



Nuts and Health: research

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Melbourne 200809



Outline

- Nutrition perspectives 2009
- Research on nuts?
- Where are the gaps in research?
- Strategic research decisions





Perspectives on Food and Health

- Food as a delivery agent of nutrients / bioactive substances

Nutrient content / function claims

- Nutrients
 - Vitamins, minerals, fibre
- Other food components

- Food and health protection or risk for lifestyle related disease

Health protection / risk claims

- Nutrients, bioactive substances
 - Excess fat, sodium
 - Type of fat, type of carbohydrate, phytonutrients
- Foods
 - Nuts, fish, whole grain cereals, legumes, meat, fruit and vegetables, herbs and spices
- Whole diets (eg Mediterranean)
 - Energy, macronutrient distribution, nutrient density
 - Food choices

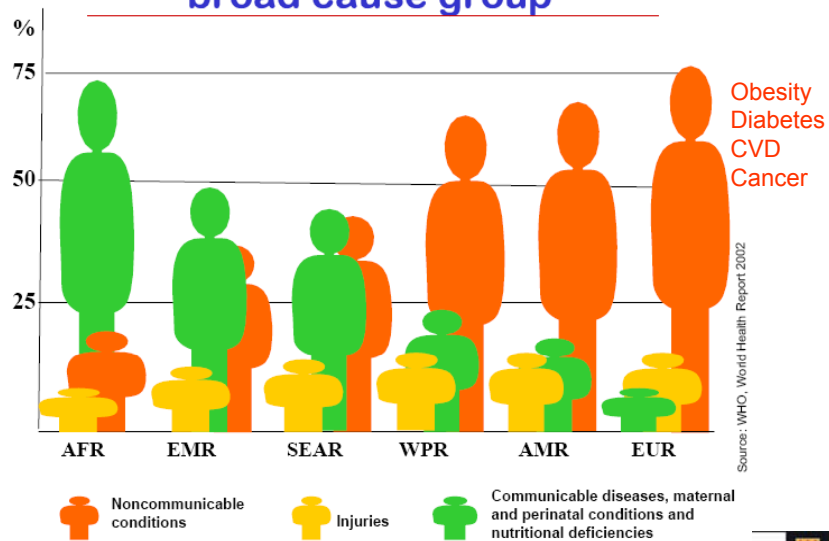


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Metrics:

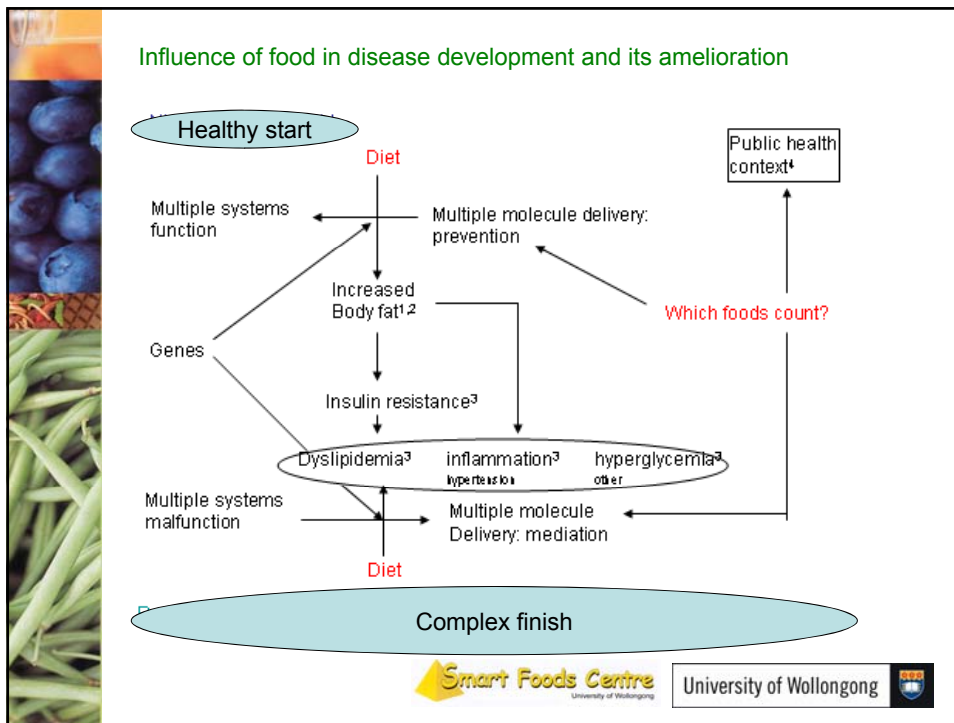
Burden of disease in DALYs by broad cause group



Pietinen 2007; <http://europe.ilisi.org/events/past/FFSympopresentations.htm>

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Humans and (other) Food : biologically determined

Human health - biology

- Dynamic system
- Bio-active substances, physiological processes and genes

Food – plant/animal biology

- Dynamic system
- Formulated system
- Delivers bio-active substances – form?

Jacobs D & Tapsell L. Food not nutrients : the fundamental unit in nutrition Nutr Rev 2007;65:439-450
 Jacobs D, Gross M, Tapsell L Food synergy: an operational concept for understanding nutrition. AmJClinNutr 2009 [in press]



Walnuts and (walnut) health

Growing walnuts requires understanding of the walnut lifecycle and health outcomes:

- leafing, flowering, precocity, harvesting dates
- yield, resistance to blight, tree-form
- weight, shell strength, seal strength, colour, shrivel, plumpness, fill
- taste, oil composition, oil content

Aging also affects walnut trees:

- Thicker shells, more blight, earlier fruiting, reduced kernel size

(after McGranahan G International Walnut Symposium, Melbourne 2009)



Functionality of food

- Parallel biological systems of humans, plants and animals
- 'you are what you eat'
- Lifestyle related disease takes a lifetime
- Prevention depends on a sustained healthy lifestyle
- Future food will better match the physiological requirements of human biology



The Perfect Diet ?



Substantiating the evidence

- Food components
 - Macronutrients
 - Micronutrients
 - Other bioactive components
- Whole foods
- Whole diets

Body of evidence

- Mechanistic research
- Observational studies
- Clinical trials

Jones P, Silva P [ed] Evidence for health claims on food: how much is enough?
J Nutr 138 6S-1. June 2008



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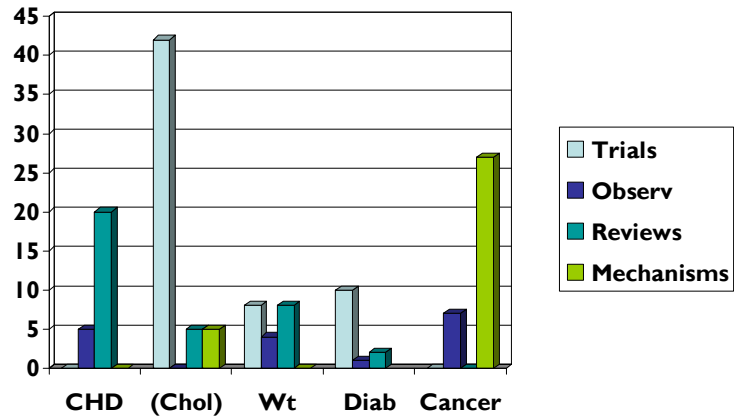
Published research on nuts (1992- 2009)

Cholesterol*	58
Cancer (1968-2009)	34
Compositional analysis (1987-2009)	31
Cardiovascular Disease*	26
Weight management	20
Cuisine and heart/diabetes	16
Diabetes	14
Other CVD risk factors*	9
Gallstones/gut health	6
Eye health	2





Published research



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Other CHD risk factors

- Blood pressure (3)
- Inflammation (3)
- Oxidation / Oxidant Capacity (3)
- Gene expression (1)

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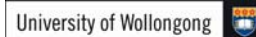
Whole diet studies

Disease	No.	Type diet
CHD	10	Mediterranean (n=9; 4 = PREDIMED) Paleolithic
Diabetes	2	Mediterranean
Weight	2	Mediterranean
Asthma	1	Mediterranean
Anti-oxidant	1	Mediterranean



Compositional analysis

Outcome	No. studies
Multiple components	5
Phyto-nutrients	10
Minerals	5
Vitamins	4
Protein quality	1
Fatty acids	1
Anti-nutrients	2





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Perspectives on Nuts and Health

- Nuts as a delivery agent of nutrients / bioactive substances
Compositional profiling
- Nuts and health protection or risk for lifestyle related disease
Evidence for effects of nut consumption
 - In context of whole diet
 - Energy
 - Macronutrient composition
 - Bio-active contribution
 - Targeting specific conditions / functionalities matched to compositional profile





Evaluation of walnut supplementation in practice: Eatwell study (Tapsell et al Diabetes Care 2005;27:2777-83)

- Type 2 diabetes mellitus (n=56)
- Clinical trial, 6 mo intervention
 - Control (usual practice)
 - Low fat/modified fat (exchange list)
 - LF/MF incl. 30g/1oz walnuts/day
- Dietary targets: P:F:CHO = 20:30:50
 - P:M:S = 1:1:1; N-6:n-3 <10:1
- Clinical outcomes
 - Weight, HbA1c, lipids

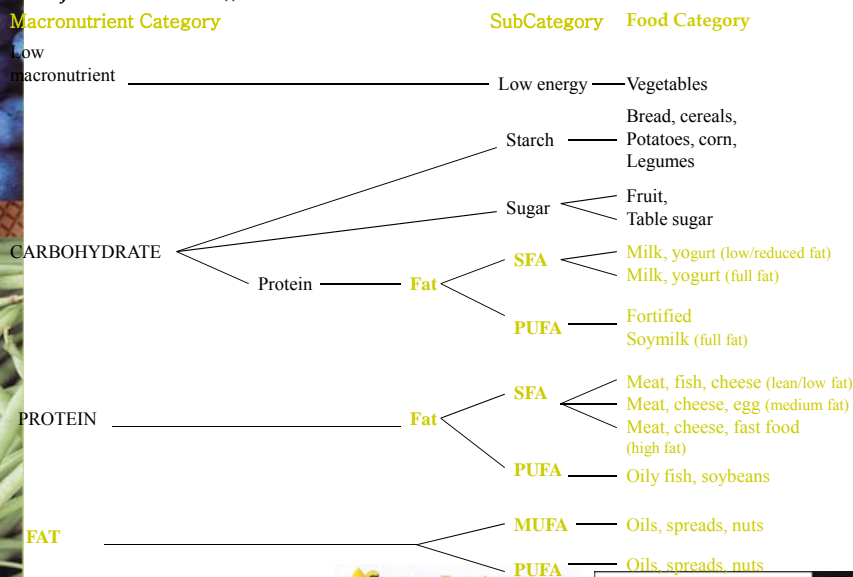


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Development of food groups based on equivalent macronutrient and fatty acid contents (Gillen et al J Am Diet Assoc)



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Walnuts as a delivery agent for PUFA (Tapsell et al Diabetes Care 2005;27:2777-83)

Table 1 Outline of dietary advice provided to each advice group (n=58)

Food category	LF (control) group	MF group	MFW group
Carbohydrate-rich	No. portions Distribution CHO type	No. portions Distribution CHO type	No. portions Distribution CHO type
Protein-rich	Serving size	No. portions Fish portions	No. portions Fish portions
Milk allowance	Type of milk	Total (ml) Type milk (LF/PUFA)	Total (ml) Type milk (LF/PUFA)
Spreads/oils/nuts	Type of spread/oil	Total (g) Type fat (MUFA/PUFA)	Total (g) Type fat (MUFA/PUFA)
Walnuts	-	-	30g/day



Dietary model

Table 1 Example of individualised advice provided to each subject in the MFW group

	Bread/Cereal/ Rice/Potato/ Pasta	Vegetables	Fruit	Milk	Lean meat	Oily Fish	Spreads/ Oils	Walnuts
Daily serves	6	5	4	600ml	450g/w	250g/w	4tsp	30g
Breakfast	2		1	330ml				
MT			1	30ml				
Lunch	2	2		30ml				
AT			1	30ml				
Dinner	2	3		30ml				
Supper			1	180ml				





Food composition: tree nuts (per 100g)

Nutrient	Walnut	Almond	Pecan	Macada	Pistach.	Cashew	Hazel.
Energy	654	578	691	718	557	566	628
PTN	15.2	21.3	9.2	7.9	20.6	18.2	15.0
CHO	13.7	19.7	13.9	13.8	28.0	27.1	16.7
Fat	65	50.6	71.9	75.8	44.4	46.9	60.8
SFA	6.1	3.9	6.2	12.1	5.4	8.3	4.5
MUFA	8.9	32.2	40.8	58.9	23.3	25.5	45.7
PUFA	47.2	12.2	21.6	1.5	13.5	8.4	7.9

Derived from Rajaram & Sabate BJN 2006;96:S85; Source USDA Aug 2005

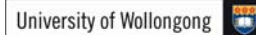


Food composition tree nuts (per 100g)

Nutrient	Walnut	Almond	Pecan	Macad	Pistachio	Cashew	Hazel
Fibre	6.7	11.8	9.6	8.6	10.3	3.3	9.7
Mg	158	275	121	130	121	292	163
α Toco	2.9*	26.2	4.1*	0.6	4.6	1.5	15.2
Lys:Arg	0.2	0.3	0.3	0.4	0.6	0.5	0.2
Cu	1.0	0.9	1.2	0.3	1.2	2.2	1.5
Phyto-nutrients	?	?	?	?	?	?	?

Derived from Rajaram & Sabate BJN 2006;96:S85; Source USDA Aug 2005

*γ tocopherol 17.2mg; 19.1mg respectively





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Strategic research conditions

- Identity of the nut
 - Which deliverables are best?
 - What's new in phyto-nutrients?
 - Are all nuts the same, do the same things?
- Cuisine fit / opportunities
 - How do nuts fit in a number of cuisines?
 - How can they be seen as a core food?



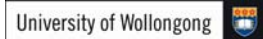
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What to do?

- Fully expose nutritional value ('island company')
 - Content
 - Function
 - Match with human functionality
- Target health/disease areas
- Build evidence base
- Develop strategic cuisine positions
- Communicate and facilitate



Thank you!
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