PROMISS
Nutrition for healthy ageing

Project e-newsletter #2
March 2018

The Horizon 2020 PROMISS project
"PRevention Of Malnutrition In Senior Subjects in the EU"

Malnutrition is a critical issue, with a direct impact on older people's quality of life. In Europe alone, about one out of 5 older people living at home is malnourished or at risk of malnutrition. Preventing malnutrition is urgent for the whole society, for older generations of today as well as those of tomorrow.

The Horizon2020 PROMISS project (http://www.promiss-vu.eu/) aims to provide insight in the **causal links between diet, physical activity, appetite and malnutrition** among older people, and to develop evidence-based dietary and physical activity strategies to enhance active and healthy ageing. PROMISS will ultimately deliver food concepts and products, as well as technology to help change behaviour and support adherence to these strategies.

In this newsletter:

A sneak peek of PROMISS research

The starting point of PROMISS's research is the analysis of existing data from longitudinal studies of older people and national dietary surveys. Such research aims to describe the diets and patterns of daily food intake, how these relate to key clinical outcomes such as disability and frailty, and how sociodemographic and lifestyle factors, particularly physical activity affect these relationships. This work is feeding the development and trials of new food products and concepts.

Longitudinal studies: Which protein? Where from? Which consequences?

PROMISS researchers are using longitudinal studies from the Netherlands, Iceland, Canada, the USA and the UK, whilst the national dietary surveys cover the Netherlands, Finland, Italy and France. **Preliminary results suggest that a considerable proportion of older people have low protein intake**, defined as less than 0.8 g per kg body weight per day. Although this proportion varies somewhat between the different studies, probably due to differences in age and health status, more consistency has been found in the foods from which older people get their protein and when these foods are eaten during the day.

Poor appetite and low protein intake among older people

Since the start of PROMISS in April 2016, several researchers have used the US Health ABC data to investigate associations of dietary intake with appetite, malnutrition and sarcopenia in US older people. The Health, Aging and Body Composition (Health ABC) cohort consists of 3,075 black and white US older people aged 70 years and over, who were generally well-functioning at baseline. The main focus of the Health ABC study is to determine risk factors for functional decline and loss of independence in healthier older people.

A first paper, entitled *"Protein intake and mobility limitation in community-dwelling older adults: the Health ABC Study"*, found that low protein intake contributes to the development of mobility limitations. This study has shown that **the risk of mobility limitation is more than double for older people in the lowest third of protein intake**, and 50% more for those in the middle third. Since the middle third covers the range up to 1.0 g per kg body weight per day these results suggests that the Recommended Dietary Allowance of 0.8 may be too low to maintain physical function in older people.

A second paper, entitled *"Poor appetite and dietary intake in community-dwelling older adults"*, focused on differences in food intake in community-dwelling older people with different appetite levels. This study showed that 21.8% of the participants reported a poor appetite. Those participants consumed less protein, dietary fiber, whole grains, fruits and vegetables, but consumed more dairy foods, fats, sweets and sodas compared to the participants with a very good appetite.

The association between diet quality and the development of protein-energy malnutrition was investigated in the third paper, entitled *"Prospective associations of poor diet quality with long-term incidence of protein-energy malnutrition in community-dwelling older adults: the Health, Aging and Body Composition Study."* This study showed that the majority of the older persons consumed a diet of insufficient quality and that 40% of the participants had a protein intake below the recommended daily intake. Furthermore, in 4 years almost 25% of the participants developed protein-energy malnutrition. It was suggested that **a higher protein intake may reduce the risk of developing persistent protein-energy malnutrition**.

The Protein Screener 55+

Another cohort study key for the research in PROMISS is LASA - The Longitudinal Aging Study Amsterdam, a cohort consisting of over 3,000 older people aged 55 years and over from the Netherlands. LASA started in 1991 with the aim to determine physical, emotional, cognitive and social predictors and consequences of ageing, and its data collection is still ongoing.

Based on it, PROMISS is developing and validating a short food questionnaire to screen for low protein intake in community-dwelling older people, the *Protein Screener 55+ (Pro^{55+})*. LASA Data on 1348 older men and women (in the age range 56-101 years) were used to develop the Pro^{55+} and data of 563 older men and women (55-71 years) of the Dutch HEalthy LIfe in an Urban Setting (HELIUS) study were used for external validation. The screener will be used to include older adult with a low protein intake in the short and long term clinical trials in PROMISS.

Older age and gender in the focus

Little is known about the diets of very old people because they are rarely included in sufficient numbers in studies, although this age group is now the fastest growing section of the population in most developed countries. This is why the Newcastle 85+ Study is a very important one, because it comprises over 700 people aged 85 years at baseline who were followed to age 90, at 18, 36 and 60 months from baseline.

In the last newsletter PROMISS presented the article *"Low protein intake, muscle strength and physical performance in the very old"* that examined the relationship between protein intake and muscle strength (measured by grip strength) and physical performance (measured by a timed walk). We found that **low protein intake negatively affects muscle strength and physical performance, especially in older women, and a combination of adequate protein intake and physical activity may be needed to slow the loss of muscle strength in this age group**.

Another article *"Prevalence and determinants of low protein intake in very old adults"*, looked at how much protein is consumed by very old people, which foods contribute, and when protein rich foods are eaten during the day. We found that **28% of very old people had low protein intake. Women, those with a higher tooth count, and those with a higher energy intake were more likely to have a higher protein intake.**

Appetite, physical function and daily activity under the magnifier

The AGES (Age, Gene/Environment Susceptibility study) Reykjavik study stems from the Reykjavik Study, a cohort established in 1967 to prospectively study cardiovascular disease in Iceland. At the time of recruitment for the AGES-Reykjavik, participants were aged 67 years and older (born between 1907 and 1935) and living in Reykjavik (n=5764).

Poor appetite can be considered as one of the causes for malnutrition among older people. The majority of previous studies in this field have been focusing on hospitalized patients or nursing home residents. Not many studies have focused on the main reasons for poor appetite or inability to eat among community dwelling older people. It is therefore still unclear how or if appetite is associated with activities of daily living and physical function in older people living at home. As part of the PROMISS project, the University of Iceland is currently working on data from the AGES study related to appetite, along with data gathered from questionnaires on activities of daily living and clinical assessments of physical function (walking speed, timed up and go and leg extension strength). An article describing the main reasons for poor appetite or disability to eat and its association with physical function is in the pipeline.

Tell me what you eat and I will tell you how you age

The Quebec Longitudinal Study on Nutrition and Successful Aging (NuAge) comprises 1793 men and women in good general health, sampled from three age groups (68–72, 73–77, 78–82 years old) who were followed annually for 3 years up to June 2008. One distinctive characteristic of NuAge is the high quality of its dietary data, which were computed from multiple 24-hour dietary recalls collected each year. The dataset also included variables related to demographics, social functioning, comorbidities, physical and cognitive functions, body composition, and several biomarkers, among others. Biosamples (serum/plasma, urine, saliva, RNA/DNA from peripheral blood mononuclear cells) were also collected annually and preserved for future analyses.

In September 2017, PROMISS presented the results of its study on "*Dietary Protein Food Clusters and risk of functional limitation and disability*". We identified distinctive dietary patterns based on the main sources of proteins: "fish and dairy", "red meat", and "poultry". We also relate these patterns to risk of disability, gait speed and grip strength, which are two measures of physical function known to decline with age and to be associated with frailty, disabilities and decreased quality of life. Only a few studies examined trajectories of physical function as conditioned by protein intake and sources. A better understanding of these relationships will contribute in defining dietary protein recommendations in older people and inform PROMISS in the development of new food products and concepts.

PROMISS: The accelerometer studies

Accelerometers are small wearable devices that record the movement of the body and thus can estimate how physically active a person is. In recent years, accelerometers have been widely used to measure physical activity, sedentary behavior and sleep patterns in ageing.
Different scientific studies have used a diversity of brands and models of accelerometers that were also worn at different positions on the body (e.g. at the wrist or at the hip). These differences complicate the interpretation and comparability of results across studies.

For example: two older people using primarily wheel chairs for their mobility tasks wear both one hip and one wrist-worn accelerometer. Subject A uses an electric wheelchair while subject B uses a manually propelled wheelchair. The output from hip-worn accelerometers may be very similar during transfer tasks while the wrist-worn accelerometers will pick up remarkable differences between the two subjects for the same task. The interpretation of the accelerometers output is thus dependent on how the data were collected.

One of the aims of PROMISS is to combine the accelerometer output data from 5 large ageing studies which have used different accelerometers (brands & models) and placement (e.g. wrist versus hip). Data on dietary intake were also collected in the five studies and different levels of daily protein intake and appetite have been calculated. To be able to compare the accelerometer data from the different studies, we are currently performing a study in the laboratory. A total of 100 older persons, well-nourished and malnourished, will wear different accelerometers at different position of the body and perform standardized tasks in the laboratory. In addition, as novel approach, accelerometer data will be compared and correlated to more state of the art measures of energy expenditure during standardized tasks. Using the output from the accelerometers, we can develop equations on how to compare one accelerometer to the other. These equations can then be used to compare the accelerometer data from the 5 large ageing studies.

The power of microbiota

There are trillions of bacteria residing in and on our bodies: the microbiota. Do these bacteria influence us? More particularly, do they influence our appetite or our nutritional status? Within the PROMISS research consortium, we focus on the role of the oral and intestinal microbiota in undernutrition in older people.

It has been known for some years that the intestinal microbiota can influence metabolic health and disease. Firstly, the microbiota breaks down the food from our diet so that the body can use the energy and nutrients. Secondly, they produce important vitamins, as well as substances that act like hormones and can influence e.g. appetite. Disturbance of the microbiota has been associated with a higher risk to become obese and develop diabetes, but also with severe undernutrition.

Furthermore, a disturbance in the oral microbiota might contribute to poor oral health and function, and possibly to poor sense of taste, smell, and appetite.

Since our microbial composition of the gut and the mouth has been shown to shift as we grow older, PROMISS will investigate whether the aged microbiome contributes to the development of undernutrition and poor appetite in older persons. If so, we could use microbiota-manipulating therapies to target undernutrition in older people.

PROMISS's first step in investigating the microbiota in older people is to conduct a study among 400 community-dwelling older people in the Netherlands. The participants for this study are recruited from LASA, the large-scale Longitudinal Aging Study Amsterdam of whom already much data were collected. PROMISS will collect oral and fecal samples to determine the respective microbial compositions. Also, an extensive dietary questionnaire, bodily measurements, blood samples, and functional taste and smell tests will be done. The study commenced in July 2017 and data collection is expected to be completed by the end of 2018.

Nutrition & appetite under the magnifying glass

The University of Ghent (Belgium) has conducted an extensive, cross-country online survey covering the Netherlands, Finland, Spain, Poland and the UK. A total of 1825 consumers aged 65+ years took part in this extensive survey. Some consumers reported a low protein intake, others a poor appetite, some reported both and some reported none. We are comparing these four groups with regard to the characteristics of these four groups (e.g. their age, living situation, and physical activity level), their meal patterns over the day and type of meals, and knowledge and awareness about their dietary protein needs.
The findings of this work will be presented in our next newsletter and in the website.

What comes next?

Into the relationships among protein intake, disability and frailty

PROMISS researchers are currently working on three other studies. In the first one, data from the different PROMISS cohorts and surveys will be compared and combined to establish the prevalence of low protein intake in European community-dwelling older people. In addition, this study will investigate how this prevalence differs in terms of characteristics such as gender, age, education level and appetite level.

In a second study, the association between poor diet quality and the risk of developing frailty in (initially non-frail) community-dwelling older people will be investigated by the Vrije Universiteit Amsterdam.

Finally, the University of Newcastle is currently extending the clinical outcomes to incident sarcopenia and disability to better inform the next PROMISS work and help set a new recommended daily allowance for protein in the very old.

PROMISS results flying from Washington to Oslo

The University of Southern Denmark reported the preliminary results of the HANC study in pre-conference workshop of the International Conference on Ambulatory Monitoring of Physical Activity and Movement (ICAMPAM) in Washington D.C. (June 2017)[1].

From Washington to Oslo: these PROMISS results will contribute to the symposium on "**The impact of appetite, low protein, and physical activity on function: the PROMISS study**" in the 24th Nordic Congress of Gerontology[2] from 2-4 May 2018 in Oslo, reporting on “associations between accelerometer-assessed physical activity, sedentary behavior, and handgrip strength among older people across Europe and USA”. The Congress will also hear about the findings from analysis of the longitudinal studies.

PROMISS celebrating the 40th anniversary of EFAD

2018 will also see PROMISS and its research progress presented at the EFAD 40th Anniversary Conference in Rotterdam on 28-29 September 2018[3]. The European Federation of the Associations of Dietitians (EFAD) will host a pitch for the PROMISS research, informing a very dedicated audience about its first results.

This project is funded from the European Union’s Horizon 2020 Research and Innovation Programme, Grant n° 678732
The newsletter only reflects the project’s view and the European Commission is not responsible for any use that may be made of the information it contains.

Contacts: PROMISS PO – Project Officer: promiss.po@vu.eu
www.promiss-vu.eu – Twitter @PROMISS_VU - LinkedIn: www.linkedin.com/groups/8551229

[1] https://ismpb.org/wp-content/uploads/2017/06/ICAMPAM2017ProgramWEB.pdf
[2] http://www.hioa.no/eng/Events/The-24th-Nordic-Congress-of-Gerontology
[3] http://efadconference.com/