Innovative food technology systems for independent senior living

Participants

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Malnutrition (over and under nutrition has significant impact on nursing care)

- **Young old Over-nutrition**
  - Non-communicable disease (NCD)
  - Arteriosclerotic Disease (CVD, IHD)

- **Old old Under-nutrition**
  - Frailty
  - Fracture, Fall
  - Infection

Independent to dependent

- Robust
- Pre-Frailty
- Frailty
- Dependency

**Prevention**
- Munchy Bento + Exercises

**Compensation**
- Personalised preference, enhanced aroma
- 3D printing
Main objectives of the project

Preventive package

- Oral Exercise
- Munchy Bento
- Physical Exercises
- Eat Together!

Adjustment package

- Swallowing texture
- Personalized preference
- Stronger aroma and taste
- 3D Printing

Intervention study

Intervention period:
12 weeks (Apr to July, 2018) *now ongoing!*

**Intervention:**
- Physical exercises (2/w)
- Oral exercises (3/w)
- Eating munchy food bento (2/w at lunch)
- Nutrition instruction

**Control:** physical exercises only
Munchy food bento

Current food alternatives for swallowing disorders
1. A common solution
Current food alternatives for swallowing disorders

2. Worst case solution

- Sufficient protein and energy
- Continued oral function

Participation of industry and public sector is vital
- Industry to advice on product development and to produce food
- Public sector to evaluate end-user value

Food is crucial for active and healthy ageing

Photo from Findus
An even better solution

- Personalized nutritional food to stay healthy during aging
- Food to retain oral functionality to stay active during aging
- Aroma, taste and texture adopted to age impaired function
- Food combined with exercise
- Novel and adopted processing and distribution

3D Food Printing

- A print head is directed to deposit a stream of a food, layer by layer, predetermined by a 3D model.

- Properties
  - Personalized nutrition and preference
  - Complex, real shapes
  - Slow production

Innovative aspects of the project

- 3D-printing of food
- Food preserving oral health
- Attractive to the end-users
Bilateral project

- Common challenge for Japan and Sweden
- Many synergies
  - Knowledge and industrial experience
    Sweden: food for persons with dysphagia
    Japan: food to prevent dysphagia
  - Elderly population
    Sweden: 20% over 65 years
    Japan: 27% (world average 8.5%)
  - Japanese and Swedish food producing companies competing commercially
  - Synergistic academic competencies
    Japan: Oral processing
    Sweden: Swallowing

Expected outcomes

- Phase 1
  - The concept has been proven and the most important parameters and techniques identified.
  - We have determined how to increase energy content and nutrients while adjusting taste and flavor to suit the preferences and needs of senior citizens.
  - The products also have diverse texture from munchy to easy to chew. Suitable distribution and processing techniques have also been determined.

- Phase 2, 2019 – 2021
  - the working parts of the concept will be further developed and refined, and up-scaled to production jointly with the participating companies and evaluated by the end-users.