



Researching Health Benefits – to Support Health Claims

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What I'm going to cover

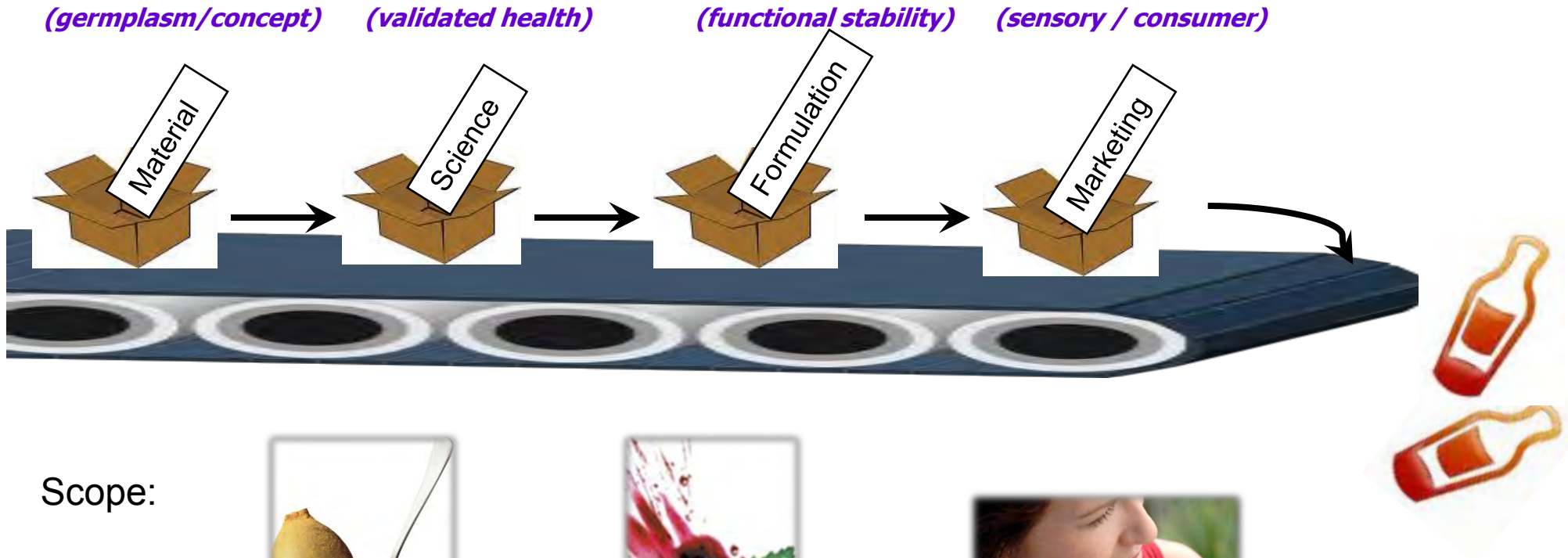
- **Who we are, what we do**
- **Our approach to supporting evidence**
- **Food-Health relationship for claims**
- **What works well**
- **What works less well**





- From Germplasm to Concept
- From Concept to Validation

Creation of concepts/prototypes based on our underpinning science



Scope:



Whole fruit (new cultivars)



Ingredients



Validated concept products



Roger Hurst

Food & Wellness

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

Jeff Greenwood (TL)
Cognitive Function & Performance



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

Birgit Ha (TL) **Physical Performance & Inflammation**



Targeted Health Areas

Science discovering the goodness in fruits and vegetables



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

Asthma

Stress ; Metabolic/Oxidative Stress ; Inflammation Modulation ; Immunity/Natural Protection

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

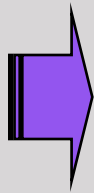


Approach



- **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



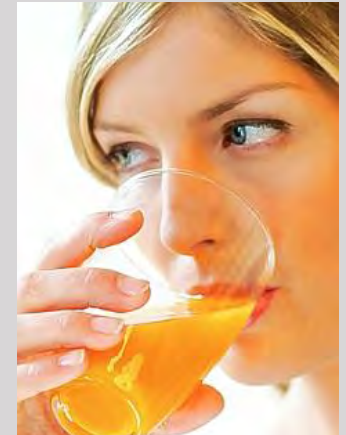
Cellular Screening



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



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



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 to enterocytes**
- **Gut wall integrity protection**

Immunity/Inflammation assays: (cell, whole blood)

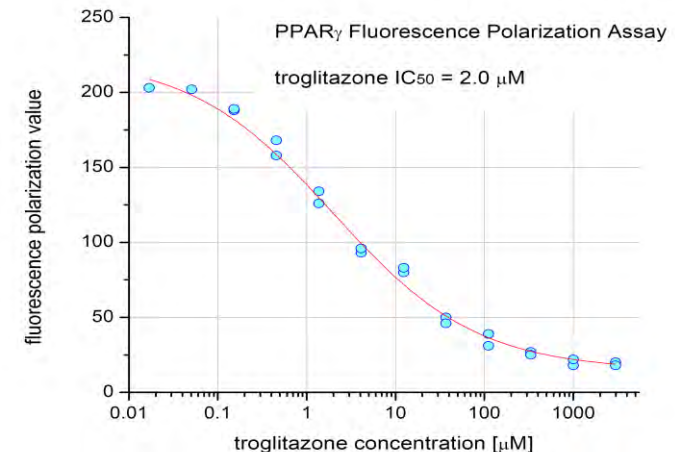
- **Modulation of cytokine, signalling mol. generation** – various cells
- **Nuclear factor (NFkB) gene activation/inhibition**
- **Induction of cytokine gene expression**
- **Natural killer cell activity** – whole blood and cell lines
- **Phagocytosis**
- **Neutrophil oxidative burst**
- **T cell subset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

Physical health assays:

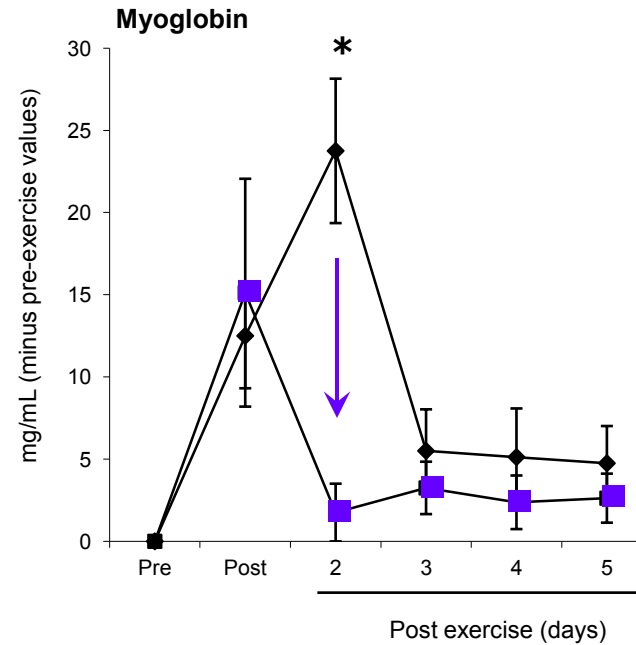
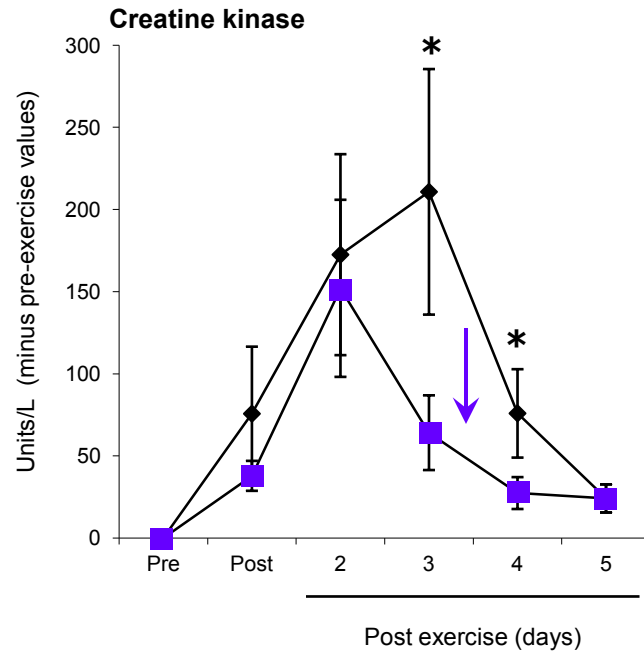
- **Direct toxicity to muscle cells**
- **Oxidative stress protection** - protection against ox stress
- **Oxidative protection** – heat shock protein expression
- **Oxidative protection** – mitochondrial ROS
- **Anti-inflammatory assay** – IL6 and TNF generation
- **Adaptive anti-oxidative measures**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

Receptor assays:

- **β 2-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

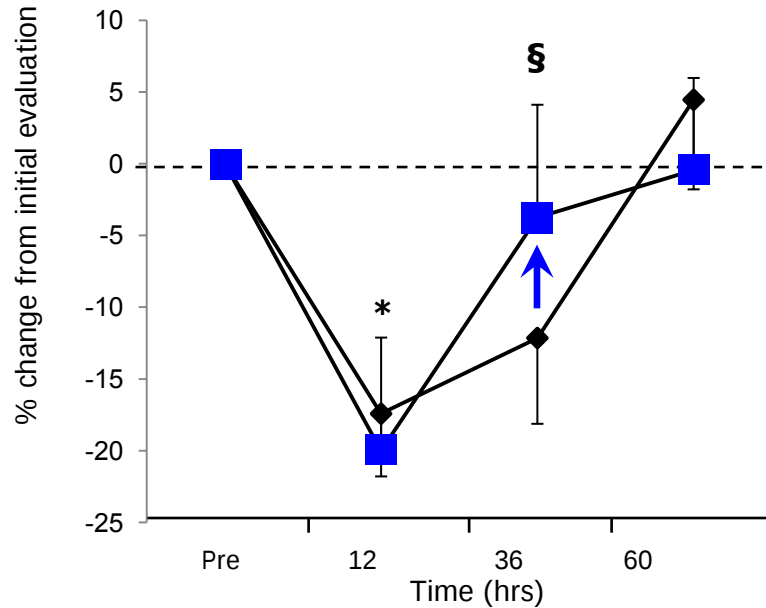
S.M. Hurst & R.D. Hurst (Sept 2013) Anthocyanins, innate immunity and exercise. *In: Anthocyanins in Health & Disease*. Taylor C. Wallace (Ed), CRC Press.



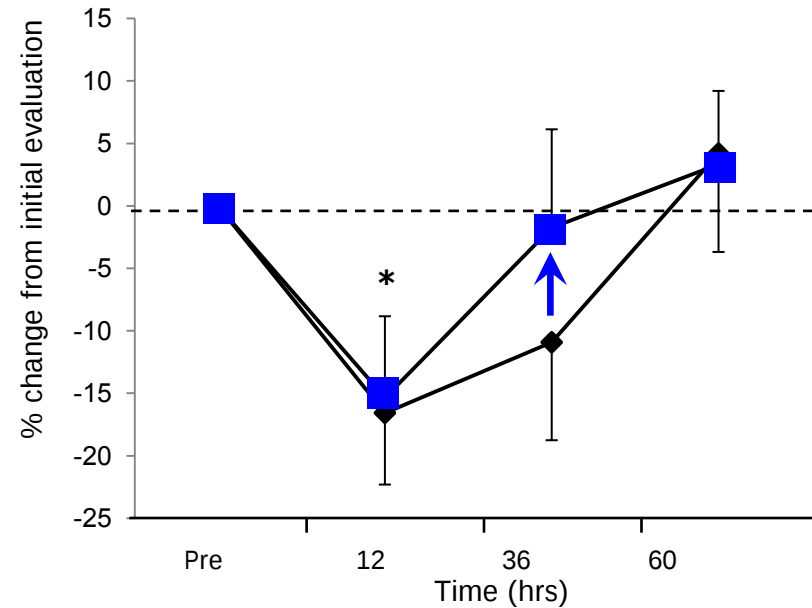
Exercise Performance Recovery - Functional



Peak isometric performance



Average isometric performance



Speedier recovery

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, What Works Less



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 wont 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



● Claim Inspector

"This 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."

