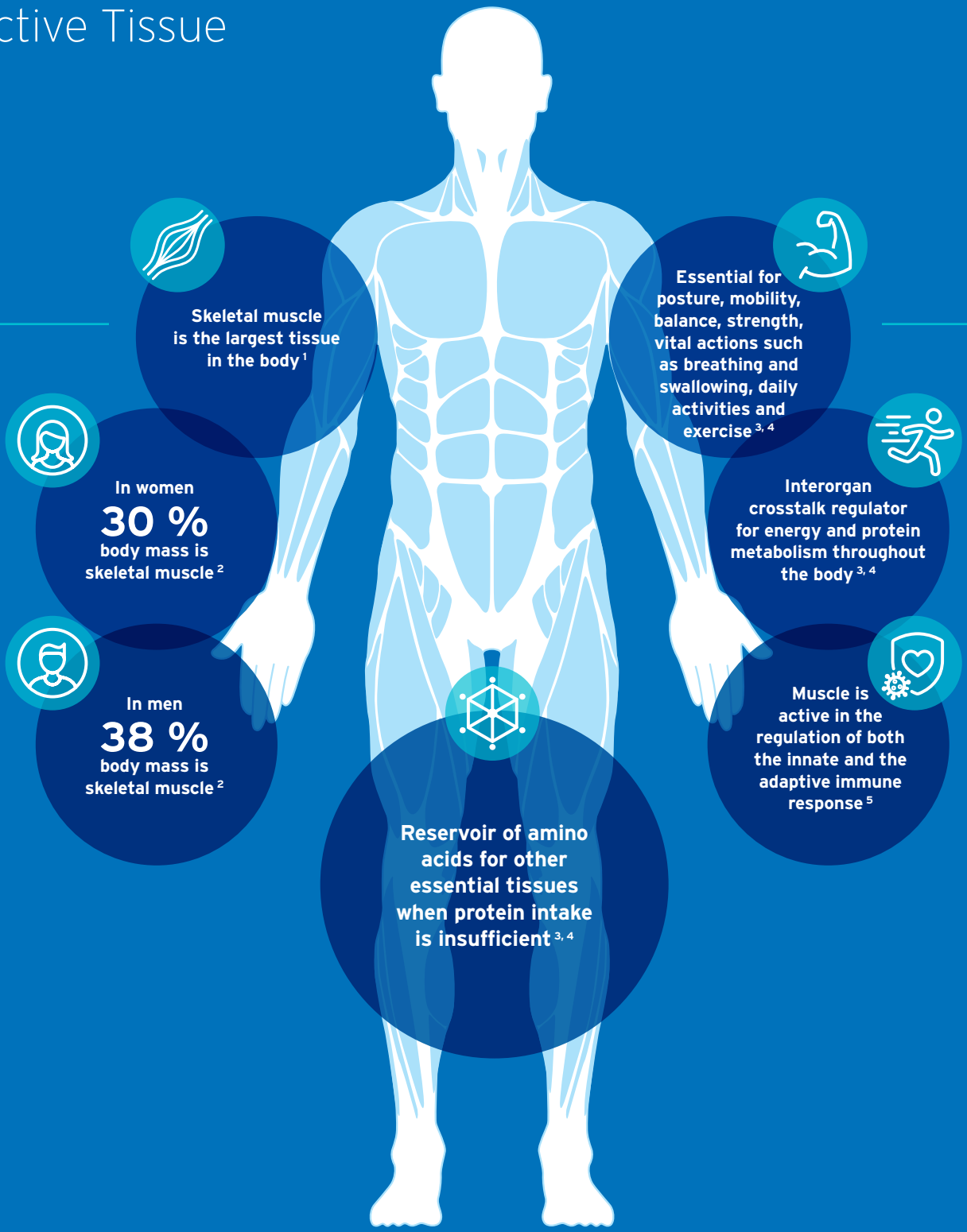
FRESENIUS KABI

Fresubin®

It's time for protein

Lean Body Mass

Muscle: A Metabolically Active Tissue



In healthy individuals there is a dynamic balance between muscle breakdown and muscle synthesis, preserving the overall muscle mass [1]

Muscle Loss:
Causes and Consequences

Ageing [5]
- Poor muscoskeletal health is common in older adults and linked to functional decline and loss of independence
- After 40 years there is a 3-5 % decline in skeletal muscle per decade
- Can be accelerated by various factors such as anorexia, hospitalisation and immobilisation

Chronic Diseases [4, 5]
- Both the disease and the treatment can cause muscle loss
- ~40 % of cancer patients have low muscle mass
- Up to 42 % of patients with chronic kidney disease have sarcopenia
- Other chronic conditions associated with muscle decline include neurodegenerative disease and COPD

Acute Conditions [5]
- Hospitalised patients may have acute muscle loss due to immobilisation, negative protein-calorie balance and disease related factors

Critical Illness [1, 4]
- Immediate and rapid loss of muscle mass varying between 17,7 and 21,8 % by day 10
- Net protein loss due to more muscle breakdown
- Extent of muscle breakdown is related to severity of illness
- Muscle catabolism is due to the pro-inflammatory cytokines and catabolic hormones released during critical illness

Decreased Lean Body Mass

Loss of lean body mass is associated with muscle weakness, impaired physical function, increased complications and mortality [1, 4]

Complications increase with greater loss of lean body mass* [4, 6]

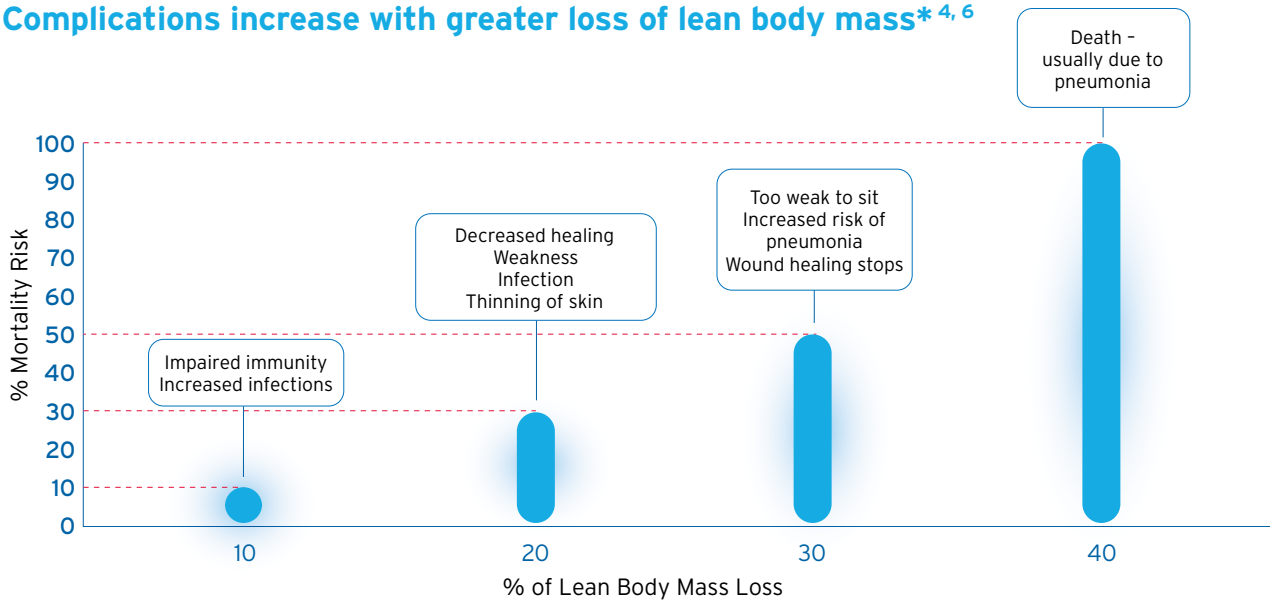
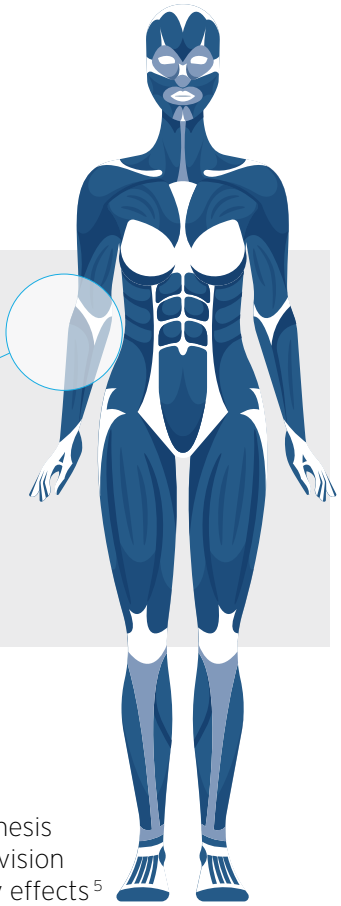


Diagram adapted from Landi *et al.* 2019 and Demling *et al.* 2009.

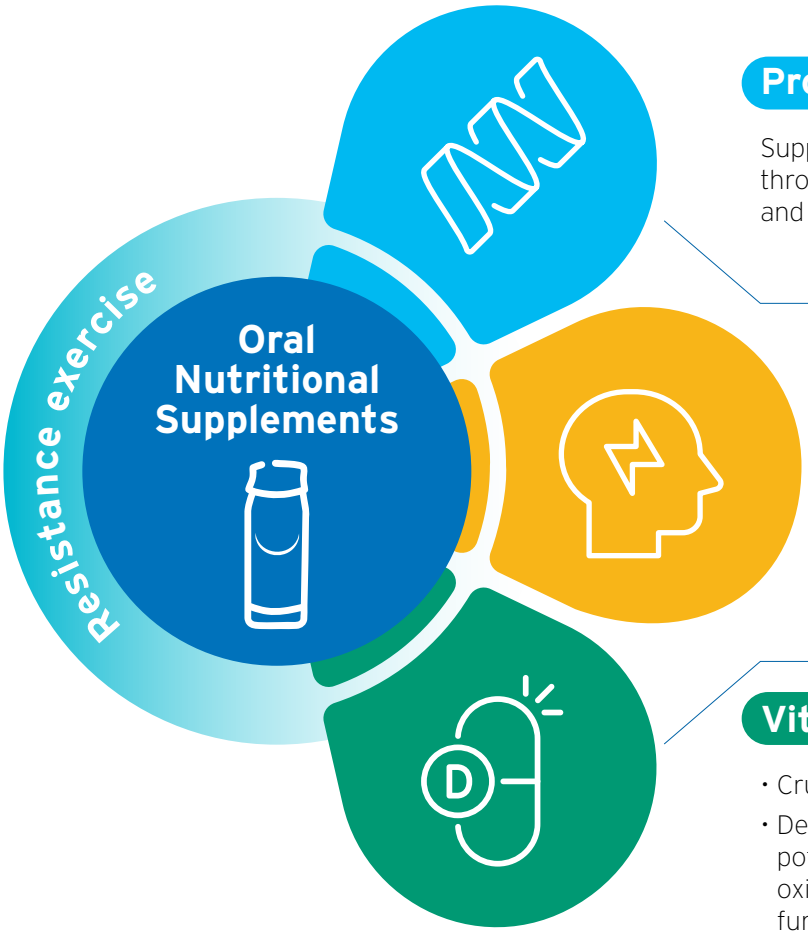
* Assuming no preexisting loss

What can we do to prevent or reverse muscle loss?



Nutrition is key for muscle anabolism, reducing catabolism, and improving outcomes.[5]

Interventions, ideally in combination with exercise, are most beneficial when proactive, early, and continued through recovery.[5]



Protein

Supports muscle synthesis through substrate provision and anti-inflammatory effects[5]

Energy

To spare muscle protein and provide adequate substrate for muscle protein synthesis – sufficient energy must be provided[5]

Vitamin D

- Crucial for bone and muscle health[5]
- Deficiency is linked to muscle dysfunction, potentially due to receptor loss, increased oxidative stress, and impaired mitochondrial function[5]

To achieve adequate protein intake through diet alone can be challenging during illness; oral nutritional supplements (ONS) can help preserve and prevent muscle loss in hospital and community settings.[6]

High-quality protein-enriched ONS have demonstrated benefits, increasing total energy and protein intake without reducing spontaneous food intake, leading to weight gain and prevention of weight loss.[6]

Oral Nutritional Supplementation

- **Preference for high energy (≥ 1,5 kcal/mL or g) and/or high protein products (≥ 7g/100 mL or 100 g)[7]**
- **Minimum effective dose: 400 kcal and 20 g Protein[8]**

Protein **quantity** and **quality** make the difference in muscle health and clinical outcomes

* Protein requirements in liver disease can differ significantly based on the nutritional status and the type of liver disease and for more detailed information the specific guidelines should be referred to

ABW - Adjusted Body Weight

IBW - Ideal Body Weight

Quality:

High quality protein shows [16]:

- High proportion of essential amino acids.
- High digestibility and bioavailability

High-quality protein is the most effective way to induce muscle protein synthesis [5]

High-quality protein promotes maintenance of metabolically active muscle and increase in lean body mass

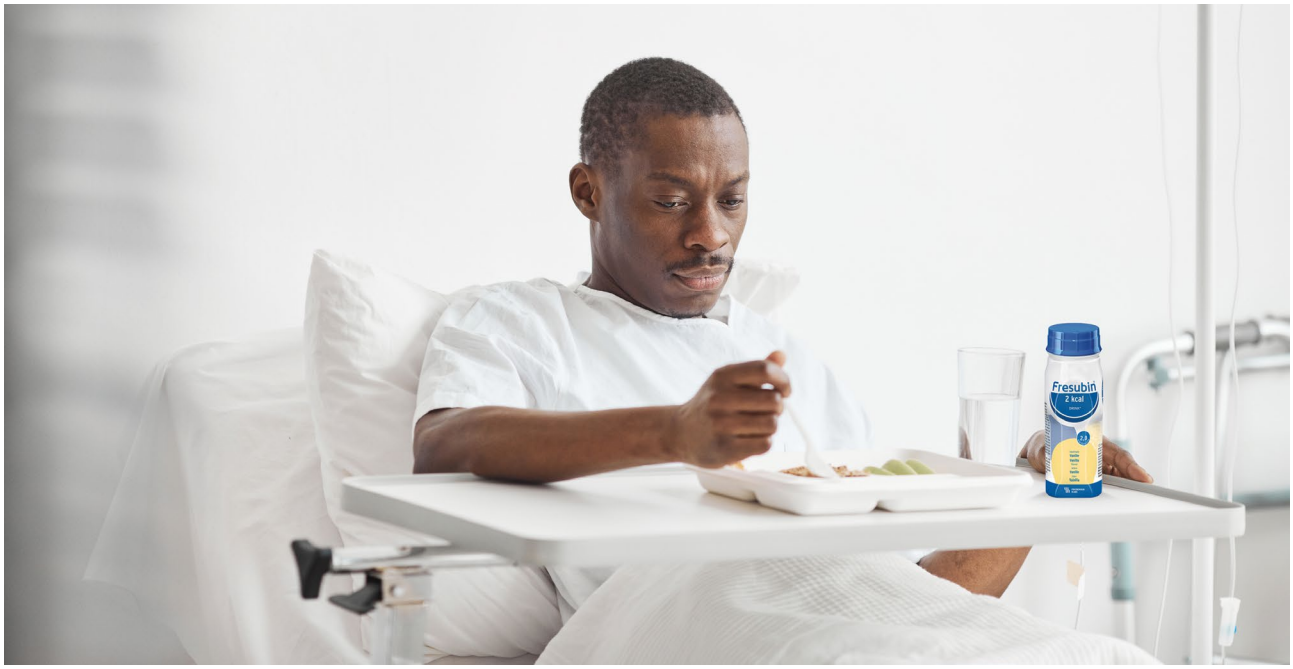
The Fresubin portfolio offers a wide range of products featuring **high-quality protein**, with varying **protein content and energy density.**

The Fresubin portfolio uses high quality protein to provide increased protein content and has solutions for individual needs.

More than 20 % of daily recommended protein need* could be achieved by taking one product high in protein or a combination of these products

Protein(g)	20	25	32,5	32,5	40	40	45	52,5	52,5	52,5
Protein % of Daily needs	**23%**	**29%**	**37%**	**37%**	**46%**	**46%**	**51%**	**60%**	**60%**	**60%**
Energy (kcal)	400	500	550	650	600	800	900	850	950	1 050
1st Fresubin for the Day	2 kcal DRINK or 3,2 KCAL Drink	2 KCAL CRÈME	2 KCAL CRÈME	2 kcal Drink or 3,2 KCAL Drink	Fresubin Protein Energy DRINK	2 kcal DRINK or 3,2 KCAL Drink	2 kcal DRINK or 3,2 KCAL Drink	2 KCAL CRÈME	2 kcal DRINK or 3,2 KCAL Drink	2 KCAL CRÈME
2nd Fresubin for the Day		2 KCAL CRÈME	Fresubin Protein Energy DRINK	2 KCAL CRÈME	Fresubin Protein Energy DRINK	2 kcal DRINK or 3,2 KCAL Drink	2 KCAL CRÈME	Fresubin Protein Energy DRINK	2 KCAL CRÈME	2 kcal DRINK or 3,2 KCAL Drink
3rd Fresubin for the Day							2 KCAL CRÈME	Fresubin Protein Energy DRINK	Fresubin Protein Energy DRINK	2 kcal DRINK or 3,2 KCAL Drink

* Daily protein intake recommendations in total could be as high as 87,5 g
Example: 1.25 g/kg/day* in 70 kg person - 70 kg x 1.25 g/kg = 87,5



Fresubin high protein standard ONS range

Find your nutritional solution

- Energy content according to individual needs
- High protein content
- Provide all necessary micronutrients
- Some variants with fibre
- Suitable for complete and supplementary nutrition
- Drinkable and spoonable formats to ensure variety
- With most popular milky or fruity flavours for different taste preferences

Finding the most suitable ONS aids compliance and improves the nutrition status due to disease-related malnutrition

			Volume	Protein (g)	Energy (kcal)	CHO (g)	Fat (g)	Fibre (g)	Vit D_3 (µg)	Flavour	Protein Source
1,5 kcal/mL	Fresubin Protein Energy DRINK		200 mL	20	300	24,8	13,4	0	5	Vanilla Strawberry	Milk
2 kcal/mL	Fresubin 2 kcal DRINK		200 mL	20	400	45	15,6	0	10	Vanilla	Milk
2 kcal/mL	Fresubin 2 kcal Fibre DRINK		200 mL	20	400	43,4	15,6	3,2	10	Chocolate	Milk
2 kcal/g	Fresubin 2 KCAL CRÈME		125 g	12,5	250	28,1	9,8	0	6,25	Vanilla	Milk
3,2 kcal/mL	Fresubin 3,2 KCAL Drink		125 mL	20	400	56	20	0,5	10	Mango	Collagen Hydrolysate Milk

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