

FRAILTY MANAGEMENT



A range of advanced protein solutions to support muscles, enabling healthy aging.



Tirlán **Here for Good**

Tirlán is an ingredient solutions partner to some of the world's leading companies and brands. At the forefront of ingredient technology, we offer a range of solutions to match the ever-changing demands of the food and nutrition industry and its consumers. With quality dairy and grains sourced from 5,000 Irish family farms, combined with advanced market research and insights, our unique platform offers fully traceable and sustainably produced natural solutions to help our customers stay ahead of the curve.

www.tirlaningredients.com



An aging population

For the first time in history, most people can expect to live into their 60s and beyond. By 2050, the world's population aged 60 years and older is projected to total 2 billion, with 426 million people over 80 years.

A longer life brings with it opportunities. These additional years provide the opportunity to pursue new activities as well as contributing to families and communities. However, the extent to which older people can enjoy opportunities is heavily dependent on their health, and their ability to prevent or recover from frailty.

The age trends

>65

By 2050, one in six people in the world will be over age 65 (16%), up from one in 11 in 2019 (9%).

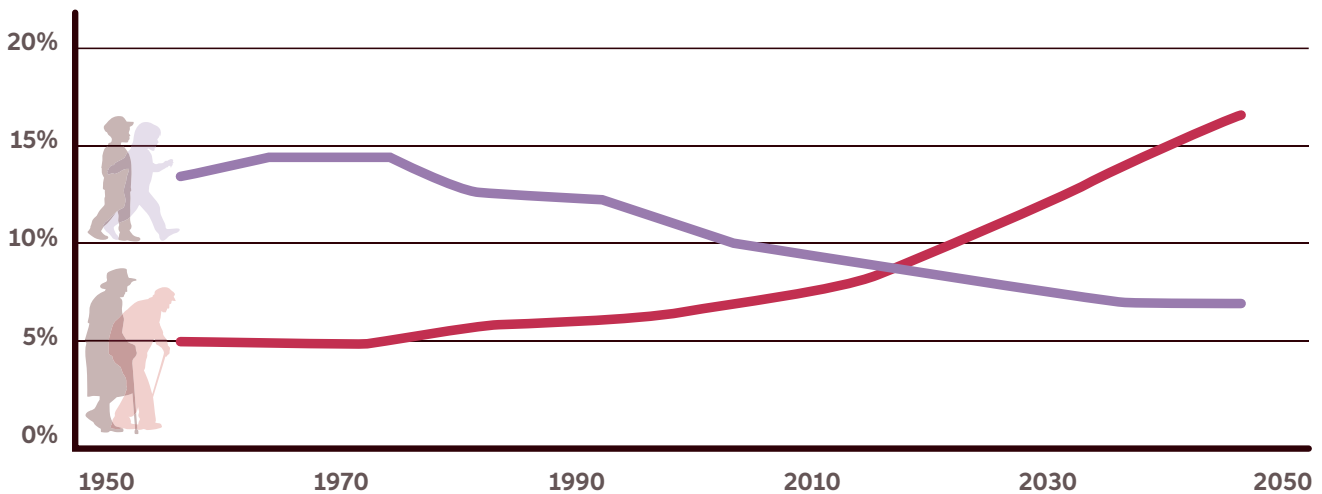
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In 2018, for the first time in history, persons aged 65 or above out-numbered children under five years of age globally.

426
Million

The number of persons aged 80 years or over is projected to triple from 143 million in 2019 to 426 million in 2050.

Young children and older people as a percentage of the population



Source: United Nations, World Population Prospects



Aging is a natural and inevitable process but frailty can be prevented.

Frailty is a clinical state characterised by decreased function of the body leading to increased vulnerability.

As people age, they move along a continuum that stretches from robustness at one end to frailty and care dependency at the other end. Frailty can result in increased vulnerability to external stressors (such as acute illness or trauma) and greater susceptibility to adverse health¹².

The age-related progressive decline of skeletal muscle mass and strength is a natural process. However, such changes can negatively influence quality of life, as well as increasing the risk of certain diseases. Maintaining muscle mass is key to preventing or reducing the onset of frailty and sarcopenia, and thus maintaining independence as people age¹².

Clinical Frailty Scale (CFS)



Physical exercise and protein can have a positive impact on frailty:

Research to date has shown that physical exercise can have a positive impact by slowing the rate of decline or even reversing frailty³. Due to the balance between muscle protein synthesis and breakdown in the maintenance of muscle mass, there is now growing acknowledgement for the importance of increased protein intake alongside this physical exercise to further impact frailty⁴.

Essential amino acids are the building blocks of protein and leucine is the most important essential amino acid and nutritional stimulus for MPS. Aged muscles do not respond in the same way as younger muscles to the essential amino acids. Higher protein levels are needed for the aged muscles to experience the same anabolic response.⁵

The source of the protein is also important to consider as there is evidence that effects on muscle protein synthesis response differs according to the protein source, with lesser anabolic effects from plant proteins observed in comparison with animal protein.⁶



The traditional recommendation for protein intake is 0.8 g/kg for adults of all ages. The need for higher levels of protein amongst older people for the preservation of lean body mass, body functions and health has been recognised.

In 2013, an expert consensus group, PROT-AGE, advised an intake 1.0-1.5 g/kg/day for individuals older than 65 years⁷. These recommendations have been incorporated into the European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines on “Protein intake and exercise for optimal muscle function with aging”, published the following year.¹²

The combination of Avonmore Protein fortified milk and resistance exercise has been shown to be an effective community-based means of reversing frailty and its associated adverse outcomes

Diet and Exercise in frailty (DEFRAIL) was a study performed to evaluate the effect of exercise and protein supplementation on frailty. Subjects participated in an hour-long session prioritising resistance exercise three times per week for eight weeks. They also consumed 500mL of Avonmore Protein milk each day.



Avonmore Protein Milk is a fortified milk from Tirlán’s consumer product range in Ireland. Avonmore Protein Milk is fortified with Solmiko MPC. 27g Protein per 500ml bottle, low in fat, naturally a source of Calcium and Vitamin B12. With added micronutrients: vitamin D, Zinc and Magnesium.

Nutritional information	Standard whole milk (100ml)	Avonmore Protein Milk (100ml)
Energy (kcal)	64	49
Fat (g)	3.5	1.0
of which saturates (g)	2.2	0.6
Carbohydrates (g)	4.7	4.8
of which sugars	4.7	4.8
Protein (g)	3.4	5.1
Calcium (mg)	119 (15% RI)	165 (21% RI)
Vitamin B ₁₂ (mg)	0.4 (16% RI)	0.4 (16% RI)
Vitamin D (mcg)		1 (20% RI)
Magnesium (mg)		28.1 (7.5% RI)
Zinc (mg)		0.75 (7.5% RI)

DEFRAIL Study⁹

The study involved an eight-week multicomponent group exercise program, suitable for community delivery, with protein supplementation from Avonmore Protein Milk. Participants recruited from Geriatric Medicine clinics were assessed at baseline, after eight weeks of regular activity (Control period), and following the eight-week program (Intervention period). The primary outcome measure was the Fried frailty score. Secondary outcome measures included measures of physical performance, body composition, cognition, mood, pain and frailty biomarkers.

Exercise took place in a group setting within the community. It comprised of 1 hour sessions on Mondays, Wednesdays and Fridays.

There were 2 resistance exercise circuits (upper limb and lower limb) and 1 aerobic/ balance station.



28 participants (22 female, 6 male) commenced the program and 22 (16 female, 6 male) completed the program.

Before starting the program, participants were assessed on a set of criteria which included Fried Frailty criteria and Physical Performance. Fried Frailty classifies adults as frail, pre-frail or non-frail. Physical Performance was based on timed up & go (TUG) and 30 second sit to stand.



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The DEFRAIL intervention may provide an effective community-based means of reversing frailty and its associated adverse outcomes⁹.

Two major frailty models were used in this study and these two models provide the Fried Frailty score.

1. The frailty phenotype defines frailty as a distinct clinical syndrome which meets 3 or more of 5 criteria.

Weakness, slowness, low level of physical activity, self reported exhaustion, unintentional weight loss

2. The frailty index defines frailty as cumulative deficits identified in a comprehensive geriatric assessment.

Positive for frail phenotype: ≥3 criteria present
 Intermediate/pre-frail: one or two criteria present
 Non-frail: no criteria present

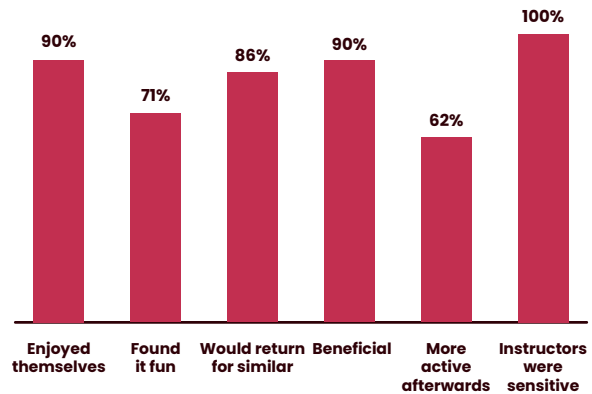
- **The median Fried frailty score improved from 4 to 2 over the eight-week intervention. This is a significant improvement in overall frailty moving from frail to pre-frail.⁹**
- **The median “Timed Up & Go” improved from 18.09 seconds to 15.56 seconds. A faster time indicates a better functional performance. The desirable time to get to is 13.5 to reduce risk of falling.⁹**
- **The median 30-second sit-to-stand improved from 6 to 8. More repetitions lead to improved strength and endurance in the legs.⁹**

The study was a community based study and so social interaction and leaving home were considered to be additional interventions which would benefit the participants in addition to exercise and protein. The team running the research believe that of all the interventions, protein supplementation was shown to provide the most benefit over the course of the study.

Team’s perception on intervention benefits

The study also showed a positive effect from a psychological perspective. Of the participants surveyed 19 enjoyed themselves and 15 found the exercises fun.

General feedback from participants



The results of the DEFRAIL show that this style of community-based diet and exercise program may provide an effective means for reversing frailty and its associated adverse outcomes. To demonstrate this, a larger longitudinal study is required.



Summary:

The combination of a diet including SolmikoHD fortified milk and resistance exercise has been shown to be an effective community-based means of reversing frailty and its associated adverse outcomes.

The complete range:

Tirlán now offers 8 types of advanced milk protein ranging from MPC to MPI. Below we outline our 4 SolmikoHD ingredients.



	Solmiko HD MPC	Solmiko HD MPC	Solmiko HD MPI	Solmiko HD MPI
Protein	80% min	80% min	85% min	85% min
Fat	2% max	2% max	2%max	2% max
Lactose	6%	4%	2%	0.5%
Bulk density	0.40	0.39	0.38	0.38

IRELAND'S UNIQUE ENVIRONMENT



Cleanest air in Europe

Urban outdoor air pollution index



Island Location

On the edge of the Atlantic Ocean with plentiful rain



Trusted Partner

Supporting leading global brands



Irish farming tradition and heritage

Generational family farms



Pure water and rich soil

Boost nutritional value



Temperate maritime climate

Perfect conditions for oat cultivation



Clean label

Natural, Non-GMO & Kosher

OUR R&D FUNCTION



The innovation hub

Our Innovation Hub houses world class facilities enabling us to bring our concepts to life.



Leading the way in process and technology

Functionalising and developing ingredients whilst always maintaining nutritional integrity.



Our external ecosystem

Our extensive network of external partners ensures we are agile.



Developed by our experts

Our team of experts passionately researching the worlds of dairy and plant.



Providing superior nutrition

At Tirlán the foundations of nutrition are built on dairy and plant. Our ethos: "Good for You, Good for the Planet".

References

- Clegg et al. Lancet 2013; 381: 752 – 62 Frailty in elderly people
- Fried L et al. Frailty in older adults: evidence for a phenotype. J Gerontol 2001
- Travers J, Romero-Ortuno R, Bailey J, Cooney MT. Delaying and reversing frailty: a systematic review of primary care interventions. Br J Gen Pract. 2018 Dec 3.
- Martone, A.M., Bianchi, L., Abete, P., Bellelli, G., Bo, M., Cherubini, A., Corica, F., Di Bari, M., Maggio, M., Manca, G.M. and Marzetti, E., 2017. The incidence of sarcopenia among hospitalized older patients: results from the Glisten study. Journal of cachexia, sarcopenia and muscle, 8(6), pp.907–914.
- Katsanos CS, Kobayashi H, Sheffield-Moore M, Aarsland A, Wolfe RR. Aging is associated with diminished accretion of muscle proteins after the ingestion of a small bolus of essential amino acids. Am J Clin Nutr. 2005 Nov;82(5):1065–73.
- S. van Vliet, N.A. Burd, L.J.C. van Loon The skeletal muscle anabolic response to plant- versus animal-based protein consumption J Nutr, 145 (2015), pp. 1981–1991, 10.3945/jn.114.204305
- Morley, J.E., Vellas, B., Van Kan, G.A., Anker, S.D., Bauer, J.M., Bernabei, R., Cesari, M., Chumlea, W.C., Doehner, W., Evans, J. and Fried, L.P., 2013. Frailty consensus: a call to action. Journal of the American Medical Directors Association, 14(6), pp.392–397.
- Deutz NE, Bauer JM, Barazzoni R, Biolo G, Boirie Y, Bony-Westphal A, Cederholm T, Cruz-Jentoft A, Krznaric Z, Nair KS, Singer P, Teta D, Tipton K, Calder PC. Protein intake and exercise for optimal muscle function with aging: recommendations from the ESPEN Expert Group. Clin Nutr. 2014 Dec;33 (6):929–36.
- ICFSR Conference Proceedings (P217 • DEFRAIL (Diet and Exercise for Frailty): Preliminary results on the effect of a novel multi-component group exercise program and protein supplementation on frailty in older adults. Dr Padraig Bambrick, 1,2, Niamh Phelan1, Thomas Byrne3, Prof. Rió na Mulcahy1,2, Dr Michael Harrison3, Prof. John Cooke1,2 (1) Department of Geriatric Medicine, University Hospital Waterford, Waterford, Ireland (2) Royal College of Surgeons in Ireland, 123 St. Stephen's Green, Dublin, Ireland (3) Department of Sport & Exercise Science, Waterford Institute of Technology, Waterford, (Ireland) - International Conference for Frailty & sarcopenia Research March 2020)




Get in Touch

To find out more about how Tirlán can support you in developing your solutions, please contact us directly.

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