	0.0	0.3	8.7	3.2	2.8
Carbohydrate (g)	16.7	17.9	18.0	22.5	17.7	18.6	17.2	17.4	2.8	4.9	11.1
Dietary Fiber (g)	4.6	5.6	6.6	8.1	7.2	6.5	5.9	6.8	1.5	3.5	3.4
Folate (µg)	104.9	179.5	112.9	94.5	36.0	75.0	MV	126.0	42.3	31.4	MV

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## Aren't pulses just another vegetable?

Table 2. Nutritional analysis of 100 kilocalorie portions of dry bean versus other vegetable subgroups.

	Dry Bean	Cassava	Potato	Carrots	Broccoli	Cucumber
Approximate Amount	-1/2-1/3 cup	-1/3 cup	-2/3 cup	-1.75 cups	-2 cups	-5 cups
Protein (g)	6.7	2.7	2.7	2.2	8.4	4.3
Total Lipid (g)	0.4	0.7	0.1	0.5	1.1	0.7
Carbohydrate (g)	18.0	22.6	22.7	23.5	19.7	24.2
Dietary Fiber (g)	6.6	0.7	2.4	8.6	7.7	3.3
Folate (µg)	112.9	MV	30.1	40.0	160.0	46.7

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## Pulses are just a meat alternative, right?

Table 3. Nutritional analysis of 100 kilocalorie portions of dry bean versus other protein foods.

	Dry Bean	Chicken Breast, Skin not Eaten	80/20 Ground Beef	Hard-Boiled Egg	Salmon	Almonds, Unroasted	Tofu
Approximate Amount	-1/2-1/3 cup	-2-oz.	-1.5-oz.	-1.25 eggs	-2-oz.	-2.7bs	-3.5-oz.
Protein (g)	6.7	16.8	8.1	8.1	16.1	3.7	10.0
Total Lipid (g)	0.4	3.1	5.6	6.8	3.5	8.6	5.6
Carbohydrate (g)	18.0	0.0	0.0	0.7	0.1	3.7	2.5
Dietary Fiber (g)	6.6	0.0	0.0	0.0	0.0	2.2	2.6
Folate (µg)	112.9	4.0	3.1	28.4	3.1	7.6	MV

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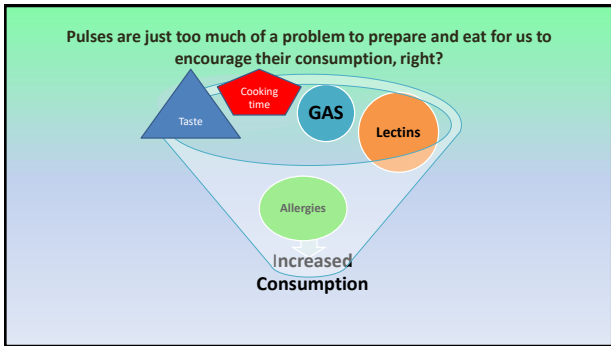
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### What is dietary fiber?

**TABLE 2** Summary of chemical characteristics of dietary fiber in foods<sup>1</sup>

Main components	Dietary fiber characteristic				Polymer type
	Insoluble dietary fiber	Soluble dietary fiber	Fermentable	Viscous	
Cellulose	HMW				Glucan
Lignin	HMW				Monolignol
Pectinate starch		HMW <sup>2</sup>	X	X	Type 1, 2, 3, 4
Hemicelluloses	HMW	HMW <sup>2</sup>	X	X	Xylen, galactan, araban, mannan, others
Pectins	HMW	HMW <sup>2</sup>	X	X	Galacturonic acid
Arabinogalans	HMW	HMW <sup>2</sup>	X	X	Xylan
$\beta$ -Glucans		HMW <sup>2</sup>	X	X	Glucan
Gums		HMW <sup>2</sup>	X	X	Mannan
Mucilages		HMW <sup>2</sup>	X	X	X
Inulin		LMW	X		Fructan
Fructooligosaccharides (fructose, kestose)		LMW	X		Fructan
Galactooligosaccharides (lactulose family)		LMW	X		Raffinose family

<sup>1</sup>HMW, high molecular weight; LMW, low molecular weight; X, the main component has the identified characteristic.  
<sup>2</sup>Available in aqueous solution but precipitates in 95% ethanol solution.

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## Critical Thinking/Problem Solving




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## Key Takeaways

- A high quality healthy diverse diet: whole food maximized
  - High botanical diversity score (think the tree)
  - Rich in pulses
- Dietary fiber-gut health-human health: mind the gap!
- Dose matters (49g protein, 49g fiber, 700kcal)
  - It's easy, safe, affordable...and I like it!

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## The bottom line

**Common Bean and Other Pulses**  
 The **Premiere, Authentic, Low Fat, High Fiber, High Protein ANTI-OBESOGENIC** Foods: Non GMO, Gluten Free, No cholesterol

*The Secret of the "Ancients" Rediscovered*

Culinary flexibility: whole food, whole powder, ingredient, any flavor/cuisine, texture, crunch




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**Questions?**



Henry J. Thompson, PhD  
Colorado State University  
Fort Collins, CO  
[henry.thompson@colostate.edu](mailto:henry.thompson@colostate.edu)




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MBC Bean Academy Summary

**Building a Foundation for Closing the Dietary Fiber Gap:  
Improving Gut Health through a Diverse Diet**

**This webinar covered:**

- What pulses are and how to properly categorize them
- Health benefits of pulse consumption
- Critical thinking approach to develop workable solutions to health improvement via increased pulse consumption




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- For questions: [MBC.BeanAcademy@gmail.com](mailto:MBC.BeanAcademy@gmail.com)




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Next **MBC Bean Academy** Webinar

**Anatomy of the Bean: Dry Bean Breeding and Production for Consumer Acceptance**

Karen Cichy, PhD  
Research Plant Geneticist  
USDA, Agriculture Research Service  
Michigan State University

Date: June 17, 2021  
2-3 pm EDT/1-2 pm CDT/noon MDT  
Applied for 1 CPE (Level 2) by the Commission on Dietetic Registration



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**How are we doing?**

- Stay on the line for a brief survey about this **MBC Bean Academy** webinar:

**Building a Foundation for Closing the Dietary Fiber Gap:  
Improving Gut Health through a Diverse Diet**

Thank you!



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