National SCIENCE Challenges

HIGH-VALUE NUTRITION

Ko Ngā Kai Whai Painga

Planning a Clinical Evaluation of Mussel-fucoidan Combination as a Functional Food

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Challenge Host

THE UNIVERSITY OF AUCKLAND Te Whare Wānanga o Tāmaki Makaurau NEW ZEALAND

Challenge Collaborating Parties

UNIVERSITY of OTAGO Te Whare Wānanga o Otāgo NEW ZEALAND

MASSEY UNIVERSITY TE KUNENGA KI PŪREHUROA UNIVERSITY OF NEW ZEALAND

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Plant & Food Research Rangahau Ahumāra Kai

New Zealand Green Shell Mussel (GSM)

- A traditional food source for Māori, GSM has been found to be able to improve joint pain
- Ulbricht et al 2009 summarised all existing clinical information regarding GSM's use. GSM exhibits beneficial effects in various conditions, including osteoarthritis, possibly through its anti-inflammatory effect.
- Abshirini et al 2021 re-visited GSM's effect in osteoarthritis, and the review shows that GSM can provide moderate and clinically meaningful treatment effects on pain.

Fucoidan from New Zealand seaweed *Undaria pinnatifida* (Wakame)

Fucoidan extracted from various seaweed species has been shown to have various health benefits and fucoidan products are being sold worldwide.

Our studies on fucoidan extracted from New Zealand grown seaweed *U. pinnatifida* show

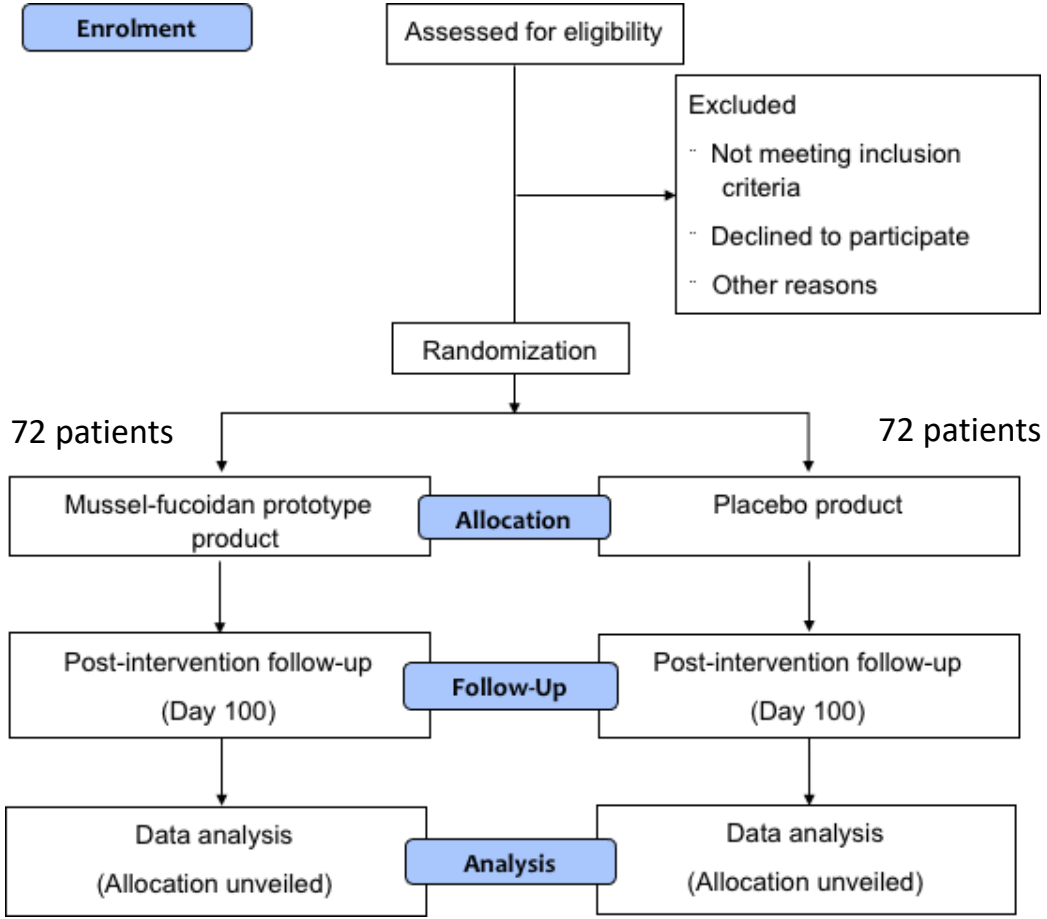
- anti-proliferation effect in cancer cells,
- antioxidant activity,
- inhibits starch digestion (glycaemic control potential)
- immunomodulation effects
- incorporates into food well.

Hypothesis

- the mussel-fucoidan combination will be superior to placebo in reducing patient-reported joint pain and/or improving insulin resistance in prediabetes.

Planning a trial – design

Target participants: ethnic Chinese



Planning a trial – Primary endpoints

- change in insulin resistance, defined by the homeostasis model of assessment (HOMA) values
- patient-reported pain measured by the Western Ontario and McMaster Universities Arthritis Index (WOMAC)

Planning a trial – Secondary endpoints

- Anthropometry
- Fasting glucose and insulin, glycated haemoglobin (HbA1c)
- Inflammatory markers (C-reactive protein, tumour necrosis factor-alpha (TNF–α), interleukin (IL)-6, IL-2, IL-8, IL-1β, IL-10 and IL-4)
- Physical function, quality of life
- Pain intensity
- satiety on a VAS (0=extremely hungry, 10=extremely full)
- analgesic medication use
- parameters related to COX-2 inhibition

Trial product – manufacturing

- Mussel powder supplied by CFarmX
- Seaweed collected from Marlborough Sounds mussel farms
- Extraction done by NZ Extract Ltd
- Drying done by Alaron Products

Trial product – chocolate

The final sugar free 55% dark chocolate product was made by PFNA Group Ltd

- Cocoa Mass approx. 55%
- Maltitol up to 30%
- Cocoa Butter up to 15%
- Emulsifiers less than 1%
- Flavour (including mint oil) less than 1%

Contribution to the field

- First RCT combine mussel with fucoidan for the treatment of joint pain and insulin resistance in prediabetes

- First trial investigating the effect of mussel in a Chinese population

Current progression

- 120 enrolled
- Enrolment completion date – 30 September 2022
- Completed participants to date – 50
- Total completion date – before 30 January 2023

The research team

- Professor Jun Lu, AUT
- Professor Rinki Murphy, University of Auckland
- Associate Professor Nada Signal, AUT
- Dr. Yannan Jiang, Biostatistician, University of Auckland
- Dr. Daniel O'Brien, AUT
- Dr. Kelvin Wang, AUT
- Mr. Arthur Sun, AUT (PhD candidate)
- Ms. Audrey Tay, University of Auckland

Trial registration and ethics approval

- ANZCTR Registration: ACTRN12621000413820, on 15 April 2021.

- Health and Disability Ethics Committee (number: 20/STH/153)

Thanks!

Any questions?

You can email me at:

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