

# Effects of Whey Protein Hydrolysate and Ginseng Berry Extract on Muscle Strength in Korean Elderly people

Da Som Yoon<sup>1,2</sup>, Hyun Hwa Bae<sup>2</sup>, Jun Gyu Lee<sup>2</sup>, Yoonhee Kim<sup>2</sup>, kyeongil Min<sup>2</sup>, Hyoung su Park<sup>3</sup>, Seok Jun Park<sup>3</sup>, Don-Kyu Kim<sup>4</sup>

<sup>1</sup>Department of Food Science and Technology, Chung-Ang University, <sup>2</sup>Department of Rehabilitation Medicine Chung-Ang University hospital, <sup>3</sup>R&D Unit, Meall Health Nutrition Co., Ltd. <sup>4</sup>Department of Rehabilitation Medicine Chung-Ang University Gwangmyeong hospital



## Objective

The purpose of this study was to evaluate the effects of whey protein hydrolysate (WPH) and ginseng berry extract (GBE) mixture supplementation for 12 weeks on muscle strength and muscle function in healthy Korean Elderly people aged over 60 years.

## Methods

- A 12-week intervention was performed for 100 healthy adults aged >60y in a single-center, randomized, double-blind, placebo-controlled trial.
- The participants were randomly assigned to consume either WPH-GBE mixture (5,000mg/day) or a placebo. All participants were asked to perform lower extremity strengthening exercises at least 3 days a week during the trial period.
- They were assessed for quadriceps muscle strength and quadriceps muscle power using Biodex<sup>®</sup> isokinetic dynamometers at baseline and 12-week after treatment.
- And handgrip strength, Short physical performance battery (SPPB), body composition using dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA), blood tests and the Euro-QoL-5D (EQ-5D) questionnaire were examined.
- Statistical processing of data was done using SPSS, and independent t-test, paired t-test and a chi-square test were performed. The level of significance was set at  $p < 0.05$ .

## Results

- A total of 88 participants (mean age  $68.0 \pm 5.1$ y) completed the study (Table 1).
- There were no significant difference ( $p > 0.05$ ) in baseline characteristics including age, sex ratio, weight, height between the two groups.

Table 1. Participants' baseline characteristics

Variable	Placebo (n=44)	WPH group (n=44)	p value
Sex (n (%))	Female	31 (70.5)	0.496 <sup>1)</sup>
	Male	13 (29.5)	
Age (years)	68.27±5.40	67.70±4.81	0.604 <sup>2)</sup>
weight (kg)	62.19±8.57	61.29±8.14	0.614 <sup>2)</sup>
height (cm)	159.10±6.63	159.36±7.56	0.867 <sup>2)</sup>

<sup>1)</sup> P values were derived from Chi-square test.  
<sup>2)</sup> P values were derived from independent t-test.

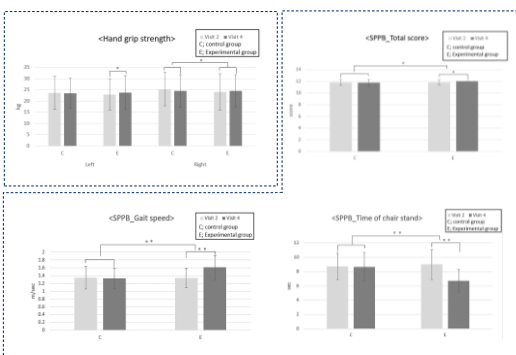


Figure 1. Effect of WPH-GBE mixture supplementation on hand grip strength and SPPB (score and timed results of sub-test)

- WPH-GBE mixture supplementation for 12 weeks significantly increased ( $p < 0.05$ ) right hand grip strength by  $0.53 \pm 2.82$  Kg in the experimental group compared to the control group ( $-0.83 \pm 2.86$  Kg) (Figure 1).
- In addition, the experimental group compared to the control group showed significant improvement ( $p < 0.05$ ) in the total score of SPPB and the timed results of each sub-test including 4-m walking speed and standing five times in a chair.
- Whereas quadriceps muscle strength and muscle power did not differ between the two groups due to the tendency to increase in both the experimental group and the control group (Table 2).
- Also, no significant changes were observed in blood tests, EQ-5D, and body composition such as skeletal muscle mass, appendicular skeletal muscle (normalized by height,  $ASM/height^2$ ), total fat mass, and percentage of body fat between the groups.

Table 2. Changes of WPH-GBE supplementation during 12-week.

Variable	Placebo group (n=44)	WPH-GBE group (n=44)	p value*
Quadriceps muscle strength (N.m)	Left Baseline	86.38±33.54	0.683
	Left 12 week	91.05±33.47	
	Right Baseline	88.46±31.74	
	Right 12 week	90.25±32.50	
Quadriceps muscle power (Extension, W)	Left Baseline	49.18±16.59	0.116
	Left 12 week	51.62±16.91	
	Right Baseline	51.41±15.97	
	Right 12 week	54.42±18.29	
Quadriceps muscle power (Flexion, W)	Left Baseline	19.29±9.12	0.172
	Left 12 week	19.96±9.96	
	Right Baseline	20.06±10.01	
	Right 12 week	20.73±10.55	
Skeletal muscle Mass (kg)	Baseline	22.55±4.21	0.629
	12 week	22.65±4.30	
ASM/weight x 100 (%)	Baseline	27.53±3.27	0.164
	12 week	27.81±3.34	
SMMI/height <sup>2</sup> (kg/m <sup>2</sup> )	Baseline	8.84±1.00	0.586
	12 week	8.87±1.03	
BMI (kg/m <sup>2</sup> )	Baseline	24.53±2.68	0.526
	12 week	24.53±2.59	
Total fat (%)	Baseline	37.29±6.38	0.428
	12 week	37.64±6.04	
Trunk fat (%)	Baseline	38.04±6.31	0.347
	12 week	38.63±5.99	
Creatinine (mg/dL)	Baseline	0.74±0.14	0.529
	12 week	0.72±0.16	
Total protein (g/dL)	Baseline	7.20±0.39	0.196
	12 week	7.10±0.34	
Albumin (g/dL)	Baseline	4.40±0.21	0.831
	12 week	4.35±0.21	
Prealbumin (mg/dL)	Baseline	27.03±4.59	0.659
	12 week	27.55±3.97	
EQ-5D-3L	Baseline	0.939±0.14	0.567
	12 week	0.975±0.04	

\* p values were compared between the groups (independent t-test) for change from baseline. Values are mean ± SD; ASM, appendicular skeletal muscle; SMMI, Skeletal Muscle Mass Index; BMI, body mass index; EQ-5D, Euro-QoL-5D.

## Conclusion

- In conclusion, WPH-GBE mixture supplementation for 12 weeks improved muscle function and muscle strength especially on the right side of hand grip strength in the elderly.
- Otherwise, quadriceps muscle strength, muscle power, and the muscle mass were no significant improvements between the groups. The results of no differences in quadriceps muscle strength and power are thought to be related to perform lower extremity strengthening exercises in both group during the trial period.
- Therefore, it is considered to be a remarkable result that there was a significant difference in upper limb muscle strength (hand grip strength) after 12 weeks of WPH-GBE mixture supplementation.

## Acknowledgment

This work was supported by the National Research Foundation of Korea(NRF) grant funded by the Korean government (Ministry of Science and ICT) (No. NRF-2019M3A9F3071923).