Dairy Nutrition in Later Life

The Underappreciated Role of Dairy Protein and Lean Tissue Mass

Presentation Outline

- Body composition and ageing
- Age-related Sarcopenia
- Milk protein support to lean tissue mass

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Headline

'38% of Irish adults are overweight and 23% are obese (SLAN 2007)'

'37% overweight (♂44%, ♀31%) and 24% obese (♂26%, ♀21%) (IUNA, 2011)'

What are overweight and obesity?

World Health Organization

Overweight and obesity, as ***measured by BMI***, are defined as an ***abnormal or excessive fat accumulation*** that may impair health.

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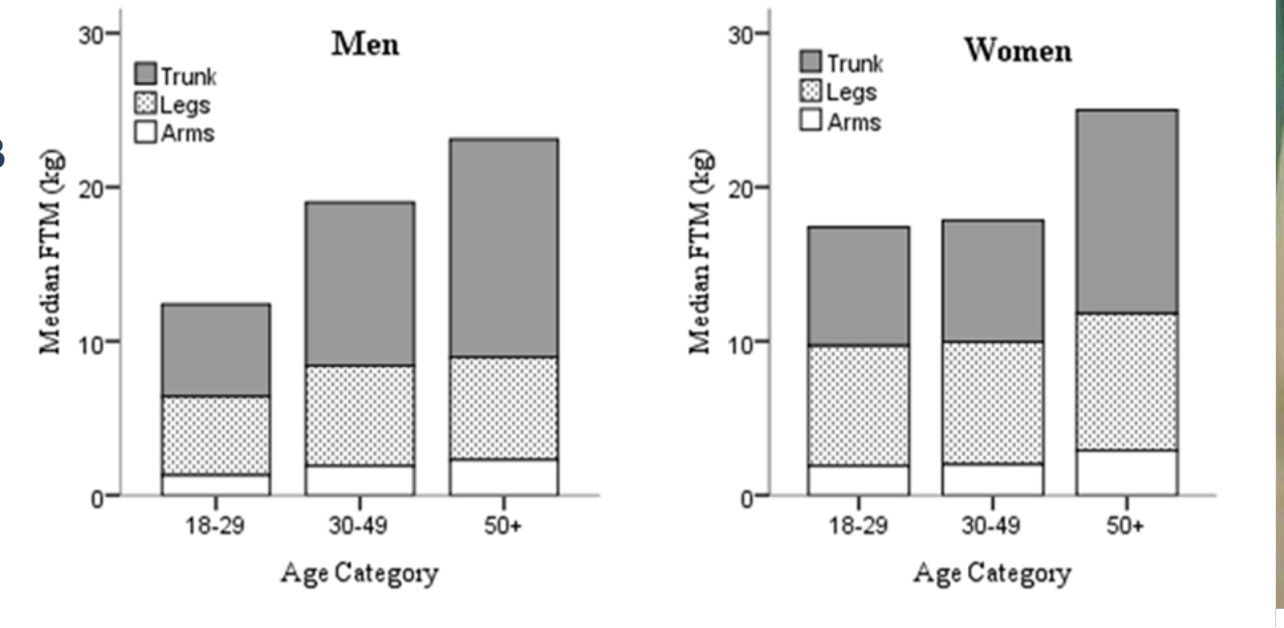
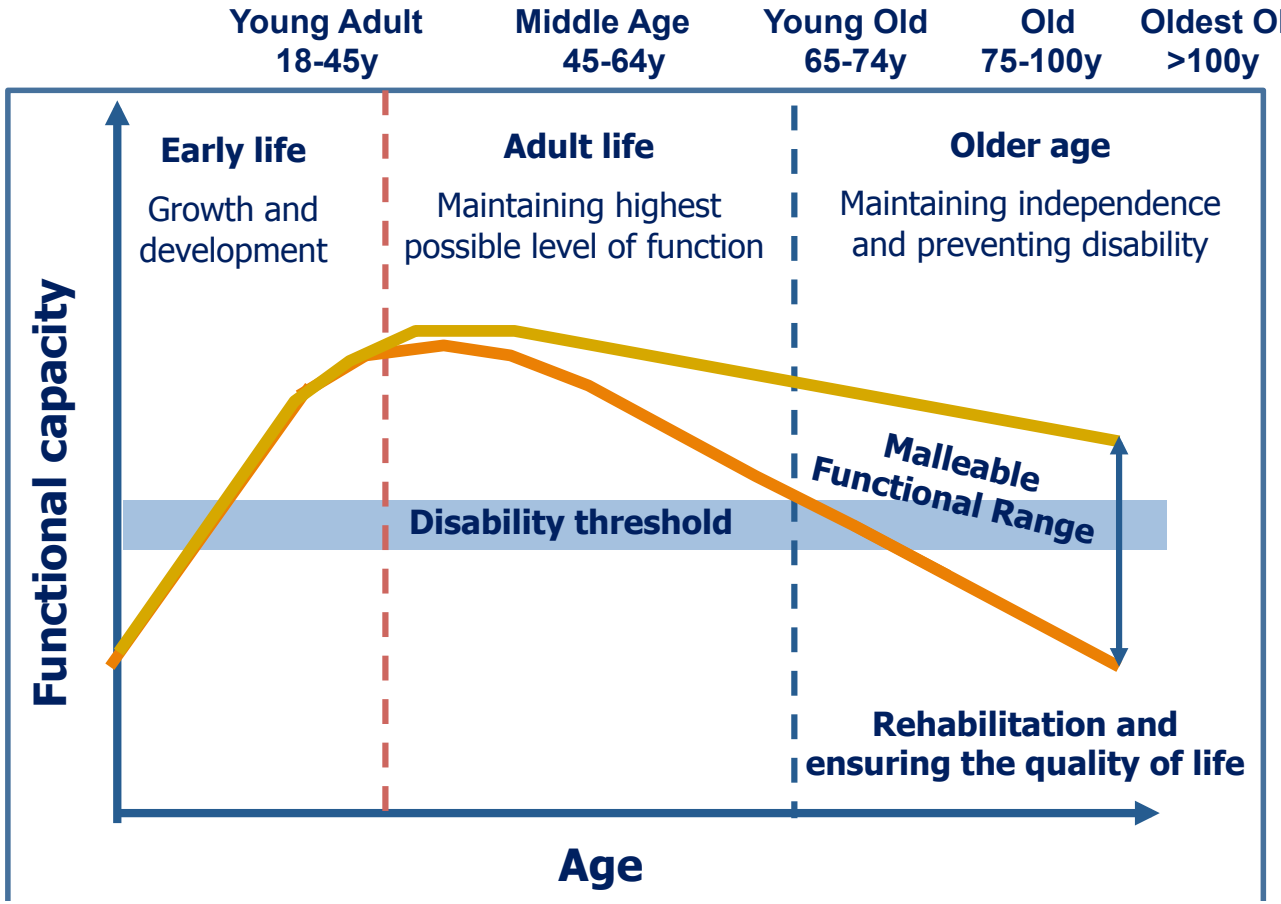


Headline

'The number of "Older people" is growing faster than any other age group.'

'By 2050, an estimated 2 billion people will be >60y and 1.2m >100y'



With a prevalence in the 7th decade of life (60–70y) of 5–13%, age-related **sarcopenia** currently affects >50 million people and **will affect >200 million by 2050**[1].

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Classification of Sarcopenia

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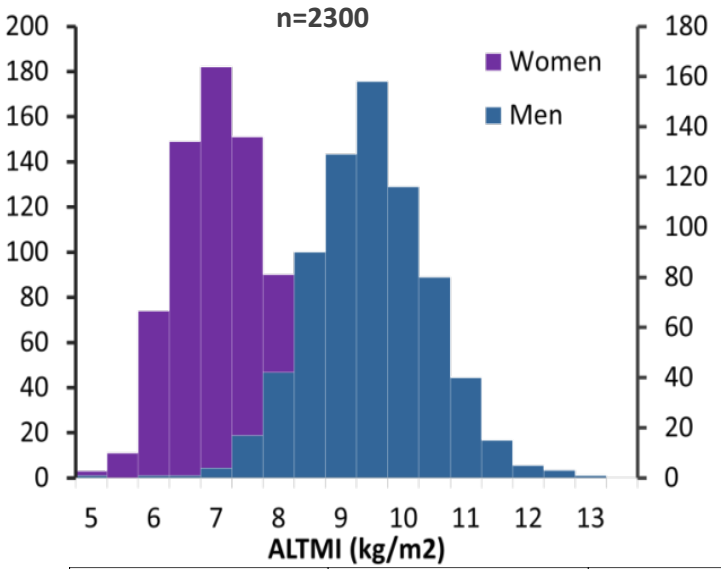
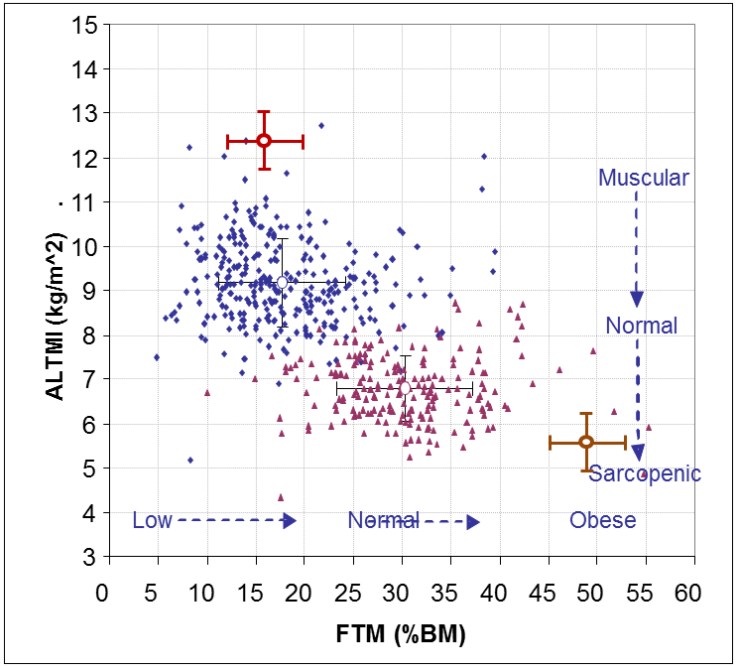
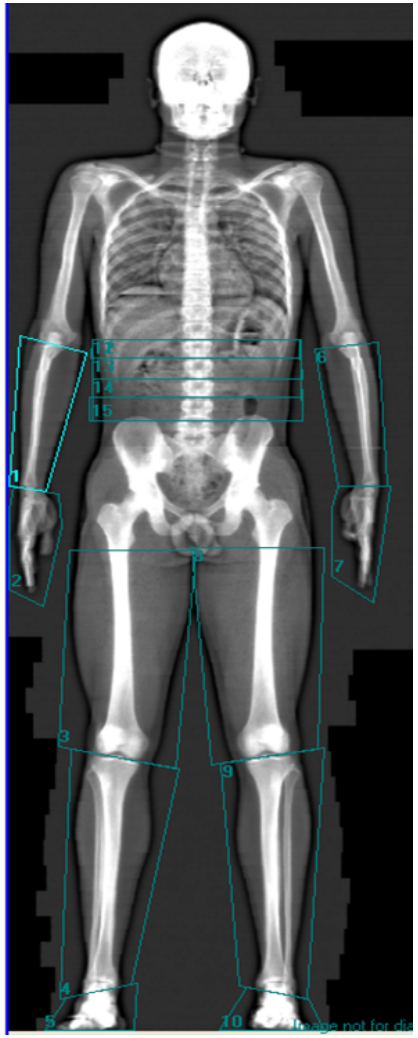
Body Composition Phenotype

- iDXA / US / MRI







Age-related <u>sarcopenia</u> affects:

- **locomotor** function, functional mobility, QoL;
- **metabolic** function, glycaemic control, BMR;
- **immune** function, glutamine for immune cells;
- **endocrine** function, myokines and cytokines;

[1]www.ul.ie/bodycompositionstudy

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Dairy Support to Sarcopenia

'Leave medicines in the chemist's pot if you can cure your patients with food'
Hippocrates

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The potential for customized nutrition and physical activity programs to improve health and quality of life in later years is under-exploited, yet urgently called for.

*'Based on increased awareness of sarcopenia in older people and widespread use of tools for screening and assessment, the ultimate goal is to identify **dietary strategies**, lifestyle changes and treatments that can prevent or delay the onset of sarcopenia.'*

[1]European Working Group on Sarcopenia in Older People (2010)

Primary consideration for dairy protein nutrient support

- Protein/peptide *quality and amount*;
- Protein/peptide *bioavailability* and *bioactivity*;
- Protein/peptide *timing of intake*.

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Protein Quality and Amount

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Key considerations: *Based on 0.8g/kg bm/day

- Total EAA (I.O.M. 2005) and specific requirement for;
- EAA regulators of Muscle Protein Synthesis (MPS);
- EAA for exercise/recovery metabolism.

EAA	IOM	IOM	Milk Whey			Milk Casein			Wheat Grain		
	$mg.kg^{-1}.d^{-1}$	$g^{-1}.d^{-1}$	$g.100g^{-1}$	g	% IOM	$g.100g^{-1}$	g	% IOM	$g.100g^{-1}$	g	% IOM
His	14	0.98	2.1	0.62	63%	3.1	0.99	101%	2.3	1.04	107%
Iso	19	1.33	7.2	2.12	160%	4.9	1.57	118%	3.7	1.68	126%
Leu	42	2.94	11.2	3.30	112%	9.9	3.16	108%	6.8	3.09	105%
Lys	38	2.66	8.8	2.59	98%	7.9	2.52	95%	2.8	1.27	48%
Meth+Cyst	19	1.33	2.2	0.65	49%	3.1	0.99	74%	3.5	1.59	119%
Phe+Tyr	33	2.31	3.1	0.91	40%	5.9	1.88	82%	6.4	2.90	126%
Thre	20	1.40	8.0	2.36	169%	3.8	1.21	87%	2.9	1.32	94%
Try	5	0.35	1.9	0.56	160%	1.5	0.48	137%	0.2	0.10	27%
Val	24	1.68	6.3	1.86	111%	6.8	2.17	129%	4.4	2.00	119%
Total	214	14.98	50.8	14.98	107%	46.9	14.98	103%	33.0	14.98	97%
Pro(g)				29.5			31.9			45.4	

*Average woman age 60 y, 69.6kg, 56g protein.d^{-1} (0.8g protein .$kgbm^{-1}$)

*Evidence to support an ***increase*** to 1.2g protein .$kgbm^{-1}$ in older adults

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Bioavailability/Bioactivity

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Key considerations:

Bioactivities;

- Insulinotrophic
- Enterogastric
- Anti-inflammatory
- Satiety

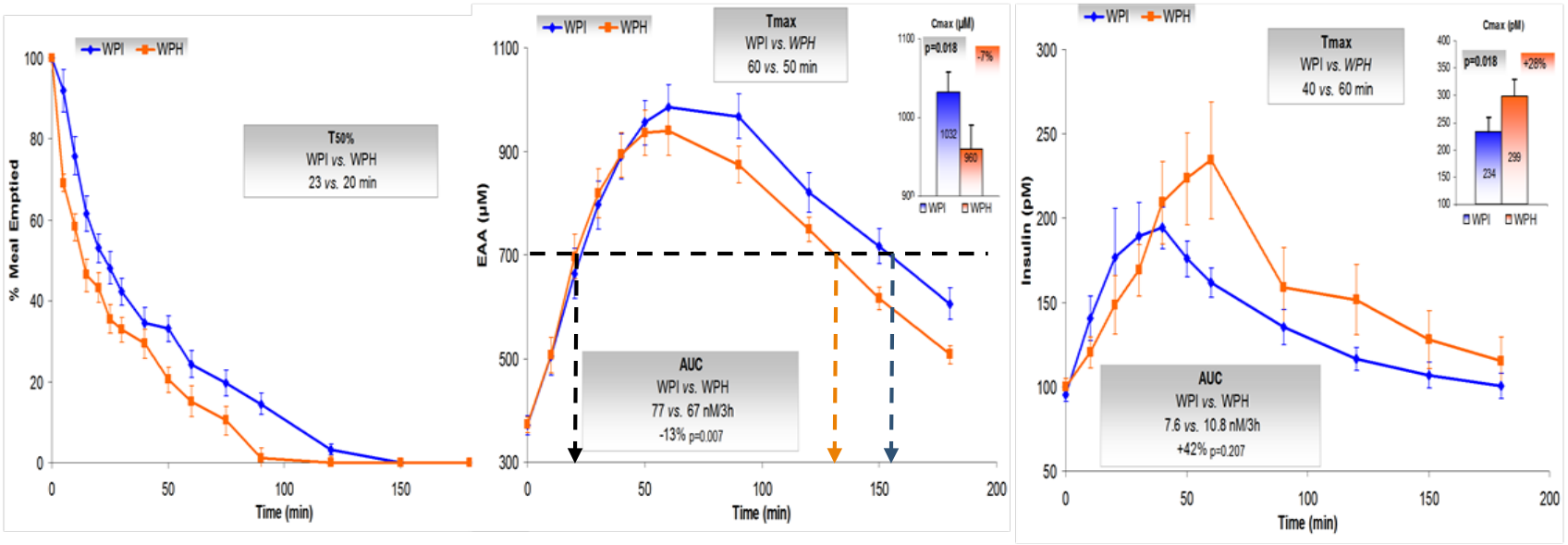
- ❖ Gut transit;
- ❖ Time and concentration in circulation;
- ❖ Availability/activity *in vivo*.

Amino Acids (2009) 37:333–339
DOI 10.1007/s00726-008-0156-0

ORIGINAL ARTICLE

Human insulinotropic response to oral ingestion of native and hydrolysed whey protein

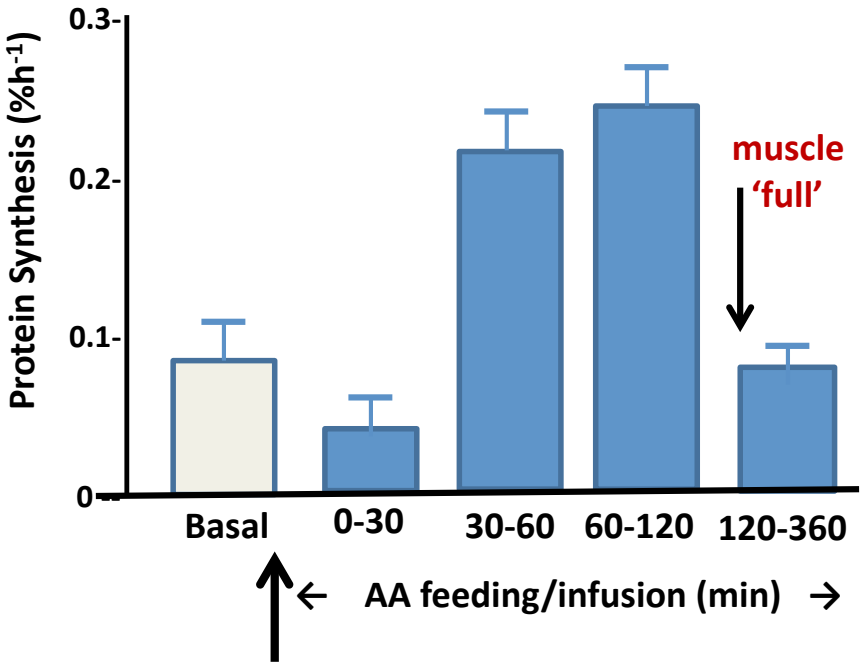
O. Power · A. Hallihan · P. Jakeman



Post-prandial effect on MPS

Key considerations:

- Stimulus of muscle protein synthesis, suppression of breakdown;
- Time course of effect following feeding
- Protein distribution between meals;



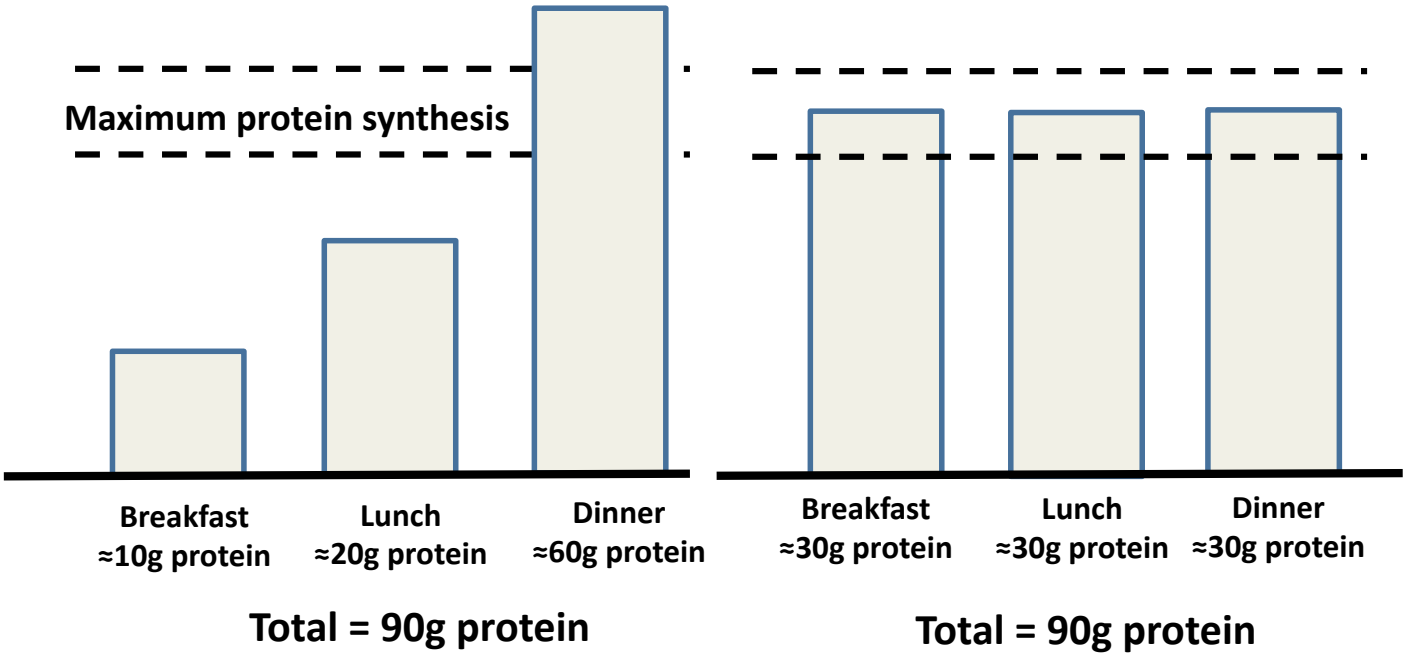
Note

- **Feeding/infusion of NEAA has no effect;**
- **~2h 'window' of increased MPS**
- **When 'full' further feeding has no further effect- refractory period.**

Timing of Milk Protein Intake

Key considerations:

- Stimulus of muscle protein synthesis, suppression of breakdown;
- Time course of effect following feeding
- Protein distribution between meals;



Opportunity for SDT

- ✓ Discovery of dairy bioactives;
- ✓ Product formulation;
- ✓ Application to Health

FOOD FOR HEALTH IRELAND

Dairy Protein Supplementation in Healthy Ageing: Sarcopenia

- RCT selected from recruitment of healthy ♂ and ♀50-70y

Supported by Enterprise Ireland

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Thank You

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