Functional Foods for Healthy Aging: Research and a Toolkit for Knowledge Translation

FFIGS

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Presentation Outline

• Background
  • Aging and Health
  • Functional Foods

• Research Examples

• Knowledge Translation
  • Functional Foods for Healthy Aging Toolkit
  • Agri-food for Healthy Aging (A-HA)

• Summary Notes
Aging is Becoming More Common

- Aging of the population will accelerate over the next 3 decades
- The number of Canadian adults >65 years old is projected to increase from 4.2 to 9.8 million between 2005 and 2036
- The “older adults” share of the population will increase from 13.2 to 24.5%

Statistics Canada, Census of Canada
Older adults are comprising more of the population

Percent of Canadians aged 65 or older

Statistics Canada, Census of Canada
Dr. David Butler Jones’ Report: Canadians are living longer

Golden years shining brighter: Canadian seniors living longer, better

BY SHANNON PROUDFOOT, POSTMEDIA NEWS  OCTOBER 29, 2010  COMMENTS (21)

2010 report on the State of Public Health in Canada focused on aging and seniors

• By 2050, more than 25% of population will be over 65 years old
• Life expectancy is rising at 78 for men, 83 for women
• Chronic health conditions:
  – 89% have ≥1
  – 25% have ≥4
• 37% taken steps to improve their health
CTV News March 20, 2013: Seniors at Nutritional Risk

- Statistics Canada report
- 15,000 Canadians >65 years old
- Healthy Aging Arm, Canadian Community Health Survey
- Used SCREEN nutritional screening tool to ask about cooking and eating habits, nutritional intake, changes to body weight and health

34% were at nutritional risk

- Opportunity to address this issue with functional foods
Healthy Aging: Food and Health

• Relation of food and its constituents to health has evolved
  • Traditionally prevent deficiency disease
  • Now includes prevention of chronic disease
  • Evolution manifests in numerous policies

• Key example is advance of functional foods
  • Extension of how we relate food and food constituents to health
  • Major influence on research activity in food, nutrition and health
What are Functional Foods?

Simplest definition: Foods that may provide health benefits beyond basic nutrition

- Conventional food form
- Specific bioactive constituent
  - enhanced content in the food
  - added to the food
- Biological rationale to relate to health
A functional food is similar in appearance to, or may be, a conventional food that is consumed as part of a usual diet, and is demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions, i.e. they contain bioactive compound.

Nutracuetical: Health Canada Definition

A nutraceutical is a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with food. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease.

Functional Foods and Health: Relevance to Older Adults

• Functional foods have relevance to many areas of human health and this can apply to multiple life-stage and gender groups

• Among these life-stage groups, older adults emerge as a highly relevant beneficiary of FF
Functional Foods and Health: Relevance to Older Adults

Research report

Who consumes functional foods and nutraceuticals in Canada?
Results of cluster analysis of the 2006 survey of Canadians’ Demand for Food Products Supporting Health and Wellness

Deepananda Herath *, John Cranfield, Spencer Henson

• Analysis of Canadian’s demand for food products in support of health

• Identified disease threat as a key driver and that this increases with age
Functional Foods for Healthy Aging
RESEARCH Examples

• Vitamin D in a bun
• Omega-3 fatty acids in mashed potatoes
• Spearmint tea high in antioxidants
• Dietary fibre in dairy products
• Soy protein in muffins
• Resistant starch in bagels
• Micronutrient-fortified foods
Long-term effects of giving nursing home residents bread fortified with 125 μg (5000 IU) vitamin D₃ per daily serving¹–⁴

Veronica Mocanu, Paul A Stitt, Anca Roxana Costan, Otilia Voroniuc, Eusebie Zbranca, Veronica Luca, and Reinhold Vieth

- 45 LTC residents consumed a bun fortified with 5000 IU Vitamin D₃ and 320 mg calcium for 1 year
- Resulted in elevation of serum 25-OH-D from baseline of 28 mmol/L to 125.6 mmol/L
- BMD of lumbar spine and hip also significantly increased
- No hypercalcemia

**FIGURE 2.** Serum 25-hydroxyvitamin D [25(OH)D] concentrations presented as box plots showing quartile values before fortification and during the consumption of bread fortified with vitamin D₃ and calcium.
Omega-3 Fatty Acids

Direct quantitation of omega-3 fatty acid intake of Canadian residents of a long-term care facility

Jennifer A. Fratesi, Ryan C. Hogg, Genevieve S. Young-Newton, Ashley C. Patterson, Payman Charkhzarin, Karin Block Thomas, Michael T. Sharratt, and Ken D. Stark

• Analysis of dietary intake and blood levels revealed LOW levels of EPA and DHA relative to amounts known to affect morbidities

• Potential for inclusion of functional foods in long-term care and beyond
Enhancing Foods with EPA and DHA in Long-term Care

• Prof. Ken Stark (U Waterloo) working on incorporation of microencapsulated fish oil into well accepted foods in LTC in Ontario

• Mashed potatoes, hot soup, hot cereal

• Sensory analyses show resident acceptance

• Progress to intervention study to evaluate effects of consumption on DHA and EPA status
Spearmint high in bioactive rosmarinic acid (RA)

High-RA spearmint reduces joint inflammation in horses

University of Guelph is testing high-RA TEA in adults with arthritis

RESEARCH EXAMPLE
Spearmint Tea for Osteoarthritis

Ontario Veterinary College
Clinical Studies

Plant Agriculture

Human Nutraceutical Research Unit
RESEARCH EXAMPLE

Fibre-Fortified Dairy Products

• University of Guelph inter-disciplinary research team developing dairy products enhanced with various sources of dietary fibre (flaxseed gum, soy polysaccharide, oat beta-glucan)

• Food science expertise to overcome dispersion issues of dietary fibre

• Sensory science to explore consumer acceptance of products

• Nutritional science to explore glycemic response
Agriculture and Agri-food Canada-funded multi-centre human clinical study

Collaboration among food science and human nutrition

Study muffins formulated and produced in Department of Food Science, University of Guelph

Human 6-week intervention parallel-arm study to examine effect of soy muffins (12.5 and 25 g protein/day) on CVD risk markers

Funded by AAFC
Resistant Starch Bagels for Diabetes and Colon Cancer

Maize high in resistant starch (RS) from Plant Agriculture

Bagels produced by Canada Bread using high-RS corn flour

Human study to test effect of bagels on risk factors of diabetes and colon cancer

Funded by OMAFRA Food Research Program
RESEARCH EXAMPLE

Enhancing the Nutritional Quality of Foods for LTC

• Identify micronutrients of most concern to adults in LTC
• Identify which foods to fortify with identified micronutrients and frequency of consuming those foods
• Determine acceptability of fortified foods
• Pilot test production and serving of foods within long term care home environment
Functional Foods for Healthy Aging
Consumer Understanding

Factors that PROMOTE consumption
Consumption and purchase patterns
Factors that DISCOURAGE consumption

Understanding FF in Health and Disease among Older Adults

Awareness in relation to HEALTH
Sources of information

Preferred FF targets for
• Health
• Bioactive
• Food matrix

Sample characteristics: medical, lifestyle, demographics
Methods: Research Participants

• Older adults ≥ 60 years old
  • Community dwelling
  • Not utilizing meal-assisted services
  • Able to complete questionnaire or focus group
  • Able to provide written consent
Methods: Study Questionnaire

- Awareness of Functional Foods
- Current Functional Food Consumption
- Motivation to Consume Functional Foods
- Functional Food Matrices
- Functional Food Bioactives
- FF Definition
- Functional Food Bioactive Ingredients
- Health Areas as they relate to Functional Foods
- Medical, Lifestyle, Demographic Information

INFORMATION SHEETS

REB#10SE012
Results:

Awareness and Consumption of Functional Foods

Timing of FF Consumption (n=200)

- 26% of participants aware of the term “functional food”
- Prevalence of FF consumption was 93%
- Majority (75.3%) of participants are consuming FF on a daily basis
Results:
Awareness and Consumption of Functional Foods

Top most frequently consumed functional food products (n=200)

- Yogurt with Probiotics
- Eggs with Omega-3 Fatty Acids
- Bread with Dietary Fibre
- Cereal with Dietary Fibre
- Orange Juice with Calcium and Vitamin D

Percent of Participants
Results: Functional Food Matrices and Bioactives

Food Matrices

<table>
<thead>
<tr>
<th>Food Matrix</th>
<th>Percent of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogurt/Beverages</td>
<td>60</td>
</tr>
<tr>
<td>Breads</td>
<td>40</td>
</tr>
<tr>
<td>Cereals</td>
<td>30</td>
</tr>
<tr>
<td>Eggs</td>
<td>20</td>
</tr>
<tr>
<td>Beverages</td>
<td>10</td>
</tr>
<tr>
<td>Margarine</td>
<td>5</td>
</tr>
<tr>
<td>Pasta</td>
<td>3</td>
</tr>
<tr>
<td>Crackers/Cookies</td>
<td>2</td>
</tr>
<tr>
<td>Granola Bars</td>
<td>1</td>
</tr>
<tr>
<td>Cheese</td>
<td>0.5</td>
</tr>
<tr>
<td>Salad Dressing</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Bioactives

<table>
<thead>
<tr>
<th>Bioactive</th>
<th>Percent of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary Fibre</td>
<td>80</td>
</tr>
<tr>
<td>Omega-3 Fatty Acids</td>
<td>60</td>
</tr>
<tr>
<td>Probiotics</td>
<td>40</td>
</tr>
<tr>
<td>Antioxidants</td>
<td>30</td>
</tr>
<tr>
<td>Prebiotics</td>
<td>20</td>
</tr>
<tr>
<td>Plant Sterols</td>
<td>10</td>
</tr>
</tbody>
</table>
Results: Health Areas as they Relate to Functional Foods

Health areas addressed through the consumption of **Antioxidants** in functional foods

Health areas addressed through the consumption of **Dietary Fibre** in functional foods
Results: Health Areas as they Relate to Functional Foods

Health areas addressed through the consumption of **Omega-3 Fatty Acids** in functional foods

Health areas addressed through the consumption of **Probiotics** in functional foods
Results: Health Areas as they Relate to Functional Foods

Health areas addressed through the consumption of **Plant Sterols** in functional foods

Health areas addressed through the consumption of **Prebiotics** in functional foods
Research Stakeholders

- Registered Dietitians
  - Results will inform better interaction with older adult patients/clients in their navigation of daily food choices to manage health
  - Concepts could relate to patients/clients in other life stage groups as well
- Food Industry
- Older Adults
- Academic community
Realizing Opportunities
Knowledge Translation and Transfer

• Key phase of research process

• Knowledge translation defined as:
  • Transformation of knowledge into use through synthesis, dissemination, and exchange among researchers and research users (OMAFRA 2011).

• Numerous knowledge translation strategies to disseminate research results to stakeholders
## Toolkit as a KT Strategy

### Toolkit Purpose

*To provide guidance and materials to assist Registered Dietitians in communicating with older adults about functional foods for healthy aging*

### Development

- Weekly meetings with toolkit team to:
  - Discuss literature
  - Identify knowledge gaps
  - Determine toolkit content and main messages
  - Review and revise

### Stakeholder engagement

- Presented toolkit to stakeholders to:
  - Seek feedback
  - Inform final version
  - RAWF Health Prof. Forum
  - CFDR AGM
  - Colleague extension
  - Final version Sept 2012
Toolkit Structure

- **Section 1:**
  - Understanding FF

- **Section 2:**
  - Relevance of Functional Foods for Healthy Aging

- **Section 3:**
  - Research Summary and Results

- **Appendices:**
  - Resource and Educational Materials
Section 1: Understanding FF

• Functional Foods Defined
  • Functional food definitions established by various countries and organizations
  • Common components of functional foods
  • Food forms
  • Bioactives
  • Relation to natural health products
Section 1: Understanding FF

• Functional Food Product Guidance
  • Summary table of guidance tool, regulatory notes and dietetic practice points
    • List of ingredients
  • Nutrition Facts table
  • Nutrient Content Claims
  • Additional Food-Related Claims
  • Health Claims
    • Disease Risk Reduction Claims
    • Therapeutic Claims
    • Function Claims (Nutrient Function, Probiotic)
    • General Health Claims (Front-of-Package labelling)
Section 1: FF Product Examples

- Functional food guidance highlighted
- Dietetic practice points
- Product example sheets:
  - Cereal (oats)
  - Juice (plant sterols)
  - Margarine (omega-3)
  - Milk (omega-3)
  - Yogurt (probiotics)
- Views: top, front, back, side 1, side 2
Section 1: FF in the Canadian Marketplace

• Functional food sales revenue
• Functional foods industry growth
• Statistics Canada Functional Food and Natural Health Product Survey 2007
• Identifies need for research into consumer acceptability of functional foods
Section 2: Relevance of FF for Healthy Aging

• Role of FF in Canada’s aging demographic
  • Study of Canada’s aging demographic
  • Aging and increased disease risk
    • Focus on cancer, CVD risk and type 2 diabetes
  • Aging and increased health care expenditure
  • Potential for FF to contribute to healthy aging

• Role of RD in considering FF in practice
  • Review of current literature
Section 3: Summary and Results of University of Guelph Research Study

- Summary of research rationale
- Research purpose and objectives
- Study methods and objectives
- Study conference presentation abstracts
  - Canadian Nutrition Society 2012
  - Dietitians of Canada 2012
Inform and exemplify key functional food concepts:

- Functional food definition
- Functional food food forms
- Functional food bioactives
- Functional food health claims
- Combination of text and pictures

Appendices:
University of Guelph Research Study Information Sheets
Appendices: Bioactive Resource Sheets

- Antioxidants
- Plant Sterols
- Dietary Fibre
- Prebiotics
- Omega-3 Fatty Acids
- Probiotics

What are they and what do they do?

Research Results: What health areas are older adults using them for?

Three review articles cited for further information.
Plant sterols and healthy aging

Key background notes about phytosterols

Results from FF research study

Key references for further information
Toolkit Launch

• On January 16, 2013, webinar to 400 participants hosted by the Canadian Foundation for Dietetic Research

• PDF of the toolkit available for download on the following websites:
  – Agri-food for Healthy Aging (A-HA)
  – Canadian Foundation for Dietetic Research (CFDR)
  – Dietitians of Canada (DC)

• Promoted through e-blasts and various social media outlets of A-HA, CFDR and DC

• Evaluated through downloads and online survey
Agri-food for Healthy Aging (A-HA): Building connections and advancing knowledge within the agri-food, nutrition and health sectors

- **Objective 1:** Create and communicate A-HA knowledge translation/mobilization resources
- **Objective 2:** Plan and execute A-HA KT events
- **Objective 3:** Build relationships with new audience stakeholders
- **Objective 4:** Train highly qualified personnel (HQP)
Annual Health Professionals’ Day @ Royal Agricultural Winter Fair Fall 2010, 2011 and 2012

• Themes:
  • *Functional Foods & Natural Health Products: Staying Ahead of the Curve*
  • *Food Innovations for Health*
  • *Hot Topics in Food & Farming*

• Target audiences: Health professionals (e.g. Registered Dietitians, Naturopaths), government, food industry, researchers & students.

• 125 attended each year
Nutrition Community of Practice (CoP)

- 600+ members since starting in September 2010
- Part of Seniors Health Knowledge Network (SHKN)
- Diverse core working group
- Resource development
  - Topical reading lists, Hypoglycemia factsheet for PSWs, Best Practices Blogger on dysphagia, Gluten-free resource reference table
Innovative agri-food & nutrition strategies for healthy aging

Thursday April 4, 2013
Village of Humber Heights
Etobicoke, ON
11am - 4pm

&

Wednesday April 10, 2013
Village of Winston Park
Kitchener, ON
11am - 4pm

Register: www.foodhealthaging.eventbrite.com

Schlegel-UW Research Institute for Aging’s Agri-food for Healthy Aging (A-HA) program is hosting two events to share A-HA research to date. The agenda will be repeated at both of the locations noted above, and presentations by A-HA researchers will include:

- Making the Most of Mealtimes; creating flexibility in dining  >  Heather Keller, PhD, RD, FDC, Schlegel Research Chair in Nutrition & Aging, University of Waterloo
- Sensory properties of pureed foods: What’s important to consumers?  >  Lisa Duizer, PhD, Assistant Professor, University of Guelph
- Functional foods for healthy aging: A toolkit for health professionals  >  Alison Duncan, PhD, RD, Professor, University of Guelph
- The how, what, why and where about omega-3 fatty acids
  >  Ken Stark, PhD, Canada Research Chair in Nutritional Lipidomics, Associate Professor, University of Waterloo

Student Contest!

In a 2 minute “pitch”, students will present the latest in Nutrition & Healthy Aging research.

Vote for the cash prize winner!

Event Highlights:

- Free registration
- Lunch provided (featuring local agri-foods)
- “Marketplace” featuring nutrition resources and innovative agri-food products for healthy aging.

Funding provided by Canadian Institutes of Health Research, Institute for Nutrition, Metabolism and Diabetes.
Summary Notes

• Aging is becoming more common and functional foods are an exciting strategy to promote healthy aging

• There are multiple examples of functional foods being examined in research projects for their potential to advance optimal aging

• There are key functional food matrices and bioactive ingredients preferred among older adults and this information can be valuable to stakeholders

• The Functional Foods for Healthy Aging toolkit can be used as a knowledge transfer tool to aid Health Professionals in their interactions with older adult clients about functional foods
Acknowledgements

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  • Meagan Vella, M.Sc.
  • Laura Stratton, M.Sc.
  • Hilary Dunn, M.Sc.
  • Jenna Campbell, M.Sc., R.D.
  • Sarah Dainty, B.Sc.
• Research Participants