THE ROLE OF AMINO ACIDS AND THEIR METABOLITES IN SUPPORTING MUSCLE HEALTH IN AGING AND ILLNESS
LEUCINE AND β-HYDROXY-β-METHYLBUTYRATE (HMB)

What is Leucine?
- Leucine is one of nine essential amino acids, a branched chain amino acid, that must be consumed in the diet.
- Leucine is important for muscle protein synthesis and many metabolic functions.1

What is Beta-hydroxy-beta-methylbutyrate (HMB)?
- HMB is a metabolite derived from the amino acid leucine.
- HMB works with protein and amino acids to support muscle protein synthesis while reducing protein breakdown that can lead to muscle loss.2-4

Importance of muscle and dietary protein intake with aging and illness:
Research shows that nutrition strategies that include dietary protein, amino acids and amino acid metabolites can improve muscle mass, strength and function.5-8

DID YOU KNOW?

Most studied dose of CaHMB9 is 3g/day

Only about 5% of dietary leucine is converted to HMB9

Individuals need at least 60 grams of leucine to get 3 grams of HMB9

60 g of leucine is equivalent to eating 110 eggs

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DO LEUCINE AND HMB HAVE THE SAME EFFECTS ON PROTEIN ANABOLISM AND MUSCLE MASS?

• **Leucine** supplementation increases muscle protein synthesis and may be useful to address the age-related decline in muscle mass in elderly individuals. The effect on muscle strength shows mixed results, and there are limited data on physical performance.  

• **HMB** has been shown to increase muscle mass in healthy aging adults, preserve muscle mass during extended bed rest, and enhance recovery during exercise rehabilitation.

• **HMB** has a longer half-lifetime in the blood than that of leucine, which may favor the use of HMB above leucine to achieve protein anabolism.

• A **systematic review** and meta-analysis of 15 randomised controlled trials reporting outcomes in adults with clinical conditions characterised by loss of skeletal muscle mass and weakness revealed:
  - HMB, or supplements containing HMB, have been shown to increase skeletal muscle mass
  - HMB supported improvements in muscle strength

WHAT DO ESPEN GUIDELINES RECOMMEND?

2.2 **In malnourished polymorbid medical inpatients** or those at high risk of malnutrition, nutrient-specific ONS should be administered, when they may maintain muscle mass, reduce mortality or improve quality of life.  

7.1 **In polymorbid medical inpatients** with pressure ulcers, specific amino-acids (arginine and glutamine) and β-hydroxy-β-methylbutyrate (βHMB) can be added to oral/enteral feeds to accelerate the healing of pressure ulcers.  

9.3 **In polymorbid medical inpatients at high risk of malnutrition** or with established malnutrition aged 65 and older, continued nutritional support post hospital discharge with either ONS or individualised nutritional intervention shall be considered to lower mortality.

*Supporting evidence for these guidelines referenced the NOURISH study: Supplementation with ONS (20g high protein, 1.5g CaHMB, 350kcal, 160 IU vitamin D, and other essential micronutrients) twice a day reduced the risk of mortality by 50% through 90 days post-hospital discharge in malnourished, cardiopulmonary patients 65 years or older compared to patients receiving a placebo and standard of care.*

References: