Researching Health Benefits – to Support Health Claims

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What I’m going to cover

- Who we are, what we do
- Our approach to supporting evidence
- Food-Health relationship for claims
- What works well
- What works less well
900 staff
600 scientists
• From Germplasm to Concept
• From Concept to Validation

Creation of concepts/prototypes based on our underpining science

(germplasm/concept) (validated health) (functional stability) (sensory / consumer)

Scope:

Whole fruit (new cultivars) Ingredients Validated concept products
Roger Hurst
Food & Wellness

- Kate Chan
- Shin-Mei Yeh
- Jingli Zhang
- Arjan Scheepens (PL)

- Dominic Lomiwes
- Jing Yuan
- Kirsty Lyall
- David Stevenson
- Dawei Deng
- Greg Sawyer
- Tafadzwa Nyanhana
- Robyn Wells
- Selena Holmes
- Sue Hurst (PL)

Jeff Greenwood (TL)
Cognitive Function & Performance

Birgit Ha (TL) Physical Performance & Inflammation
Targeted Health Areas

» Physical Fitness/Performance/Recovery and Enhanced Training from Exercise
» Mental Health/Mood/Psychological Stress & Cognitive Performance
» Gut Health

Aim: To understand the bioactivity of fruit & vegetable phytochemicals to produce fresh and processed functional foods with a proven health efficacy

Medium-High Health/Functional ‘Supportive’ Evidence
Approach

- Chemical / compositional analysis
- *in vitro* model development for bioactive screening & discovery of mechanisms
- Animal feeding trials or *ex vivo* (tissue) analysis
- Human intervention trials (bioavailability/functionality)

Cultivar composition  Cellular Screening  Animal/Ex vivo feeding trials  Human Feeding Trials
Approach continued

Providing Science Evidence to Support ‘Food-Health Relationship’

= Functional Efficacy

Claims

Self-Substantiated

High Health
Why fruit, Which fruit?
The Horticulture and Food Research Institute of New Zealand

Food–Health Relationship

Proving the ‘Food – Health Relationship’ = critical

Health Benefit
‘Functionality’
Biomarkers
Physiology
Subjective

• Dose (realistic ?)
• Composition
• ID Active(s)
• Stability
• Processing, matrix
• Bioavailability
• Mechanism of action

Food-Health Relationship
Cell-based Assays

Gut health assays:
- Direct toxicity to gut cells
- Oxidative stress protection - protection against ox stress
- Growth/toxicity to good/bad bacteria
- Adhesion of good/bad bacteria bacteria to enterocytes
- Gut wall integrity protection

Physical health assays:
- Direct toxicity to muscle cells
- Oxidative stress protection - protection against ox stress
- Oxidative protection – heat shock protein expression
- Oxidative protection – mitochondrial ROS
- Anti-inflammatory assay – IL6 and TNF generation
- Adaptive anti-oxidative measures - e.g. SOD, catalase

Immunity/Inflammation assays: (cell, whole blood)
- Modulation of cytokine, signalling mol. generation – various cells
- Nuclear factor (NFkB) gene activation/inhibition
- Induction of cytokine gene expression
- Natural killer cell activity – whole blood and cell lines
- Phagocytosis
- Neutrophil oxidative burst
- T cell subset activation – flow cytometry
- Glucose uptake, lipid accumulation – adipocytes, muscle cells
- Lymphocyte Oxidative stress protection
- Adhesion of good/bad bacteria bacteria to enterocytes
- Gut wall integrity protection

Receptor assays:
- β2-adrenergic receptor affinity
- GABA-A ligand site binding
- Benzodiazepine site binding
- Monoamine oxidase inhibition
- PPAR gamma assay
Muscle Damage Recovery - biomarkers

Muscle damage prevention by blackcurrant – long term action

Effect of New Zealand blueberry consumption on recovery from eccentric exercise-induced muscle damage

*Journal of the International Society of Sports Nutrition 2012,
Yanita McLeay, Matthew J Barnes, Toby Mundel, Suzanne M Hurst, Roger D Hurst, Stephen R Stannard
What works well:

- Involvement in a funded MBIE ‘Programme’ (co-funding) – increased bang for buck – series of work

What works less well:

- One-off human trial – one trial won’t make a claim
- Human efficacy research where there is no/minimal underpinning rationale/evidence

Comment:

Its scientifically difficult to make a healthy person – even more healthy (pushing up hill)
Thank you for listening

If you think we can help you..... CONTACT US

“Tart is no ordinary lemonade. It’s a tart blend of fruit and green tea that is not only refreshing but sufficiently high in antioxidants. Plus it grows hair.”

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