



## DuPont Nutrition & Health

High Quality Soy Protein: Beneficial Across the  
Lifespan



Karuna Jayakrishna  
Dairy and Beverages Application Lead  
DuPont Nutrition & Health

# Outline

## ■ Protein in our diets

- Soy protein is a high quality protein
- Soy protein across the lifespan

## ■ Soy protein in child nutrition

## ■ Health benefits of soy protein

- Muscle health
- Weight management
- Healthy living/aging



# 9/10 Indians lack adequate protein – Survey in TOI



North	South	West	East
<ul style="list-style-type: none"> <li>• Paratha</li> <li>• Puri Sabzi</li> <li>• Chhole</li> <li>• Jalebi</li> </ul>	<ul style="list-style-type: none"> <li>• Idli</li> <li>• Vada</li> <li>• Dosa</li> <li>• Poha</li> <li>• Upma</li> <li>• Kesari Bhath</li> </ul>	<ul style="list-style-type: none"> <li>• Poha</li> <li>• Upma</li> <li>• Ghatia</li> <li>• Jalebi</li> <li>• Dhokla</li> <li>• Shira</li> <li>• Thepla</li> <li>• Thalipith</li> <li>• Bhakri</li> </ul>	<ul style="list-style-type: none"> <li>• Luchilkochuri</li> <li>• Panta bhath</li> <li>• Bread</li> <li>• Omelet</li> <li>• Rice</li> <li>• Aloo Dum</li> </ul>

Low – Medium protein consumption

## BODY MISSING ITS BUILDING BLOCKS

Survey Sample Size | 1,260

<b>Non-Vegetarians</b>	<b>Vegetarians</b>
742 (59%)	518 (41%)

**Awareness**

All-India **25%**

North **2%** | East **89%**  
West **27%** | South **13%**

Delhi **99%** | Mumbai **68%**

Delhi had the most number of respondents with protein gap, Mumbai had the least

Only **12%** take proteins as per their weight requirements  
**88%** have lower than required intake, which means every 9 out of 10 people  
 Vegetarians (**91%**) show higher protein deficit compared to non-vegetarians (**85%**)  
 Younger people, in the age group of 30-40 years, show better than average protein intake

**Essential Ingredient**  
 American Diabetes Association recommends a minimum of 0.8gm of protein for every kg of body weight

**High-Protein Foods**  
 Meats, poultry, fish | Legumes (dry beans & peas) | Tofu | Eggs | Nuts & seeds | Milk & milk products | Grains, some vegetables and some fruits (small amounts of protein relative to other sources)  
(Source: Center For Disease Control)

**Inadequate Protein Intake Signs**

- Feeling tired
- Feeling flabby instead of being muscular
- More time taken to recover from injuries
- Hairfall

## Market Analysts Agree Protein at Breakfast is An Opportunity for the Food Industry:

“Ideally, our diet should be rebalanced with more protein earlier in the day . . . Target breakfast, lunch, and snack eating occasions as consumers could benefit the most from added protein during these time periods.”

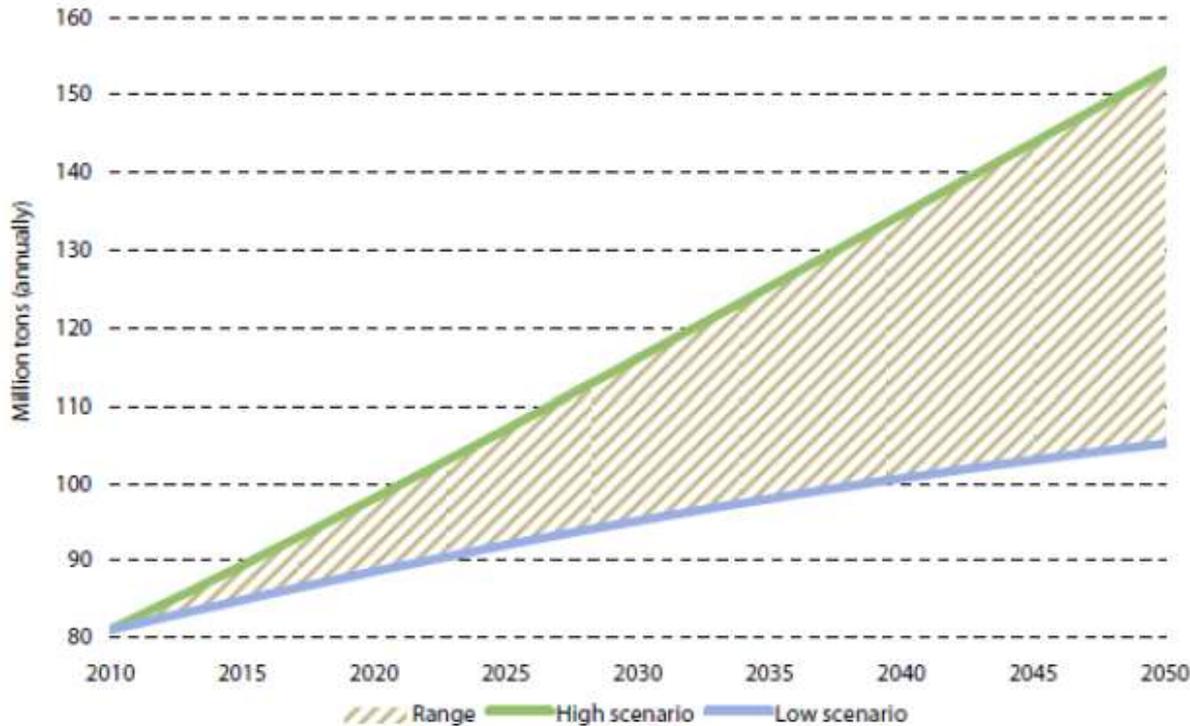
Source: Mintel, “Breakfast Could Use A Boost From Extra Protein”, August 2013

## Scientific Consensus Supporting the Concept of Protein Rebalance is Growing As Well:

“To maximize muscle protein synthesis, whereas being cognizant of total energy intake, we propose a dietary plan that includes 25–30 g of high quality protein per meal.”

Source: Paddon-Jones and Rasmussen, Curr Opin Clin Nutr Metab Care, 12(1) 86-90, 2009.

# Projected Global Protein Demand, 2010 - 2050



- By 2050\*, global population will grow by 35%
- “Urban population\*\*” increase by 73 million every year
- We need more food and have fewer resources

\*UN/DESA: World Population Prospects: The 2011 Revision (March 2012)

\*\*UN/DESA: World Urbanization Prospects: The 2011 Revision (March 2012)

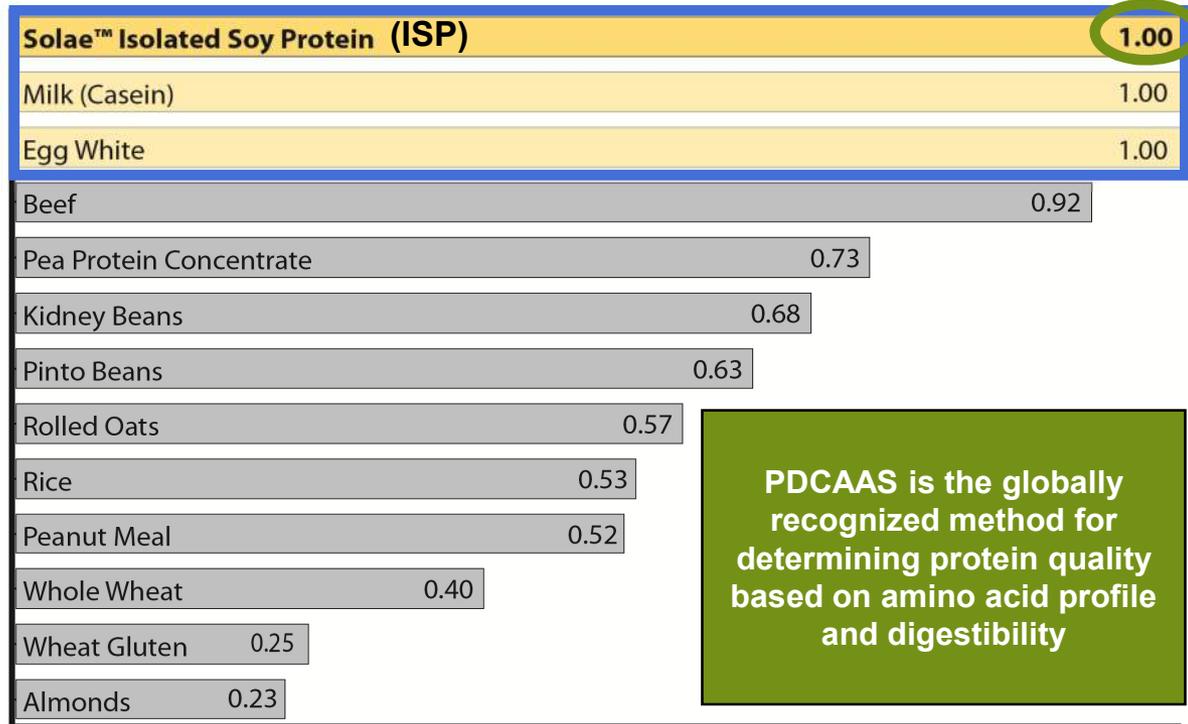
Source: LMC International 2011 Estimates

Population growth estimates based off of US Census Bureau projections

Low scenario assumes population growth in developing countries continues to consume protein at RDA minimum of 25 grams per person per day; high-end scenario assumes a gradual shift toward protein requirement of 50 grams per day, the average among developed countries

## Soy is a High Quality Protein - PDCAAS (Protein Digestibility-Corrected Amino Acid Score)

- Soy protein is a high quality protein
- DuPont™ Danisco® Isolated Soy Protein (ISP) has a PDCAAS score of 1.00
- SUPRO® ISP is comparable to high quality animal proteins (casein, egg white, beef)
- ISP is the only widely available high quality plant-based protein
- ISP is low in fat and saturated fat and is both lactose- and cholesterol-free



PDCAAS values of selected foods. PDCAAS values from published sources or calculated using publicly available amino acid and digestibility values. A score of 1.00 is the highest attainable score and is based on the amino acid reference pattern for 2-5 year olds.

*Adapted from Hughes, et al, J Ag Food Chem, 2011*



# Health Benefits of Soy Protein Across the Lifespan



Soy formulas are fortified with vitamins & minerals deliver the essential nutrition for growth & development



Milk formulated with soy protein great alternative for children who are lactose intolerant or allergic to dairy



Soy protein, as part of an exercise program, can help preserve lean muscle mass.



Soy protein, as part of calorie controlled diet, can help weight management by helping you feel fuller, longer.



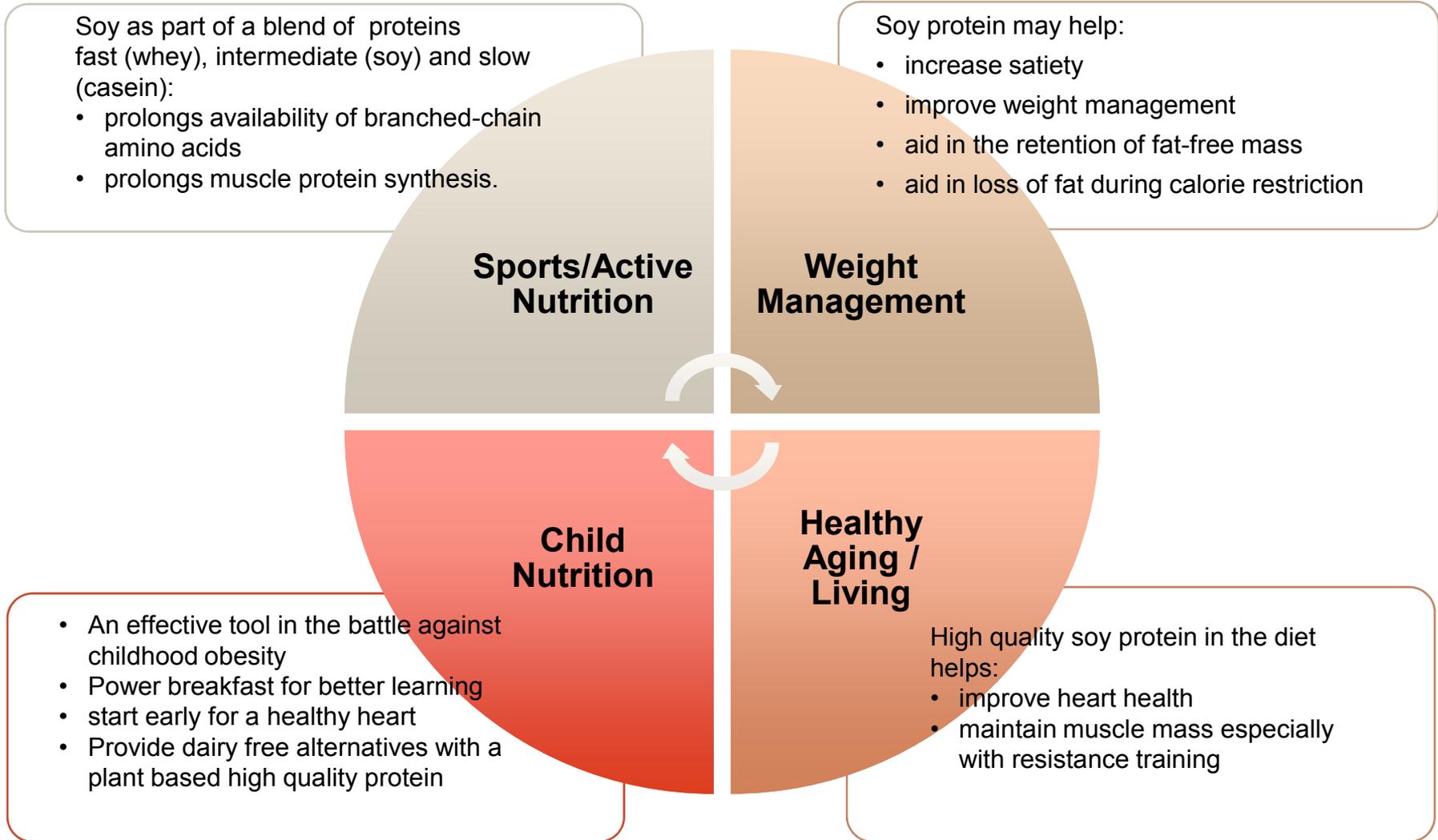
A combo of soy protein, whey & casein, helps build & maintain muscle mass while providing all the essential amino acids & nutrients

25 g/d of soy protein can decrease LDL-C levels, which may reduce risk for CVD



**Soy is a high-quality, complete protein with health benefits across the lifespan**

# Summary: Soy Protein's nutritional benefits





## Child Nutrition

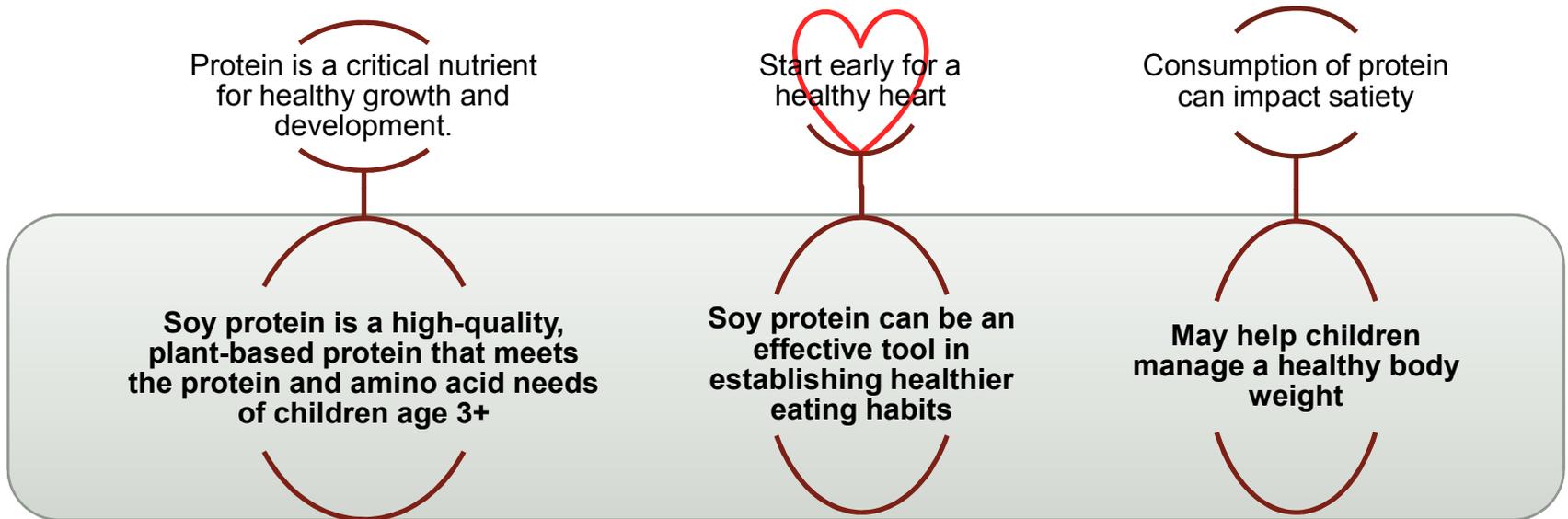
Soy protein is a healthy protein choice and may help with cardiovascular health



Health & Wellness

## Child Nutrition

DuPont™ Danisco® SUPRO® Soy Protein

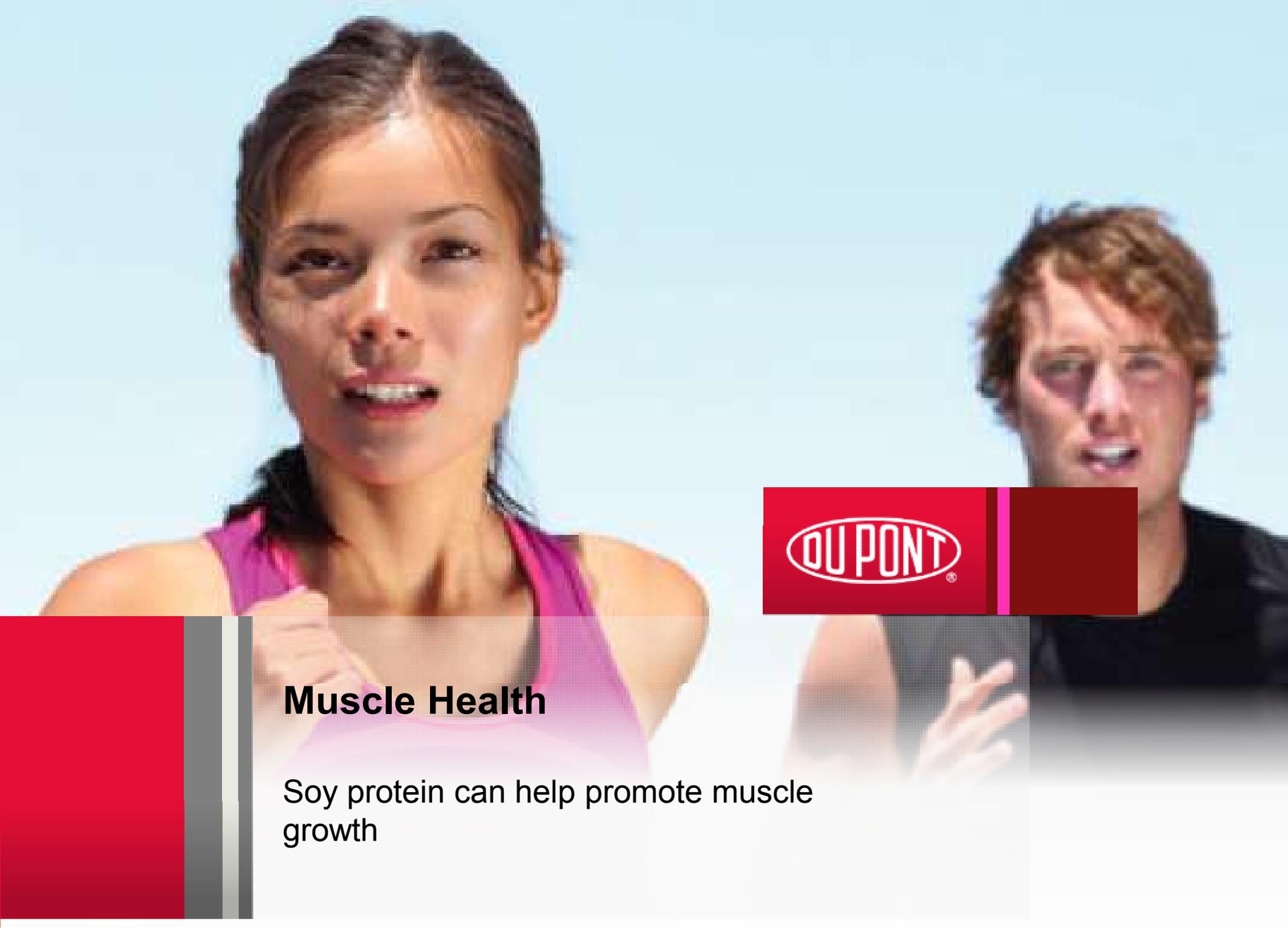


Preventing unhealthy weight gain during childhood and throughout adolescence may represent the most desirable approach to preventing an increase in or reducing the prevalence of obesity in the future.

- Children who are obese have a higher likelihood of becoming obese adults<sup>1</sup>.
- High BMI, which often indicates high percent body fat, may also have immediate consequences in children, including early onset of risk factors of disease, such as elevated lipid concentrations and blood pressure<sup>2</sup>.

1. Wake, M., et al., *Int J Obes*, 2013. 37(1): p. 86-93.

2. Freedman, D., et al., *J Pediatrics*, 2007. 150(1): p. 12-17.



## **Muscle Health**

Soy protein can help promote muscle growth



- Soy protein effective for building muscle in acute studies



- Soy protein effective for building muscle in chronic studies



- Soy and whey do not differ in chronic studies for lean body mass gains (*studies include both trained and untrained subjects*)



	Study Duration (wk)	Lean Body Mass Gain (kg)	Protein (g/day)	Statistically Different ( P ≤ 0.05)
Brown et al. Nutr J 3:22, 2004.	9	Whey protein (+1.3) Soy protein isolate (+1.2)	33	NO
Candow et al. Int J Sport Nutr Exerc Metabol. 16:233-244, 2006.	6	Whey protein (+2.5) Soy protein isolate (+1.7)	~ 85	NO
Kalman et al. J Int Soc Sports Nutr. 23(4):4, 2007.	12	Whey protein (+0.5) Soy protein Isolate (+0.5)	50	NO

# Combining unique attributes of soy & dairy proteins

Soy and dairy protein are effective for building muscle and result in similar lean body mass gains in prolonged clinical studies <sup>1,2,3</sup>

Protein	Complete Protein	Digestion Rate	Lean Body Mass Gains	High in Leucine	High in Arginine & Glutamine	Antioxidant Activity
Whey		Fast				
Soy		Intermediate				
Casein		Slow				
Combined		Prolonged				

***Blending soy, whey, and casein proteins may increase the anabolic window for increased growth and maximize muscle building***

Adapted from Paul et al., *J Am Coll Nutr.* 2010

<sup>1</sup> Brown et al., *Nutr J.* 2004.

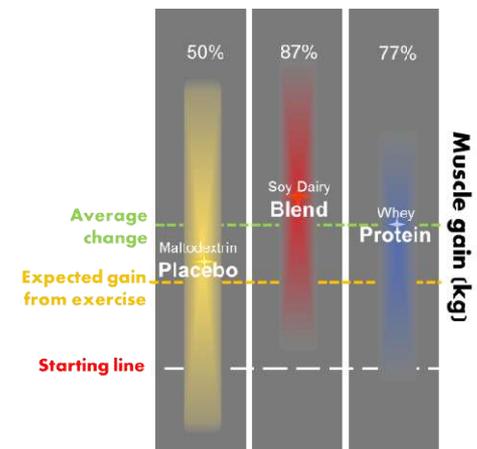
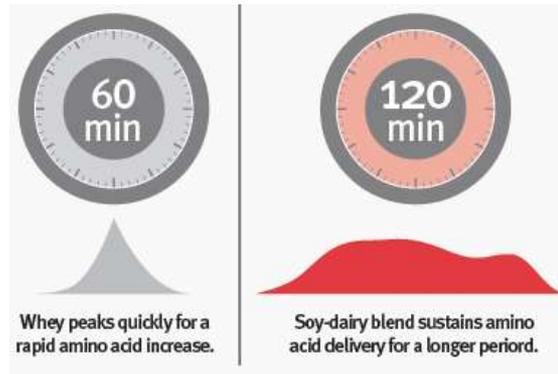
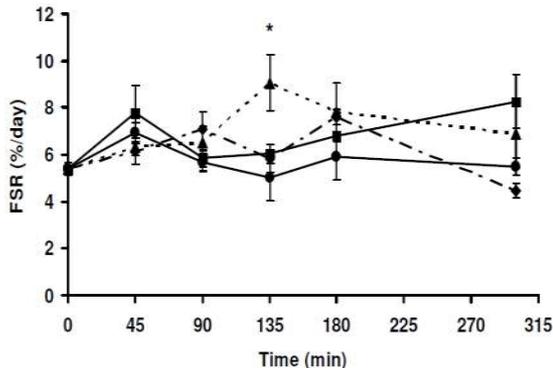
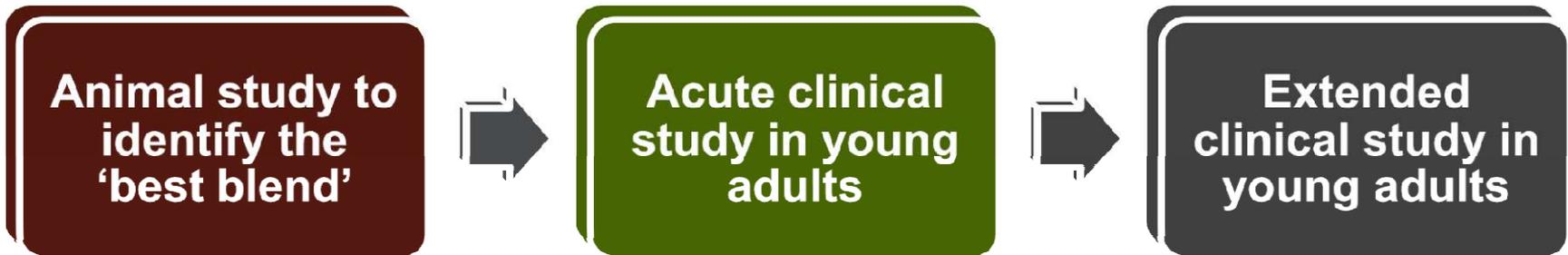
<sup>2</sup> Kalman et al., *J In Soc Sports Nutr.* 2007.

<sup>3</sup> Candow et al., *Int J Sport Nutr Exerc.* 2006.

# Soy-dairy protein blend for enhanced muscle building

Blending soy, whey and casein proteins increases the anabolic window for increased growth and maximize muscle building

Protein	Complete Protein	Digestion Rate	Lean Body Mass Gains	High in Leucine	High in Arginine & Glutamine	Antioxidant Activity
Whey	✓	Fast	✓	✓		
Soy	✓	Intermediate	✓		✓	✓
Casein	✓	Slow	✓			
Combined	✓	Prolonged	✓	✓	✓	✓



**Soy-dairy protein blend (25% whey, 25% SUPRO® soy protein isolate, 50% casein)**



# Weight Management

Soy protein can be satiating and may help reduce abdominal fat



Health & Wellness

# Weight Management

DuPont™ Danisco® SUPRO® Soy Protein



- Soy protein has been demonstrated to be as effective as other high-quality protein sources at increasing satiety & aiding weight loss
- Diets higher in protein
  - Increase appetite control & satiety more than carbohydrates
  - Preserve more lean body mass during

**New study:** The beneficial effects of protein-rich, afternoon snacks on appetite control, satiety, and reward-driven eating behavior in young people

## Experimental Design

Randomized crossover design testing 3 snack scenarios in older adolescent subjects

- 1) Higher Protein (Soy) Snack Foods
- 2) Typical, Low Protein (Soy) Snack Foods
- 3) No Snack

## Key Findings

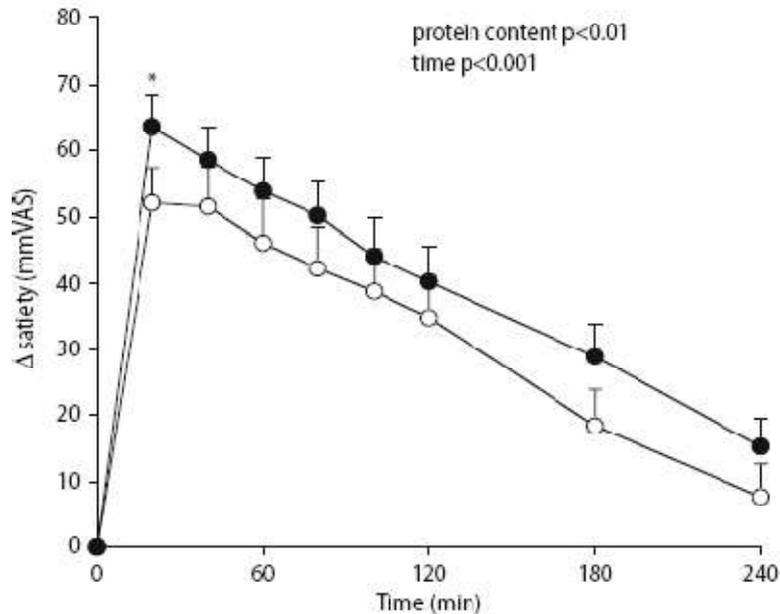
The consumption of snacks led to reduction in appetite, increases in satiety, reductions in evening intake compared to no snacking.

The protein snack led to further improvements by delaying eating initiation, reducing snacking throughout the evening & improving overall diet quality

Margriet A.B. Veldhorst  
 Arie G. Nieuwenhuizen  
 Ananda Hochstenbach-Waelen  
 Klaas R. Westerterp  
 Marielle P.K.J. Engelen  
 Robert-Jan M. Brummer  
 Nicolaas E.P. Deutz  
 Margriet S. Westerterp-Plantenga

## Effects of high and normal soyprotein breakfasts on satiety and subsequent energy intake, including amino acid and 'satiety' hormone responses

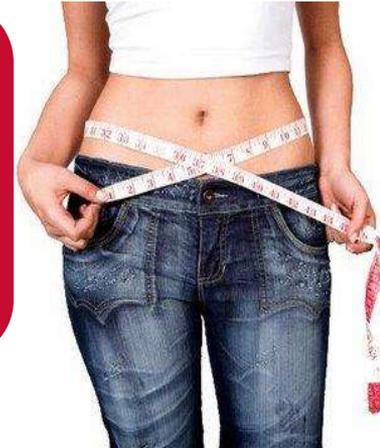
Eur J Nutr (2009) 48:92–100



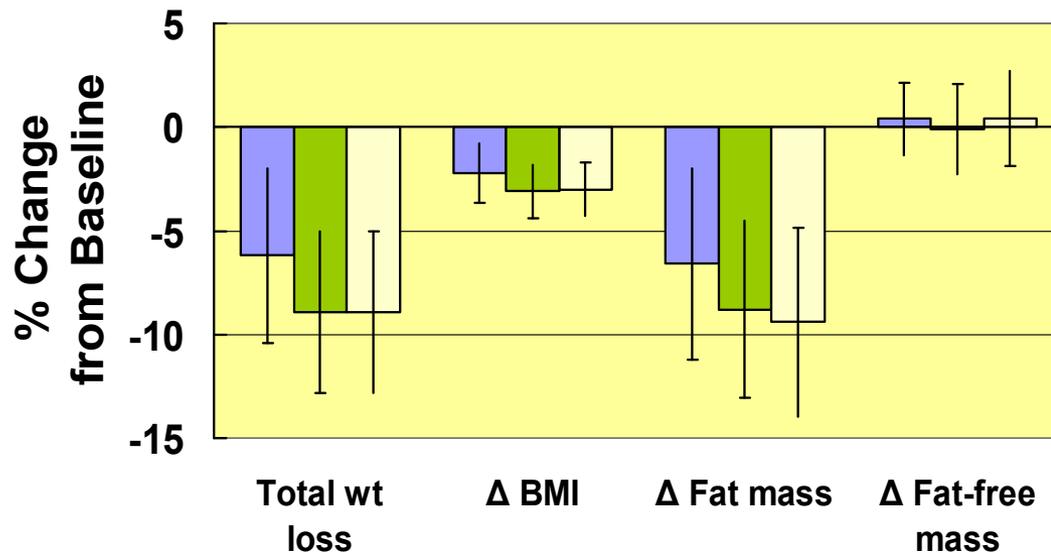
Soy-custard given at a high protein level (25% of calories) showed superior satiating properties (Visual Analog Scales and insulin) compared to a normal protein soy-custard (10% of calories).

**Greater satiating effect is seen with greater intake.**

- A diet rich in high-quality protein is gaining scientific support as a successful strategy to promote weight loss and/or prevent weight gain or regain in adults.
- The effectiveness of higher protein meals/diets includes the improvement in appetite control and satiety.



■ Lifestyle Education ■ Substitutional Diet (soy) □ Substitutional Diet (soy) + PA



- Soy protein decreases abdominal fat during weight management.
- Soy protein promotes fat loss and preserves lean body mass during weight loss induced by energy restriction.

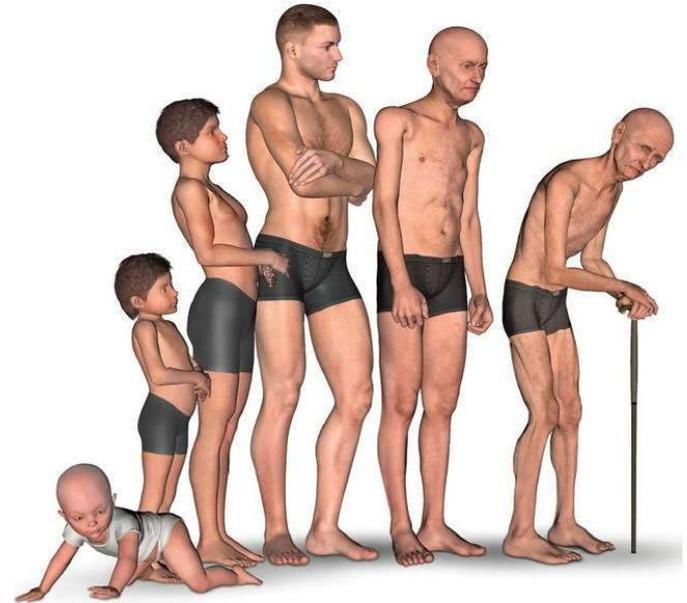


## Healthy Living, Healthy Aging

Soy Protein for Healthy Living

## Population differences

- Loss of lean body mass occurs exponentially with age ('sarcopenia')
- Protein synthesis in the post-absorptive period declines during aging
- Protein intake  $>1.0$  g/kg/d has been recommended to maintain physical function during aging<sup>1</sup>
- Ongoing research examining the effects of protein sources on aging muscles***



***Effects of protein blends on muscle protein synthesis & breakdown in healthy older adults***

*Clinicaltrials.gov: NCT0184726*

# Sarcopenia – Muscle Loss, Fat Accretion

*Roubenoff R et al. (2003) J of Gerontology, 58(11) 1012-1017, 2003*

**Muscle  
(light  
gray)**



**Young, active**

**Fat  
(dark  
gray)**

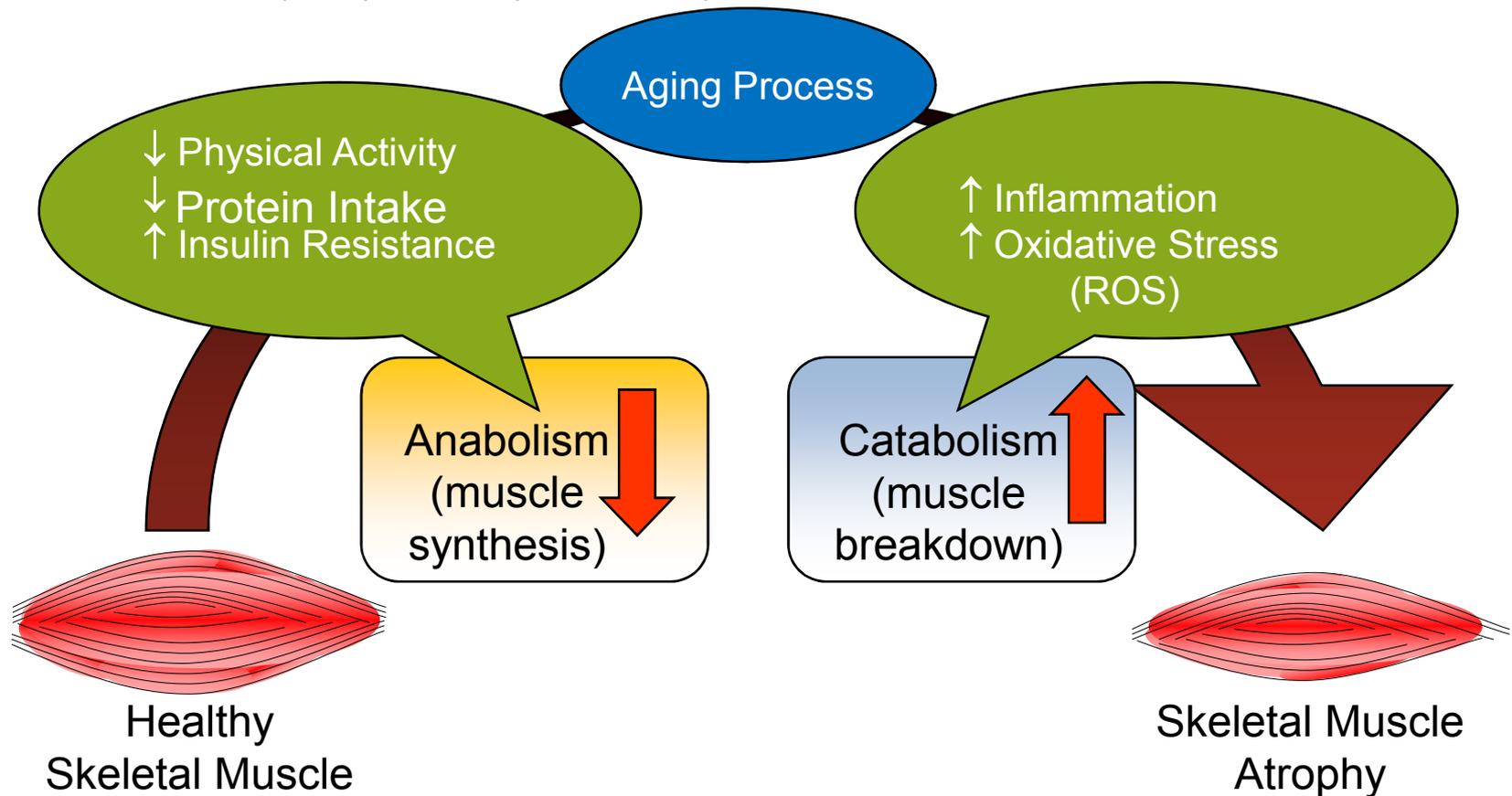


**Old, sedentary**

***MRI images of a 25-yr old vs a 75-yr old (both healthy)***

# Mechanism for Development of Sarcopenia

Adapted from Roubenoff R et al. (2000) *J. Gerontol A Biol Med Sci.* (12):M716-24.  
Jackman RW et al. (2004) *Am J Physiol Cell Physiol* 287:C834-C843



**Increased protein intake, along with exercise, is essential to maintain or increase muscle mass in the sarcopenic elderly.**

# In conclusion, across the lifespan, soy protein is a high quality protein that can play a role in:

- Child Nutrition – healthy growth and development, tool against childhood obesity, early start to a healthy heart, and a high quality alternative to dairy protein.
- Muscle Health – soy protein enhances muscle synthesis and promotes muscle growth.
- Weight Management – soy protein helps improve body composition and induces satiety.
- Cardiovascular Health – soy can help improve cholesterol levels.
- Healthy Living – soy protein has many health and nutrition benefits for the aging population - improving heart health, maintaining muscle mass especially with resistance training.

# DuPont™ Dansico® Soy Protein Solutions



# ADVANTAGES OF DUPONT™ DANISCO® SOY PROTEIN SOLUTIONS

## PRODUCT QUALITY

Our high-quality raw materials, strict manufacturing standards, and robust inventory management ensure the safety and consistency of our products, while offering the choice of GM or non-GM products.

## NUTRITIONAL

Soy protein is comparable in protein quality to dairy protein, low in fat, cholesterol-free and lactose-free. Our soy protein products have been shown to provide health benefits across the life span, from child nutrition through active adulthood into healthy aging.

## ECONOMICAL

Our soy proteins are an economical alternative to animal-based proteins, providing price and supply stability, which helps control costs and improve brand profitability.

**DUPONT™  
DANISCO®  
SOY PROTEIN  
SOLUTIONS**

## FUNCTIONAL

Our soy-based proteins are designed to deliver both the protein functionality required of specific end use applications and the sensory attributes consumers expect.

## ENVIRONMENTAL

The carbon footprint of our plant-based soy proteins is 8 to 80 times smaller than animal-based proteins.



# DuPont Nutrition & Health. It's What's Inside.



## **On the Web**

food.dupont.com  
danisco.com



## **On Youtube**

<https://www.youtube.com/channel/UCarRvRlCdW3V7ganpvHoJ-Q>



## **On WeChat**

Chinese language channel  
(use your mobile to scan code)



## **On**

**LinkedIn** <https://www.linkedin.com/company/4943>

## **LinkedIn Show case pages:**



## **Soy Proteins:**

<https://www.linkedin.com/company/soy-proteins>



## **Bakery Performance:**

<https://www.linkedin.com/company/bakery-performance>



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<https://twitter.com/danisco>



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<http://www.slideshare.net/dupontfood>

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**On Youtube**  
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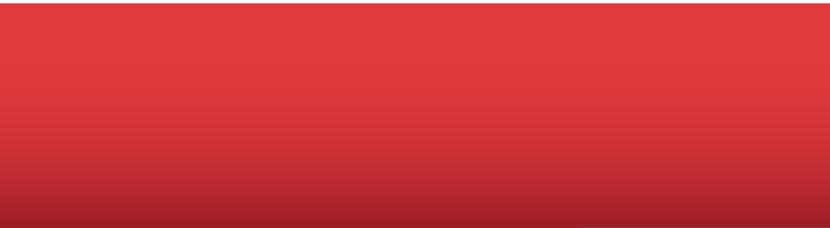
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 (use your mobile to scan code)



**On Twitter**  
<https://twitter.com/danisco>



**SlideShare:**  
<http://www.slideshare.net/dupontfood>



DuPont Nutrition & Health combines in-depth knowledge of food and nutrition with current research and expert science to deliver unmatched value to the food, beverage and dietary supplement industries.

We are innovative solvers, drawing on deep consumer insights and a broad product portfolio to help our customers turn challenges into high-value business opportunities

