Nutrition and Genes: More Questions than Answers

Canadian Foundation for Dietetic Research

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Outline

- Overview
- Emergent themes
- Selected findings
- Salient messages
- Knowledge Translation (KT)
- Audience discussion

Nomenclature

Nutritional genomics:

Integrative science at the interface of nutrition, molecular biology and genomics. (p. 20)

Nutrigenomics:

Investigates the role of nutrients in gene expression.

Nutrigenetics:

Study of how genetic variants or polymorphisms can affect responses to nutrients.

Castle, D., Cline, C., Daar, A.S., Tsamis, C., Singer, P.A. (2007). *Science, society and the supermarket. The opportunities and challenges of nutrigenomics.* New Jersey: Wiley.

Research Team

- Ellen Vogel, PhD, RD, FDC
- Milly Ryan-Harshman, PhD, RD (Biotechnology)
- Julia Green-Johnson, PhD; UOIT (Functional Foods)
- Holly Jones-Taggart, PhD; UOIT (Human Genetics)
- David Castle, PhD; University of Ottawa (Ethics)
- Zubin Austin, PhD; University of Toronto (Pharmacy)
- Kristin Anderson, RD, MPH; Manitoba Health (Nutrition Policy)

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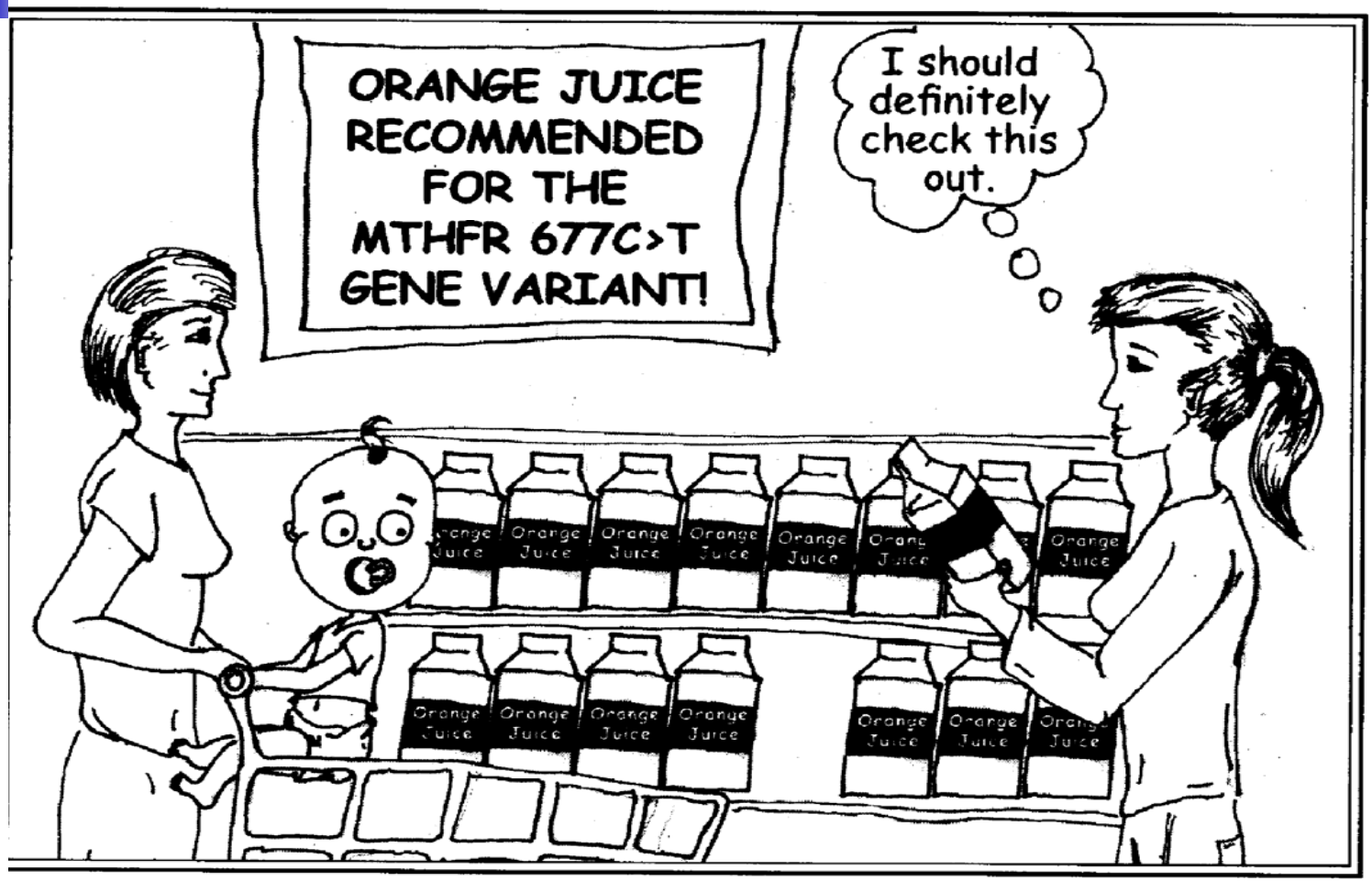
Data Collection

- Key informant interviews (12) conducted with national and international experts identified using a “snowball sampling” technique
- Focus group interviews (6) conducted with dietitians working in diverse practice settings across Canada
- Problem-based case study (*“Diet and Risk of Cardiovascular Disease”)* used to introduce the topic. Background information included a summary of current evidence related to genetic polymorphisms, blood lipid levels and dietary intervention

Initiating a conversation



DeBusk, R. & Joffe, Y. (2006) *It's not just your genes!* San Diego: BKDR, Inc.

Emergent themes (n=5)

- Knowledge, skills and confidence gaps of dietetics professionals
- Clinical validity and utility of predictive tests
- Population health versus medical perspectives
- “Medicalization” of food and nutrition
- Interdisciplinary and cross-sectoral collaboration

"We are facing this in practice"

- *"I had a patient last year whose son sent a hair sample in, and got on to tube feeding, and came back with a computer printout of the test. They* [parents] *wanted us to change everything based on this. It looked very good, but it wasn't scientific at all. I saw the printout, but it was all gobbledygook, you know a lot of words that sounded good, but not scientific."*

A motivator . . . or not ?

- *“Can’t do anything about it, nothing’s going to work. I’m just going to go along on my merry way and make no changes at all because I’m going to die, you know. ‘Something’s going to kill me,’ we get that all the time now, but we’re just starting to get the ‘’It’s in my genes’ message, because that is out there, the message is already out there.”*

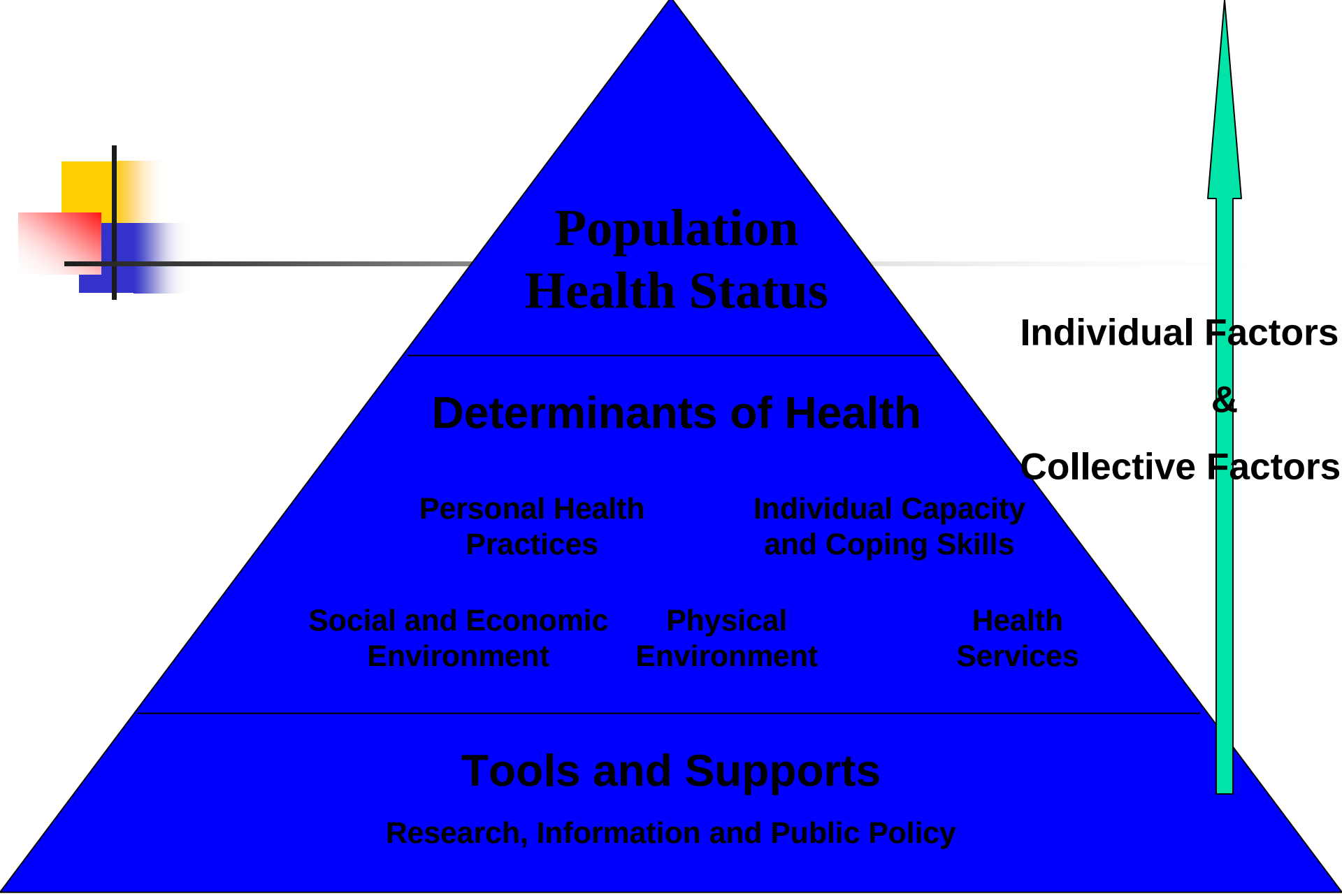
Potential benefits

- *"One of the things that I really enjoy is the ability to be able to individualize something for somebody, and tailor it to their needs, and then see them make changes in their life that brings a positive beneficial result . . ."* *(1)*
- *"It helps with the compliance because the patient will think it is something for them."* *(2)*
- *"We won't be seen as the people with the diet sheet! It will augment our level of rank and expertise."* (3)

(1) Focus group participant (2) Focus group participant (3) Focus group participant

Enhancing outcomes

- *“This will increase access to objective data. Compliance often is improved when you can show those numbers and those markers to the patient and not just say, ‘It’s a bit high, it’s a bit low.’ The more information we have . . . we can define very specific interventions that lead to improvement.”*



A Population Health Approach

Understanding the Forces That Influence Our Eating Habits

What We Know and Need to Know

Population surveys suggest that income-related food insecurity in Canada has increased from 10.2% in 1998-99 to 14.7% in 2000-01, with even higher rates reported in vulnerable groups . . .

Ledrou, I. & Gervais, J. (2005 May). Food insecurity. *Health reports, 16*(3), pp. 47-51. Statistics Canada (Catalogue 82-003).

Population Health vs. Medical Perspectives

	Population Health	**Medical**
Scope/Target	Population	Individuals
Cause of Disease	Social conditions	Individual biology and behaviour
View of Health	Resource for living	Absence of disease
View of Food	Prerequisite for health	Commodity to prevent or treat disease

Adapted: Lawrence, M., & Germov, J. (2004). Future food: The politics of functional foods and health claims. In J. Germov and L. Williams (Eds.), *A sociology of food and nutrition* (pp. 119-147). South Melbourne, Victoria, Australia: Oxford University Press.

Choosing or losing health?

- *“I want to see people eat well and choose healthy foods. But as a public health worker I know that the things that will make a difference will be social assistance rates, minimum wage, assistive education . . . . All those things would make people far healthier. I don’t see nutritional genomics helping the social determinants of health.”*

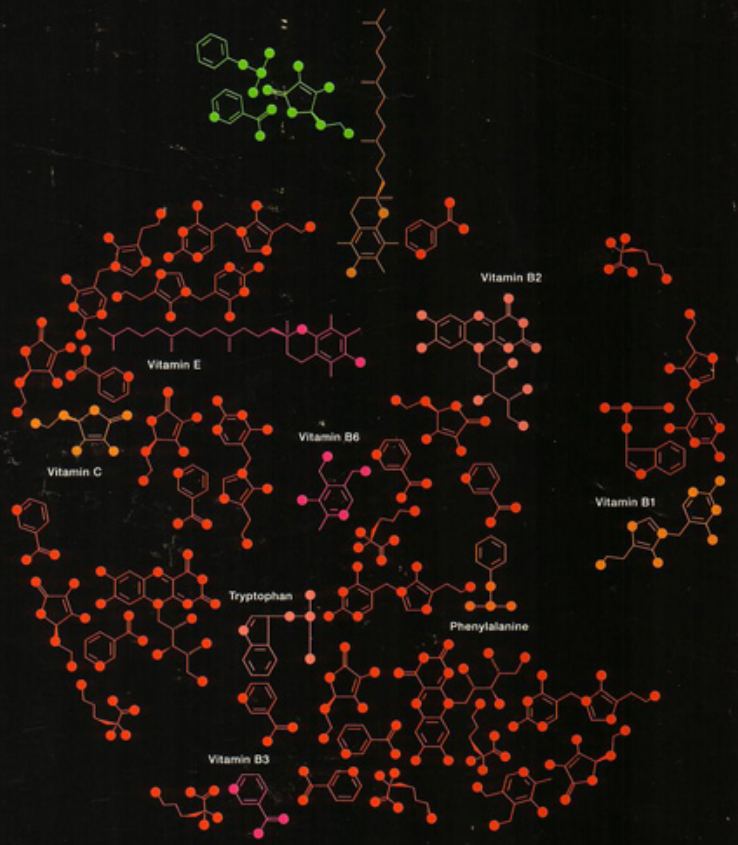
Involving the public

- *“For me, it comes back to how to involve the media? I’d like to see a broad social marketing campaign, particularly as we move into this era of ‘different strokes for different folks.’ We’re now going to have situations where there are a million answers, there’s an answer for every person . . . and people are going to need to learn differently.”*

A 10TH-CENTURY ROAD TALE! A SWASHBUCKLING, EMPIRE-CHANGING ADVENTURE SET BETWEEN THE BLACK AND CASPIAN SEAS! SILK-ROAD SWORD FIGHTS! KIDNAPPING AND INTRIGUE! AN ABYSSINIAN GIANT! AND MORE!!! THE NEW SUNDAY SERIAL, BY MICHAEL CHABON

The New York Times Magazine

JANUARY 28, 2007 / SECTION 6



The Age of Nutritionism

How scientists have ruined the way we eat. By Michael Pollan

LAURA SECOR: WHO'S IN CHARGE IN IRAN? **MARK OPPENHEIMER:** HOW WOULD JESUS DANCE?

Single-nutrient arguments

- *"Nutrition arguments are almost invariably about single nutrients taken out of their food context, single foods taken out of their dietary contexts, or single risk factors taken out of their lifestyle context.*
- *Single-nutrient arguments are 'reductive' in that they reduce diets and food choices to one simple decision: eat this or avoid that, and all problems will be solved."* (p. 10)

Nestle, M. (2006). *What to eat.* New York: North Point Press.

Imagine

- *“So now Jane has to go home and not only deal with cooking for her new genotype, but she also cooks for her husband who has a completely different genotype and completely different dietary needs . . . . For me, a lot of it comes down to what recipes am I going to be giving Jane so that she can carry through?”*

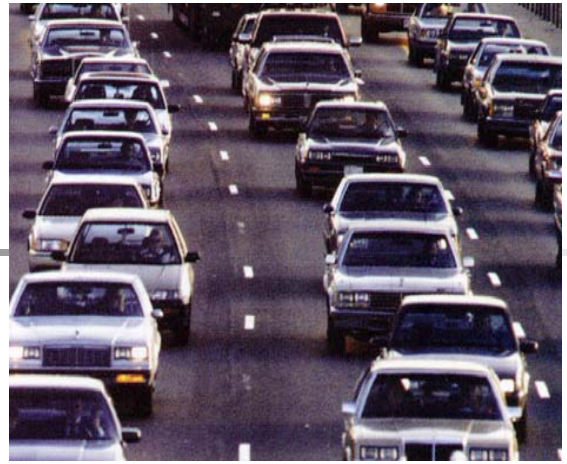
A balancing act

- *“We’re still talking about the art of counselling and helping someone move forward, versus advocating science. How do we link those two? It’s probably something that we wrestle with a lot . . . .*
- *There can be an awful lot of science out there, but in the end, it’s one-on-one across the table, talking to that individual, trying to find out what it is that will give them the comfort that they need to make the change.”*

"A tough, tough sell?"

- *"Just because the science is there doesn't mean that that's where people are going to be. As we always say when we have our beer and pizza on Friday nights, it's not about physiological needs at all. I think it* [medicalization of food and nutrition] *takes away the joy of food and that's going to be a tough, tough sell!"*

A Road Map for the Next Decade



Adapted: Gillies, P. (2006, June 2). *Nutrigenomics: Industry's perspective.* Paper presented at Nutrigenomics and Beyond: Informing the future. Institute of Medicine. Washington, DC.

Build new bridges across disciplines
Consult widely with stakeholders
Establish strategic partnerships
Align objectives
Train for the future

Building bridges

- "*It's probably unwise to restrict such information to dietitians, only. The dietitians will provide the personal nutrition advice based on our knowledge of nutritional genomics. However, in most diseases you need a collaborative approach among different health care providers, physicians, pharmacists, all others nutrition health professionals need to be knowledgeable . . .* "

  (key informant)

RDs . . . on the front line

- "*I think we need to be on the front line because we can't let industry take this information and let them provide it to the public. I think health professionals need to understand it first and we need to put regulations in place so it's used properly . . . it should be based on science and it should have regulations towards it so that the public is protected.*"

Tackling the “hard” questions

- *“The big thing we learned from biotechnology is that dietitians weren’t ready to agree, or come to consensus on a common position . . . There is a range of values and beliefs around it, regardless of the science. When I look at nutrigenomics research I think it’s important that we can answer: ‘Who’s going to fund the research; Who’s benefiting and in what ways?”*

Salient messages

- Learn from our past mistakes: Social analysis needs to occur as the science and technology is evolving
- Don’t promise more that we can deliver
- Reflect on the social consequences of promoting food as medicine
- Begin by addressing the “hard” questions: Who will benefit, from what foods; under what circumstances?
- Acknowledge that genetic testing isn’t always the answer (“Knowledge is Power; Ignorance is Bliss”)
- Build new interdisciplinary bridges to move forward
- Forge strategic partnerships with stakeholder groups including industry, consumers and the media

Knowledge Translation

- Dietitians of Canada: PEN developed a Background Document on Nutrigenomics and Dietetic Practice
- Online, interactive tool on nutritional genomics developed by Ryan-Harshman, Vogel, *et al.*, [UOIT Teaching Innovation Fund 2007: $5,000]
- "*Nutritional Genomics and Dietetics Professional Practice: A Review*" accepted for publication in *Canadian Journal Of Dietetic Practice and Research*
- NUTRITION AND GENOMICS: Issues of Ethics, Law, Regulation and Communication (Eds. D. Castle & N. Ries). Vogel, DeBusk & Ryan-Harshman are authors: Strategies to address capacity gaps in dietetics professionals [title to be determined]. Elsevier, 2008

Knowledge Translation

- Research Presentation. Nutrition File Seminar, *In Pursuit of the Perfect Diet*. Sponsor: Alberta Milk (Dietitians of Canada, University of Alberta, Canadian Dairy Products). Edmonton, AB (February 13, 2007); Calgary, AB (February 14, 2007)
- Research Abstract. Second Bruce Ames International Symposium on Nutritional Genomics, University of California, Davis. October 12-14, 2007
- Research Presentation. CIHR-SYNAPSE Youth Mentorship Initiative. Nutrition, Genes and Health. February, 2008 [Funding to UOIT: $25,000]

As Mark Twain said:

"There are people who strictly deprive themselves of each and every eatable, drinkable and 'smokable' which has in anyway acquired a shady reputation. They pay this price for health. And health is all they get for it. How strange it is. It is like paying out your whole future for a cow that has run dry."

Gratzer, W. (2005). *Terror at the table: The curious history of nutrition.* New York: Oxford University Press.

Thank you!

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