Le carni rosse.
The good, the bad, the ugly.

Il processo NACCP (Nutrient and hazard Analisys of critical control point) per la filiera della carne bovina

DIPARTIMENTO DI BIOMEDICINA E PREVENZIONE
Università degli Studi di Roma "Tor Vergata"

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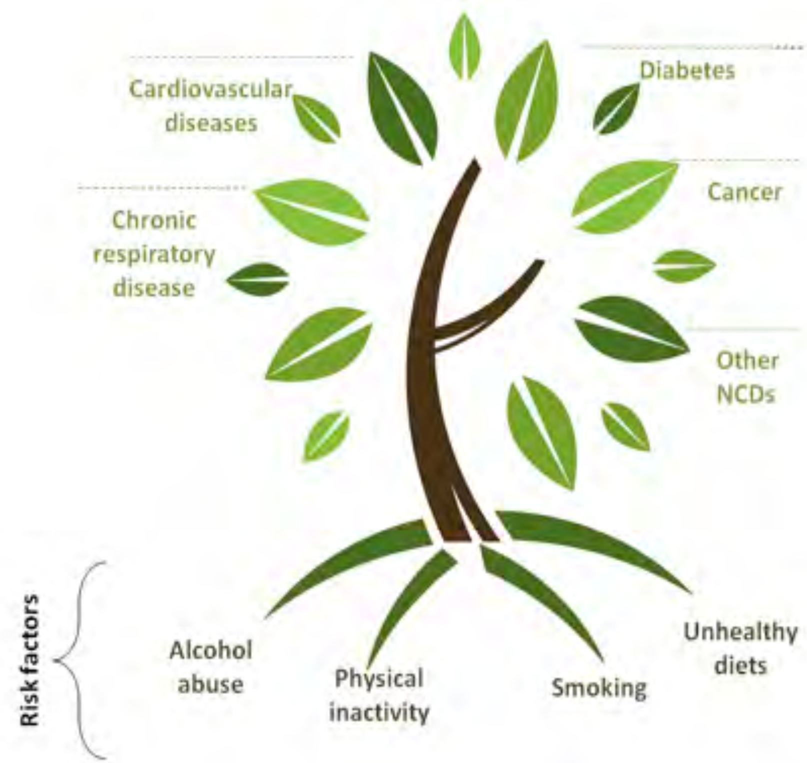
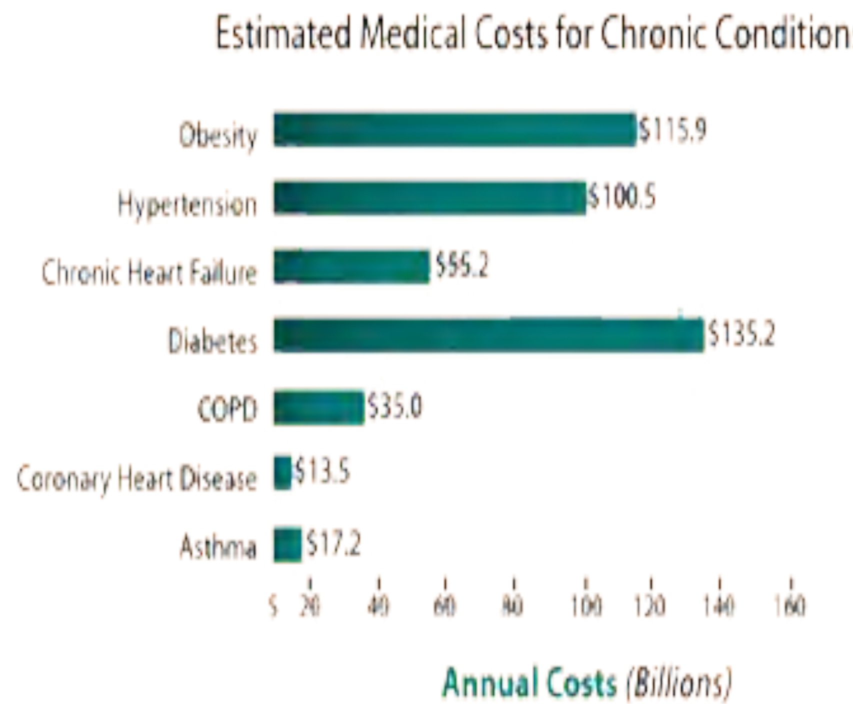




60% of all deaths are due to chronic diseases

Review Article

Personalized Lifestyle Medicine: Relevance for Nutrition and Lifestyle Recommendations

Hindawi Publishing Corporation
The Scientific World Journal
Volume 2013, Article ID 129841, 14 pages
http://dx.doi.org/10.1155/2013/129841

Deanna M. Minich and Jeffrey S. Bland

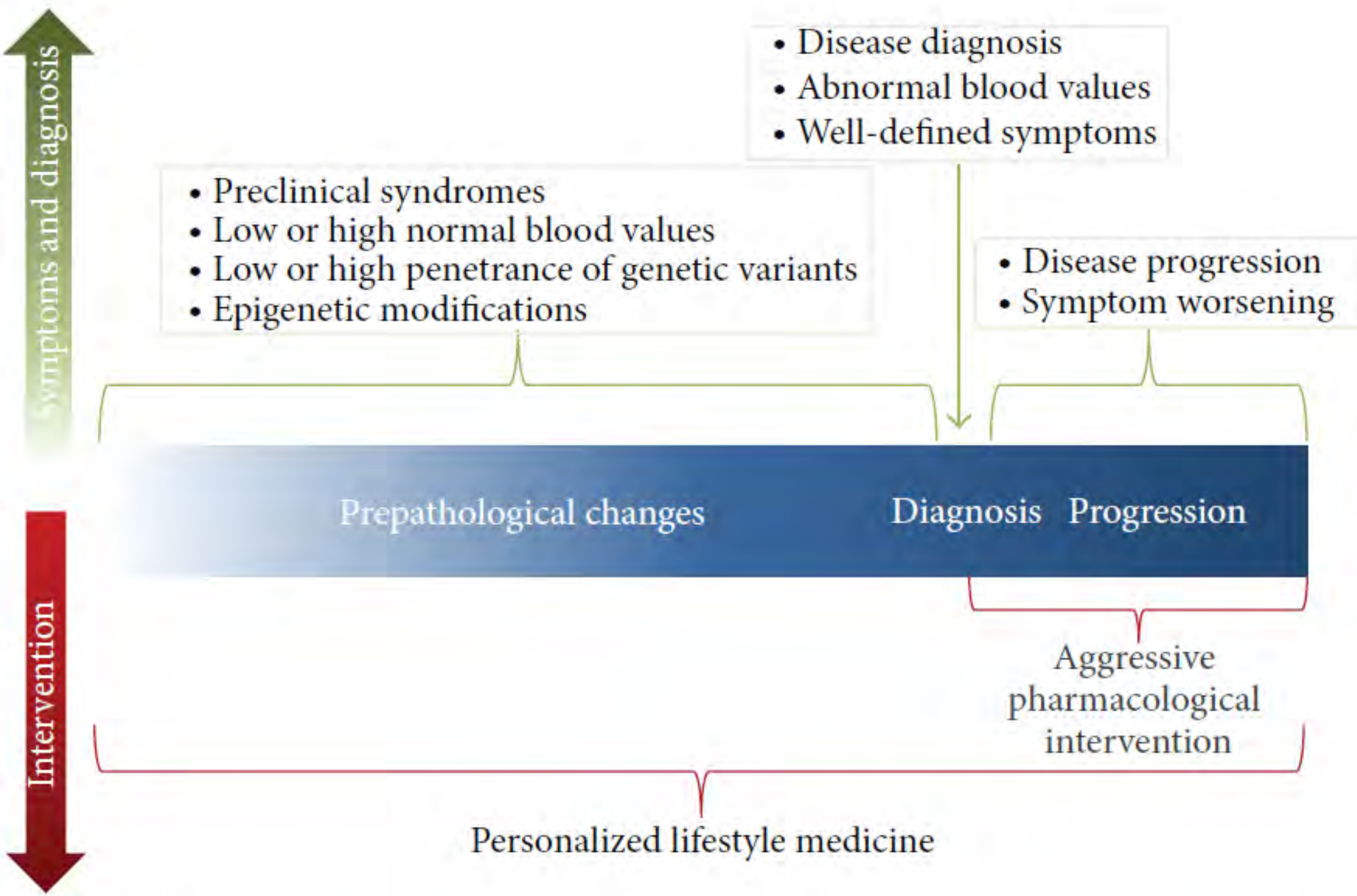
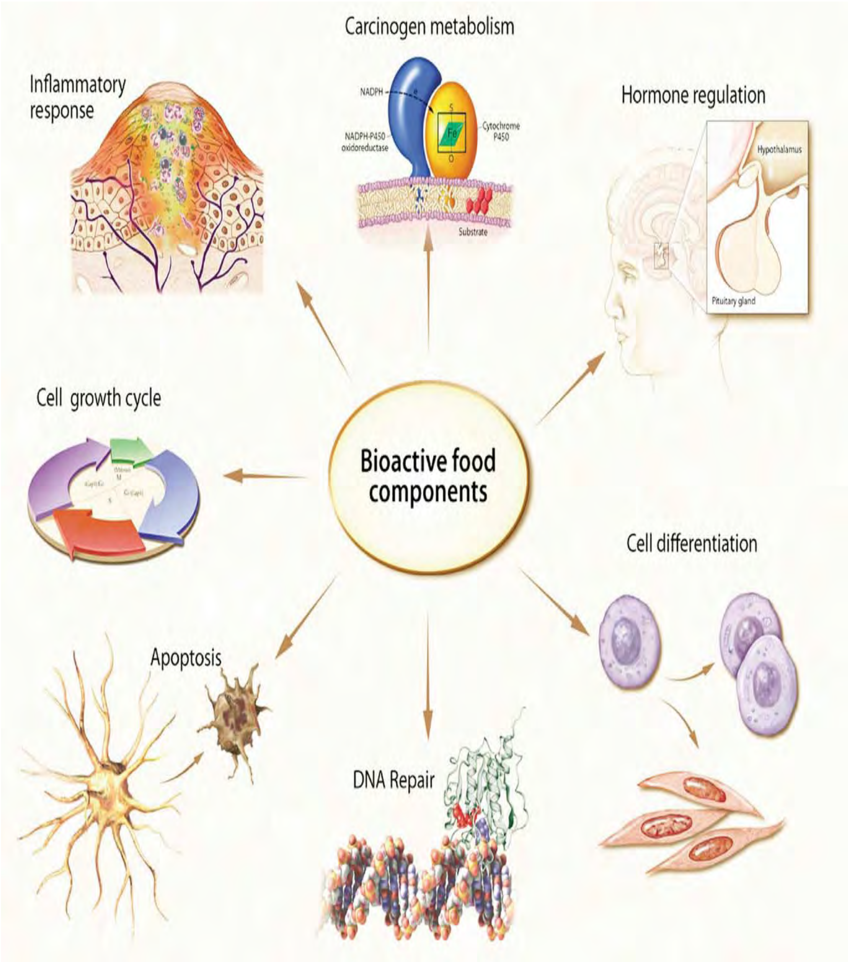


FIGURE 2: The trajectory of disease and role for personalized lifestyle medicine.

The genetic contribution to disease risk and variability in response to diet: where is the hidden heritability?

Anne Marie Minihane
Department of Nutrition, Norwich Medical School, University of East Anglia, Norwich NR4 7TJ, UK

Proceedings of the Nutrition Society (2013), **72**, 40–47



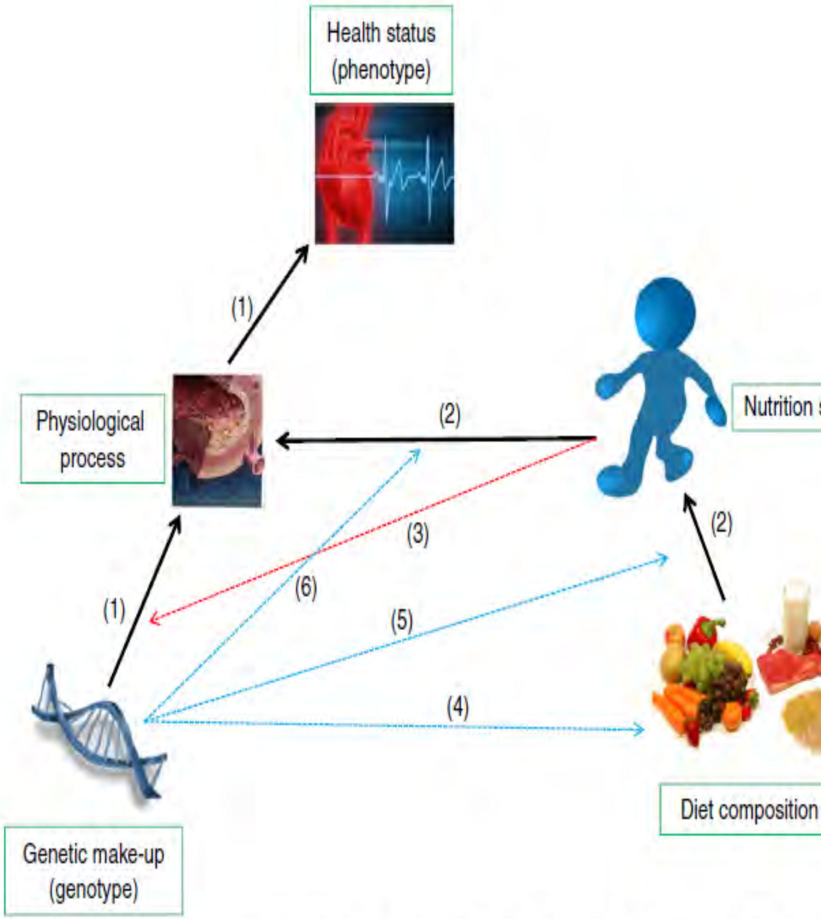
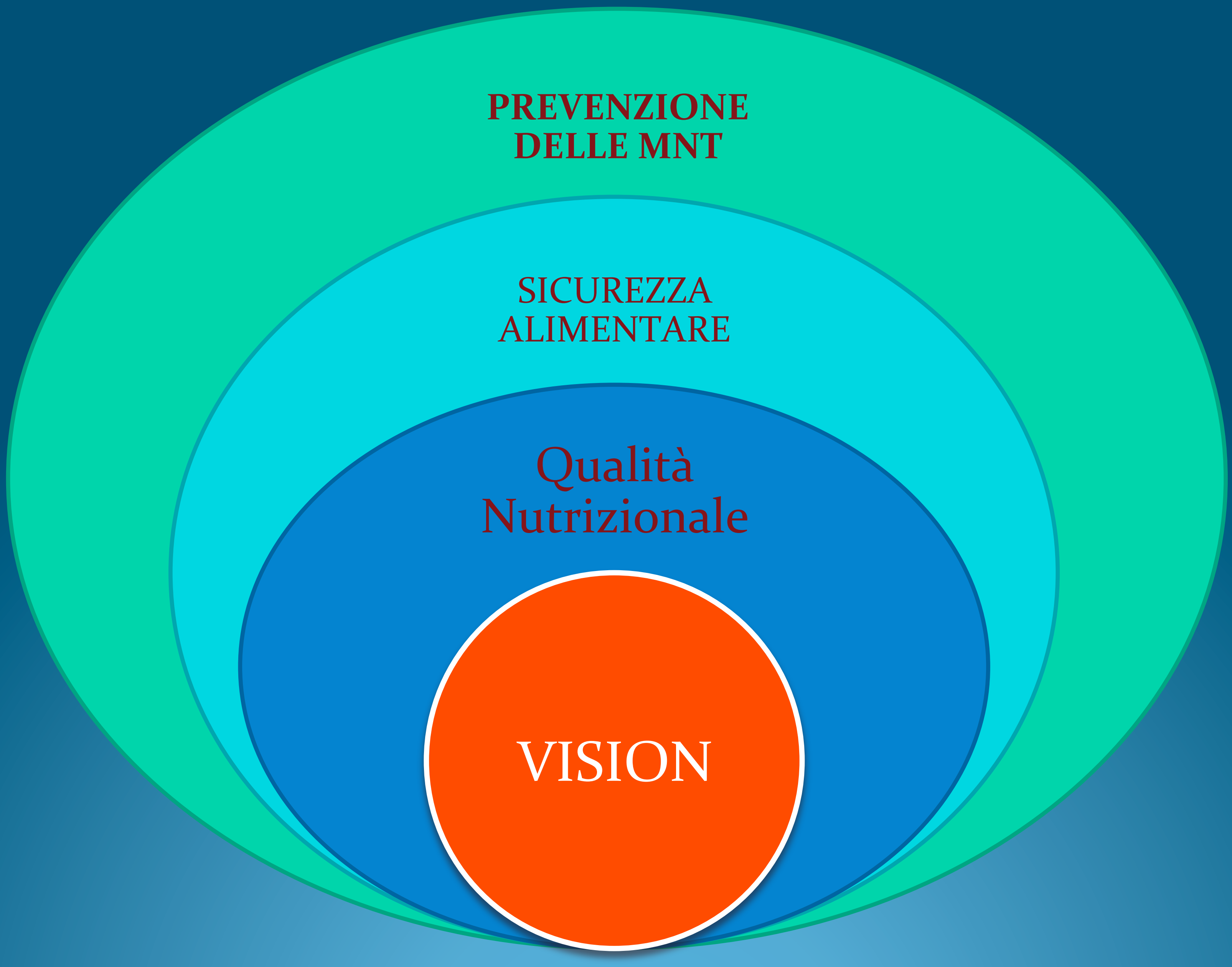


Fig. 1. (colour online) The complexity of genotype–diet–phenotype interactions: (1) phys
cal status and phenotype are influenced by genotype; (2) diet composition influences
concentration and form of individual dietary components which in turn influences physio
status; (3) the penetrance of an individual gene variant is influenced by nutritional
(4) although as yet relatively under investigated there is evidence that the food consu
influenced by genotype, with genetic variation affecting food preferences, appetit
satiety[4,5]; (5) once ingested, the digestion of food, the absorption efficiency of nu
and non-nutrients, their post-absorptive metabolism and tissue uptake, utilisation and s
and elimination from the body are under genetic control; (6) the influence of a particular
status of a dietary component on phenotype is influenced by genotype via an ar
mechanisms including genetic variability in cell signalling pathways, transcription factor a
biotransformation enzymes, etc.


PREVENZIONE
DELLE MNT
SICUREZZA
ALIMENTARE
Qualità
Nutrizionale
VISION

Regolamento CE 854/2004: obblighi operatori, controlli autorità competente, sanzioni

Regolamento CE 853/2004: stoccaggio, luogo, lavorazione, trasporto prodotti animali e importazioni da Paesi Terzi

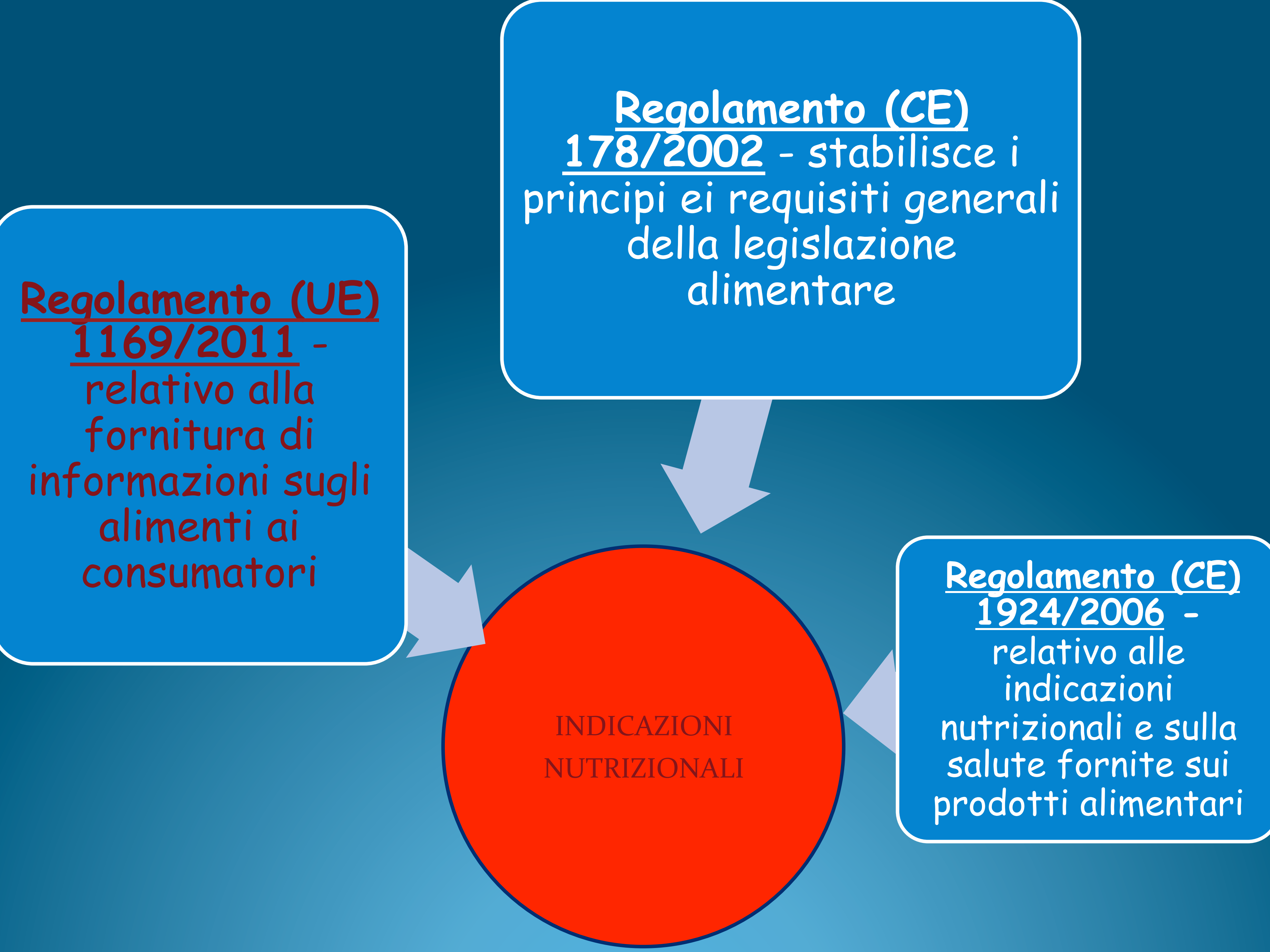
Regolamento CE 882/2004: prevenzioni dei rischi, trasparenza del mercato, informazioni per il pubblico

Sicurezza alimentare HACCP

D.Lgs 193/07

Regolamento CE 852/2004: igiene, analisi pericoli e CCP

Regolamento CE 183/2005: requisiti igiene mangimi


Regolamento (CE) 178/2002 - stabilisce i principi ei requisiti generali della legislazione alimentare
Regolamento (UE) 1169/2011 - relativo alla fornitura di informazioni sugli alimenti ai consumatori
Regolamento (CE) 1924/2006 - relativo alle indicazioni nutrizionali e sulla salute fornite sui prodotti alimentari
INDICAZIONI NUTRIZIONALI

- **Che cosa è la qualità???**

"l'insieme delle proprietà e caratteristiche di un prodotto o servizio che gli conferiscono l'attitudine a soddisfare bisogni espressi o impliciti" (norma UNI EN ISO 8402).

- **Qualità organolettica:** insieme dei caratteri organolettici dell'alimento
- **Qualità nutrizionale**
- **Qualità igienico sanitaria**
- **Qualità tecnologica:** insieme delle proprietà di un alimento che lo rendono idoneo ad un certo processo di tecnologia alimentare

QUALITA' E SICUREZZA

Coniugare il binomio qualità e prezzo

Importanza della tracciabilità della filiera produttiva e della verifica degli effetti sul consumatore

Nutrient & Hazard Analysis of Critical Control Point

I PRINCIPIO

Garanzia del mantenimento del diritto alla salute

II PRINCIPIO

Garanzia della qualità

III PRINCIPIO

Garanzia di una corretta informazione sui prodotti

IV PRINCIPIO

Profitto Etico

L'evoluzione dell' HACCP

direttiva 43/9 Reg. 852/2004

HACCP
identificazione dei punti critici di controllo

NACCP
identificazione dei punti critici di controllo

1. Identificare ogni pericolo da prevenire, eliminare o ridurre
2. Identificare i punti critici di controllo (CCP - Critical Control Points) nelle fasi in cui è possibile prevenire, eliminare o ridurre un rischio
3. Stabilire, per questi punti critici di controllo, i limiti critici che differenziano l'accettabilità dalla inaccettabilità
4. Stabilire e applicare procedure di sorveglianza efficaci nei punti critici di controllo
5. Stabilire azioni correttive se un punto critico non risulta sotto controllo (superamento dei limiti critici stabiliti)
6. Stabilire le procedure da applicare regolarmente per verificare l'effettivo funzionamento delle misure adottate
7. Predisporre documenti e registrazioni adeguati alla natura e alle dimensioni dell'impresa alimentare

Rischio igienico-sanitario:
contaminazione fisica, chimica, microbiologica

Rischio perdita nutriente nella filiera

Identificazione degli NCCP

Analisi ambientali:
Identificazione e valutazione degli aspetti ambientali (diretti e indiretti)
Quantificazione dei fattori d'impatto
Identificazione aree critiche e di vulnerabilità del territorio

Valutazione Impatto Ambientale

VIA

Analisi Agronomiche:
genotipizzazione della cultivar, necessità di fertilizzazione del terreno per richieste nutritive,
tecniche di coltivazione

Analisi Veterinarie:
dati genetici, SNPs per caratteri favorevoli, dati clinico-veterinari, tipologia di stabulazione,
farmaci veterinari

VERIFICA DELLA QUALITA' NUTRIZIONALE

GAP
Good
Agricolture
Pratics

GEP
Good
Environmentale
Pratics

GMP
Good
Manufacting
Pratics

GLP
Good
Laboratory
Pratics

GHP
Good Hygiene
Pratics

GKP
Good
Housekeeping
pratics

GNP
Good Nutritional Pratics

Il Biomarcatore

Misurazioni degli agenti biologici, ambientali, diagnostici, etc., mediante campionamenti allo scopo di determinare il livello di esposizione e studiare l'efficacia delle misure di prevenzione adottate o da adottare

Caratteristiche

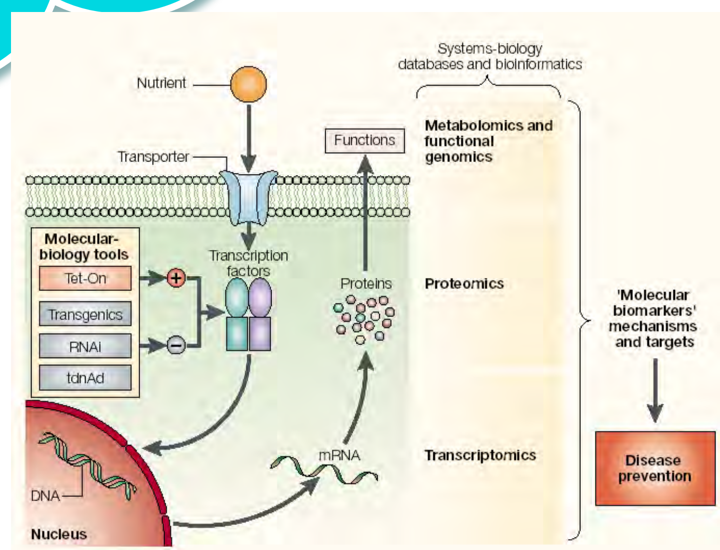
- **Accessibilità**
- **Specificità**
- **Affidabilità**
- **Rappresentatività**
- **Sensibilità**

TIPI DI BIOMARCATORI

Biomarcatori Ambientali (metalli pesanti, diossine etc.)
Biomarcatori Biologici (alghe, batteri, protozoi, etc.)
Biomarcatori Igienico-sanitari (batteri patogeni)
Biomarcatori Nutrizionali (carboidrati, proteine, lipidi)
Biomarcatori Diagnostici (marcatori tumorali)

BIOMARCATORI NUTRIZIONALI CARNE BOVINA

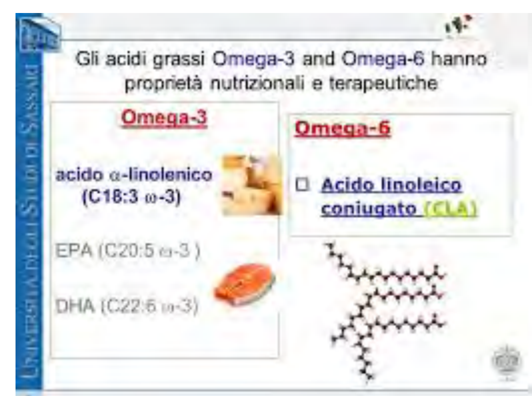
Le principali classi di biomarcatori nutrizionali sono:
- **macronutrienti come proteine, grassi e carboidrati**
- **micronutrienti come Sali minerali, vitamine e antiossidanti**
- **fibre**



CLA

Acido linoleico coniugato

$\Omega 6/\Omega 3$



Gli effetti del Acido linoleico coniugato

Effetti positivi in un intervallo di 3.2-4.2 g/die di CLA.

Infiammazione

- ↑ concentrazioni di mRna IL-10
- ↓ concentrazioni di mRna IL-12
- ↑ superficie di espressioni per i recettori IL-10
- ↑ espressione pERK
- ↑ concentrazione citosolica di NF-kB e IkBa
- ↓ quella nucleare di NF-kB
- ↑ up-regola PPARγ e PPARδ con ↓ infiammazioni al colon mediate da NF-kB

Diabete

- ↑ livelli di proteine delle vie del segnale insulinico GLUT4 e IRS-1
- ↓ espressione di molecole pro-infiam MCP-1, CD68, IL-6 e TNF-α (deriverebbe dalla ↓ diminuzione nel tessuto adiposo del segnale di trasduzione del NF-kB)
- ↓ concentrazioni di mRNA del TNF-α e inverte la down-regulation di GLUT4 e IRS-1 mediata dal TNF-α.
- promuove la sensibilità all'insulina riducendo l'infiammazione del tessuto adiposo

Aterosclerosi

- ↓ livelli plasmatici di trigliceridi
- ↓ infiltrazioni di macrofagi nella lesione con riduzione delle lesioni pre-aterosclerotiche
- ↑ concentrazioni e recettori per PPARγ e PPARα nelle lesioni aterosclerotiche

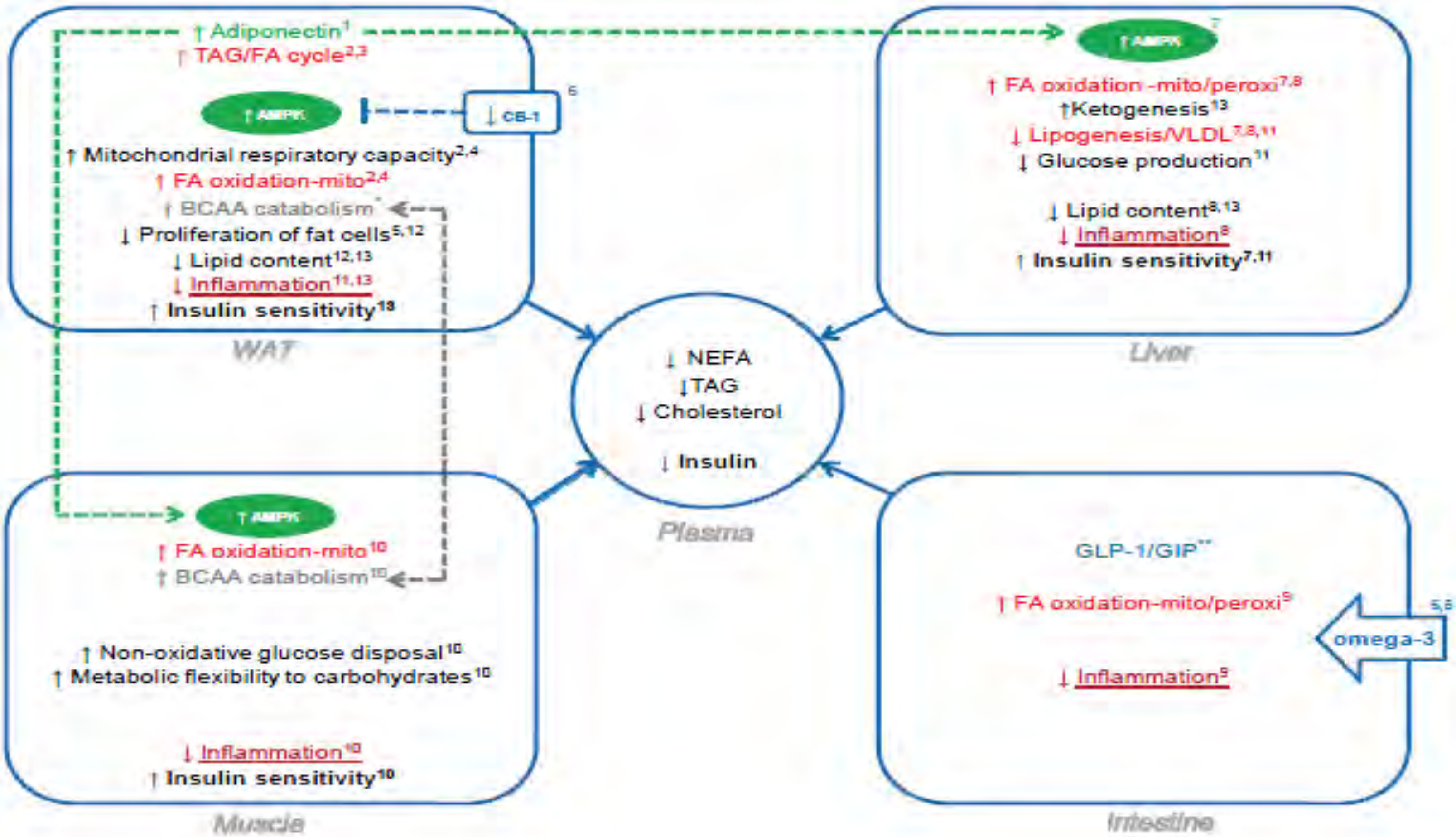
Obesità

- esercita un effetto sui geni ipotalamici che regolano l'appetito, riducendo l'espressione del neuropeptide Y e di proteine/neuro peptidi che aumentano l'introito di cibo
- ↑ termogenesi: up-regola il disaccoppiamento di proteine (UCP) e aumenta l'espressione delle CPT1 coinvolte nell'assorbimento di acidi grassi mitocondriali e catalizza la tappa limitante dell'ossidazione degli acidi grassi.
- ↑ l'espressione di UCP e la β-ossidazione.

Apoptosi

- induce apoptosi nei pre-adipociti
- ↑ livelli di mRNA di geni coinvolti in ISR (risposta allo stress integrata)
- ↑↑↑ attivazione di trascrizione fattore3, CHOP, TRIB3, X-box, GADD34 : arresto della crescita dell' adipocita
- le risposte cellulari allo stress portano a ↑↑ Ca++ intracellulare e del ROS (specie reattive dell'ossigeno) portano all'apoptosi cellulare

Gli effetti sui vari tessuti



Physiol. Res. 63 (Suppl. 1): S93-S118, 2014

REVIEW

The Effect of *n-3* Fatty Acids on Glucose Homeostasis and Insulin Sensitivity

P. FLACHS[1], M. ROSSMEISL[1], J. KOPECKY[1]

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Nutrición Hospitalaria

Nutr Hosp. 2014;30(3):467-477
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Revisión

Contribución de los Ácidos Grasos Omega-3 para la Memoria y la Función Cognitiva

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[1]Departamento de Gastroenterología de la Facultad de Medicina de la Universidad de São Paulo. [2]Laboratorio de Investigación Médica LIM 35 – FMUSP. Brasil.

ELSEVIER

Meat Science

Volume 97, Issue 3, July 2014, Pages 384–394

Advancing Beef Safety through Research and Innovation: Prosafebeef

Review

Enhancing the nutritional and health value of beef lipids and their relationship with meat quality

Nigel D. Scollan[a], Dirk Dannenberger[b], Karin Nuernberg[b], Ian Richardson[c], Siân MacKintosh[a], Jean-Francois Hocquette[d, e], Aidan P. Moloney[f]

Abstract

This paper focuses on dietary approaches to control intramuscular fat deposition to increase beneficial omega-3 polyunsaturated fatty acids (PUFA) and conjugated linoleic acid content and reduce saturated fatty acids in beef. Beef lipid trans-fatty acids are considered, along with relationships between lipids in beef and colour shelf-life and sensory attributes. Ruminal lipolysis and biohydrogenation limit the ability to improve beef lipids. Feeding omega-3 rich forage increases linolenic acid and long-chain PUFA in beef lipids, an effect increased by ruminally-protecting lipids, but consequently may alter flavour characteristics and shelf-life. Antioxidants, particularly α-tocopherol, stabilise high concentrations of muscle PUFA. Currently, the concentration of long-chain omega-3 PUFA in beef from cattle fed non-ruminally-protected lipids falls below the limit considered by some authorities to be labelled a source of omega-3 PUFA. The mechanisms regulating fatty acid isomer distribution in bovine tissues remain unclear. Further enhancement of beef lipids requires greater understanding of ruminal biohydrogenation.

Animal (2014), 8:12, pp 1999–2010
doi:10.1017/S1751731114001955

Inclusion of sunflower seed and wheat dried distillers' grains with solubles in a red clover silage-based diet enhances steers performance, meat quality and fatty acid profiles

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[1]Agriculture and Agri-Food Canada (AAFC), Lacombe Research Centre, 6000 C & E Trail, Lacombe, AB, Canada T4L 1W1; [2]Department of Animal Sciences, Faculty of AgriSciences, Stellenbosch University, P. Bag X1, Matieland 7602, South Africa; [3]Department of Natural Resource Sciences, Thompson Rivers University, Kamloops, BC, Canada V2C 0C8; [4]Agriculture and Agri-Food Canada (AAFC), Lethbridge Research Centre, 1st Avenue South 5403, PO Box 3000, Lethbridge, AB, Canada T1J 4B1

Table 5 *Effects of diet on sensory attributes of meat from yearling steers*

	Dietary treatments					
Sensory attributes	Control	SS	DDGS-15	DDGS-30	s.e.m.	*P*-value
Initial tenderness	6.17^{b}	6.11^{b}	5.94^{b}	6.61^{a}	0.19	0.004
Overall tenderness	6.45^{b}	6.32^{b}	6.23^{b}	6.82^{a}	0.24	0.01
Amount of connective tissue	8.35	8.28	8.36	8.52	0.23	0.09
Initial juiciness	5.54	5.69	5.52	5.47	0.17	0.49
Sustainable juiciness	5.72	5.66	5.70	5.63	0.22	0.81
Beef flavour intensity	5.02	5.13	5.20	5.32	0.17	0.22
Off-flavour intensity	7.38^{bc}	7.13^{c}	7.50^{ab}	7.72^{a}	0.25	0.01

SS = sunflower seed; DDGS-15 = 15% wheat dried distillers' grain with solubles + sunflower seed; DDGS-30 = 30% wheat dried distillers' grain with solubles + sunflower seed.

a,b,c Means with different superscripts for a particular sensory attribute are significantly different (P<0.05).

Attribute scores followed a nine-point descriptive scale for initial and overall tenderness (9 = extremely tender; 1 = extremely tough), initial and sustainable juiciness (9 = extremely juicy; 1 = extremely dry), beef flavour (9 = extremely intense; 1 = extremely bland/none), off-flavour intensity (9 = extremely bland/none; 1 = extremely intense) and residual mouth coating (9 = no mouth coating; 1 = extreme mouth coating).

Table 4 *Effects of diet on l.m. fatty acid profiles of yearling steers*

Variable	Dietary treatments				s.e.m.	P-value
	Control	SS	DDGS-15	DDGS-30		
∑FA (mg/g muscle)	26.5^{c}	27.3^{c}	32.9^{b}	37.4^{a}	0.9	0.04
∑PUFA	5.99	7.16	5.58	5.59	0.75	0.42
∑n-6 PUFA	4.93^{b}	6.32^{a}	4.91^{b}	5.05^{b}	0.50	0.05
18:2n-6	3.56^{b}	4.90^{a}	3.81^{b}	3.96^{b}	0.37	0.02
20:2n-6	0.08	0.06	0.07	0.06	0.01	0.08
20:3n-6	0.39	0.40	0.33	0.35	0.04	0.28
20:4n-6	0.79^{ab}	0.87^{a}	0.63^{bc}	0.57^{c}	0.09	0.02
22:4n-6	0.10	0.08	0.08	0.10	0.01	0.17
∑n-3 PUFA	1.06^{a}	0.84^{b}	0.66^{c}	0.55^{c}	0.06	<0.001
18:3n-3	0.64^{a}	0.50^{b}	0.40^{c}	0.35^{c}	0.03	<0.001
22:5n-3	0.38^{a}	0.31^{b}	0.23^{c}	0.18^{c}	0.03	<0.001
22:6n-3	0.04^{a}	0.04^{a}	0.03^{bc}	0.02^{c}	0.01	0.01
∑CLnA	0.13^{a}	0.12^{ab}	0.10^{bc}	0.09^{c}	0.01	0.01
c9,t11,t15-18:3	0.02^{a}	0.01^{b}	0.01^{b}	0.01^{b}	0.01	0.01
c9,t11, c15-18:3	0.11^{a}	0.11^{a}	0.09^{ab}	0.08^{b}	0.00	0.03
∑AD	0.57^{b}	0.71^{a}	0.76^{a}	0.72^{a}	0.02	<0.001
∑CLA	0.43^{c}	0.64^{a}	0.65^{a}	0.59^{b}	0.02	<0.001
∑MUFA	42.0^{c}	42.3^{bc}	43.8^{ab}	44.7^{a}	0.6	0.01
∑c-MUFA	39.4^{a}	36.8^{b}	38.1^{b}	39.6^{a}	0.6	0.01
c9-14:1	0.50	0.51	0.40	0.48	0.04	0.14
c7-16:1	0.20^{a}	0.17^{b}	0.16^{b}	0.14^{c}	0.01	<0.001
c9-16:1	2.84^{a}	2.62^{ab}	2.23^{c}	2.48^{bc}	0.13	0.01
c9-17:1	0.66^{a}	0.52^{b}	0.49^{bc}	0.48^{c}	0.02	<0.001
c9-18:1	33.4^{a}	30.8^{b}	32.9^{a}	34.1^{a}	0.7	0.01
c11-18:1	0.97^{a}	0.86^{b}	0.75^{c}	0.74^{c}	0.04	<0.001
c12-18:1	0.15^{d}	0.71^{a}	0.56^{b}	0.44^{c}	0.02	<0.001
13-18:1	0.23	0.23	0.22	0.23	0.01	0.57
c14-18:1	0.04^{c}	0.06^{ab}	0.07^{a}	0.05^{b}	0.01	<0.001
c15-18:1	0.11^{c}	0.14^{a}	0.14^{a}	0.13^{b}	0.01	<0.001
c16-18:1	0.03^{b}	0.03^{b}	0.04^{a}	0.04^{a}	0.01	0.02
c9-20:1	0.11^{a}	0.08^{b}	0.08^{b}	0.10^{ab}	0.01	0.04
c11-20:1	0.13	0.12	0.13	0.15	0.01	0.09
∑Trans-18:1	2.58^{c}	5.52^{a}	5.69^{a}	5.06^{b}	0.12	<0.001
t11-/t10-18:1	7.41^{a}	6.05^{b}	5.55^{bc}	5.12^{c}	0.21	<0.001
∑BCFA	2.09^{a}	1.64^{b}	1.60^{b}	1.39^{c}	0.04	<0.001
iso-14:0	0.08^{a}	0.07^{ab}	0.07^{ab}	0.06^{c}	0.01	0.01
iso-15:0	0.24^{a}	0.20^{b}	0.20^{b}	0.15^{c}	0.01	<0.001
anteiso-15:0	0.23^{a}	0.20^{b}	0.19^{b}	0.16^{c}	0.01	<0.001
iso-16:0	0.32^{a}	0.24^{b}	0.22^{b}	0.19^{c}	0.01	<0.001
iso-17:0	0.40^{a}	0.34^{b}	0.32^{b}	0.28^{c}	0.01	<0.001
anteiso-17:0	0.60^{a}	0.44^{b}	0.44^{b}	0.40^{c}	0.01	<0.001
iso-18:0	0.22^{a}	0.15^{b}	0.15^{b}	0.14^{b}	0.01	<0.001
∑SFA	46.2	44.6	45.39	45.0	0.76	0.22
14:0	2.42	2.22	2.08	2.22	0.12	0.21
15:0	0.53^{a}	0.50^{a}	0.46^{b}	0.40^{c}	0.01	<0.001
16:0	26.1^{a}	23.1^{c}	23.3^{c}	24.6^{b}	0.3	<0.001
17:0	1.19^{a}	0.94^{bc}	0.97^{b}	0.89^{c}	0.03	<0.001
18:0	15.6^{c}	17.5^{ab}	18.2^{a}	16.6^{bc}	0.6	0.01
19:0	0.09^{a}	0.07^{b}	0.06^{b}	0.06^{b}	0.01	<0.001
20:0	0.14	0.13	0.13	0.13	0.01	0.40
22:0	0.09	0.10	0.09	0.08	0.01	0.16

SS = sunflower seed; DDGS-15 = 15% wheat dried distillers' grain with solubles + sunflower seed; DDGS-30 = 30% wheat dried distillers' grain with solubles + sunflower seed.

a,b,c,d Means with different superscripts for a particular fatty acid profile are significantly different ($P < 0.05$).

∑FA, total fatty acids in mg/g of meat; ∑PUFA, sum of polyunsaturated fatty acids = ∑n-6 PUFA + ∑n-3 PUFA; ∑n-6 PUFA = sum of 18:2n-6, 20:2n-6, 20:3n-6, 20:4n-6, 22:4n-6; ∑n-3 sum of 18:3n-3, 22:5n-3, 22:6n-3; ∑CLnA, sum of CLnA = c9,t11,t15-, c9,t11,c15-; ∑AD, atypical dienes = sum of t8,c12-, t8,c13-, c9,t12-, t9,c12-, t9,t12-/c9,t13-, c9,c15-, t11,c15-; ∑CLA, CLA = sum of t7,c9-, c9,t11-, t9,t11-, t11,c13-; ∑MUFA, sum of monounsaturated fatty acids = ∑c-MUFA + ∑t-18:1; ∑c-MUFA = sum of c9-14:1, c7-16:1, c9-16:1, c9-17:1, c9-18:1, c11-18:1, c12-18:1, c13-18:1, c14-18:1, c15-18:1, c16-18:1, c9-20:1, c11-20:1; ∑t18:1, sum of trans-18:1 isomers = t6/t7/t8-, t9, t10-, t11-, t12-, t13-t14-, t15-, t16-; t11-/t10-18:1, ratio of t11-18:1 to t10-18:1; ∑BCFA, branched-chain fatty acids = sum of iso-14:0, iso-15:0, anteiso-15:0, iso-16, iso-17:0, anteiso-17:0, iso-18:0; ∑SFA = sum of 14:0, 16:0, 18:0, 20:0; 22:0

Conclusions

Feeding the SS diet as opposed to the control diet had no effect on carcass and meat quality traits but increased growth rates, proportions of *t*-18:1 isomers, AD and CLA isomers with the first double bond from carbon 7 to 10 from the carboxyl end, n-6 PUFA and reduced proportions of n-3 PUFA, CLnA, BCFA, odd-chain SFA and 16:0. Substituting DDGS into the SS diet improved growth performance, carcass traits, meat quality and yielded similar proportions of FA. Feeding a combination of SS and DGGS in RCS-based diets, therefore, presents an opportunity to enhance beef production and quality while maintaining large proportions of healthful FA, especially vaccenic and rumenic acids in beef.

Monitoraggio: valutazione dei rischi

Ad ogni step produttivo, il processo NACCP valuta il rischio di contaminazione con pericolo per la sicurezza del consumatore e il rischio di poter perdere il biomarcatore nutrizionale di interesse. Per capire la gravità è necessario applicare un calcolo del rischio che identifica in maniera univoca tale possibilità e può indirizzare gli operatori del settore all'adozione di specifiche azioni correttive per poter ridurre tale possibilità. Il criterio di analisi del rischio nutrizionale è basato sulla probabilità che una fase, particolarmente delicata, possa far diminuire o perdere la qualità nutrizionale dell'alimento

Rischio (R)= Probabilità (P) x Danno (D)

$$\Sigma R(p_{a,b,c\ldots n+1})$$

P4	4	8	12	16
P3	3	6	9	12
P2	2	4	6	8
P1	1	2	3	4
	D1	D2	D3	D4

R > 8	Azione correttiva immediata
4 ≤ R ≥ 8	Azione correttiva urgente
2 ≤ R ≥ 3	Azione correttiva eseguibile
R = 1	Azione correttiva non necessaria

Valore	Livello	Definizione
4	Pericolo elevato	Totale perdita del biomarcatore nutrizionale. Totale perdita della qualità nutrizionale.
3	Pericolo moderato	Perdita importante del biomarcatore nutrizionale. Parziale perdite della qualità nutrizionale
2	Pericolo lieve	Parziale perdita del biomarcatore nutrizionale. Lieve perdita della qualità nutrizionale
1	Sicurezza	Ridotta perdita del biomarcatore nutrizionale. Lievissima perdita della qualità nutrizionale

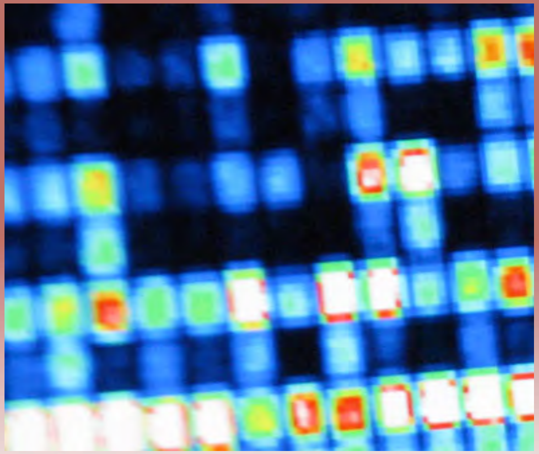
Valutazione Impatto sulla Salute
VIS

Livello 1
Analisi dello Stato Nutrizionale: abitudini alimentari, stile di vita e composizione Corporea

Effetto sul Consumatore

Scelta di un biomarker diagnostico

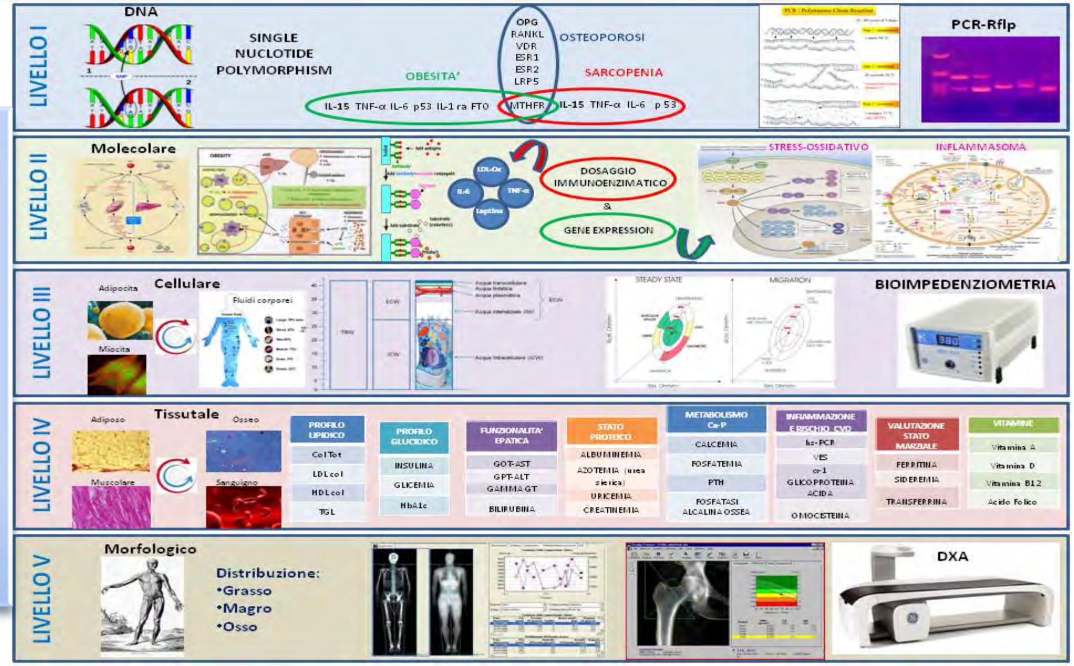
Livello 2
Analisi delle caratteristiche biochimiche: studio del profilo lipidico, glucidico, ossidativo ed infiammatorio



Livello 3
Analisi Nutrigenetiche e Nutrigenomiche

Verifica delle proprietà salutari

Studi scientifici per la valutazione dello stato nutrizionale (composizione corporea, profili biochimici clinici, genetici e genomici)



Antropometria:
- Peso (Kg)
- Statura (cm)
- Circonferenze (cm)

Valutazione della composizione corporea (DXA)
- Massa grassa (Kg)
- Massa magra (Kg)
- Contenuto minerale osseo (Kg)

Analisi biochimico clinica:
- Profilo lipidico, glucidico, infiammatorio, …

Dispendio energetico:
Calorimetria indiretta
harmband

Analisi genetica:
Polimorfismi genetici
Espressione genica

Critical role for peptide YY in protein-mediated satiation and body-weight regulation

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Summary

Dietary protein enhances satiety and promotes weight loss, but the mechanisms by which appetite is affected remain unclear. We investigated the role of gut hormones, key regulators of ingestive behavior, in mediating the satiating effects of different macronutrients. In normal-weight and obese human subjects, high-protein intake induced the greatest release of the anorectic hormone peptide YY (PYY) and the most pronounced satiety. Long-term augmentation of dietary protein in mice increased plasma PYY levels, decreased food intake, and reduced adiposity. To directly determine the role of PYY in mediating the satiating effects of protein, we generated *Pyy* null mice, which were selectively resistant to the satiating and weight-reducing effects of protein and developed marked obesity that was reversed by exogenous PYY treatment. Our findings suggest that modulating the release of endogenous satiety factors, such as PYY, through alteration of specific diet constituents could provide a rational therapy for obesity.

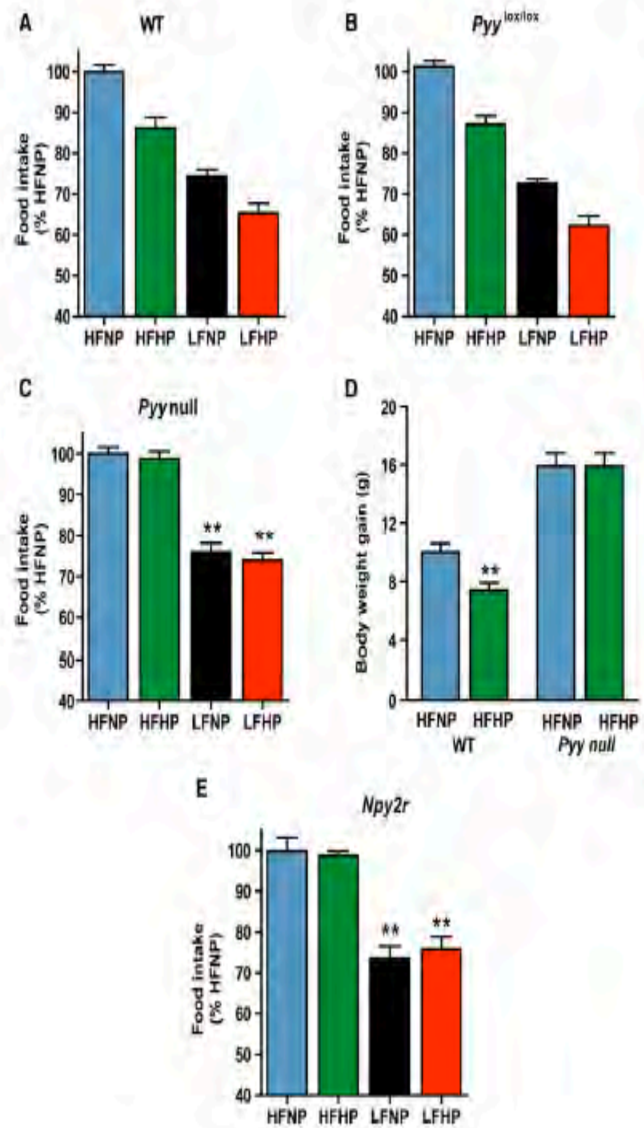

Figure 6. *Pyy* null mice resist the satiating effects of protein

For all panels: high-fat normal-protein (HFNP: blue bar), high-fat high-protein (HFHP: green bar), low-fat normal-protein (LFNP: black bars), and low-fat high-protein (LFHP: red bars). Food intake is expressed as a % of intake of the HFNP diet.

A) 24 hr cumulative food intake of different diets following an overnight fast in 8-week-old female wt mice, n = 18 per diet group; all diets are significantly different from each other, $p < 0.05$.

B) 24 hr cumulative food intake of different diets in 8-week-old female *Pyy*$^{lox/lox}$, n = 12 per diet group; all diets are significantly different from each other, $p < 0.05$.

C) Total 24 hr cumulative food intake of different diets following an overnight fast in 8-week-old female *Pyy* null mice. n = 17 per group, ** $p < 0.01$, high-fat diets versus low-fat diets.

D) Body weight gain in male wt and *Pyy* null mice with ad libitum access to HFNP or HFHP diets for 8 weeks, n = 8 per group, **$p < 0.01$, HFNP versus HFHP.

E) 24 hr cumulative food intake of different diets following an overnight fast in 8-week-old female *Npy2r* null mice, n = 12 per diet group, **$p < 0.01$ high-fat diets versus low-fat diets. All data presented are mean ± SEM.

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ELSEVIER

Inclusion of red meat in healthful dietary patterns

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ABSTRACT

Dietary patterns are an important concept in dietary recommendations. The Western pattern is most commonly defined as a diet characterized by high intakes of refined grains, sugar and red meat, and has been shown to be associated with increased risks for certain types of cancer, coronary heart disease, diabetes, and obesity. However, isolating the independent effects of individual foods on health outcomes is central to helping individuals choose foods to build healthier dietary patterns to which they can adhere. Red meat is a popular source of high quality protein and provides a variety of essential nutrients that improve overall diet quality. It is also a source of saturated fatty acids, which observational evidence suggests are associated with heart disease, although recent data challenge this. Several studies have shown that lean red meat can be successfully included in recommended heart-healthy dietary patterns without detriment to blood lipids. Furthermore, increased dietary protein has been shown to promote healthy body weight and composition, in part by increasing satiety, and to improve vitality and stamina.

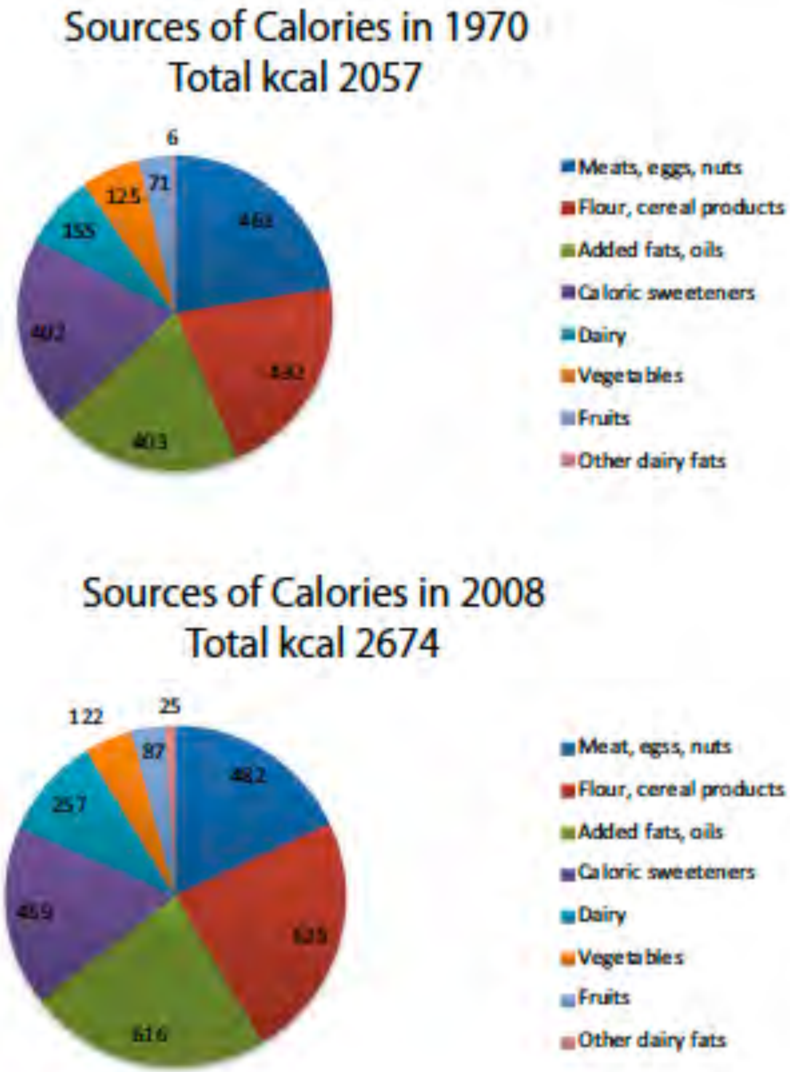

Fig. 1. Shifts in calorie sources in the United States*. *Values reported on figures are kcal. Adapted from 2010 Dietary Guidelines for Advisory Committee Report.

Weighted average of individual study differences (beef vs. poultry/fish): 1.8 mg/dL (-1.0, 4.5 mg/dL); $p = 0.206$

Fig. 2. Meta-analysis results of the effects of beef or poultry/fish consumption on LDL-C*. *Circle sizes are proportional to the weights used in the meta-analysis, and the lines indicate 95% confidence intervals (CI). The diamond represents the summary measure (mean and 95% CI) for the lipoprotein lipid impacts of beef or poultry/fish consumption. I^2 (beef) = 42.0%, p = 0.01; I^2 (poultry and/or fish) = 36.9%, p = 0.003.
Taken from: Maki 2012. Permission granted for re-use.

Table 4
Mean nutrient intakes and percentage of total nutrient intake contributed by total beef and lean beef in adults 51 + years of age (n = 6243): NHANES 1999–2004[a].
Adapted from Zanovec et al., 2010.

51 + years	Total beef		Lean beef	
	Mean (SEM)	%	Mean (SEM)	%
Food energy, kJ	395.2 (13.0)	4.98	293.5 (10.0)	3.70
Protein, g	10.05 (0.34)	13.71	10.05 (0.34)	13.71
Carbohydrate, g	0.0 (0.0)	0.00	0.0 (0.0)	0.00
Total fat, g	5.70 (0.19)	7.81	3.01 (0.10)	4.12
SFA, g	2.18 (0.07)	9.33	0.84 (0.03)	3.59
MUFA, g	2.48 (0.08)	9.16	1.35 (0.05)	4.99
PUFA, g	0.21 (0.01)	1.35	0.10 (0.01)	0.66
Cholesterol, mg	32.5 (1.1)	12.14	29.5 (1.0)	11.04
Micronutrient intakes that are the same in total beef and lean beef				
Vitamin A, µg RAE		0.0 (0.0)		0.00
Vitamin C, mg		0.0 (0.0)		0.00
Thiamin, mg		0.025 (0.001)		1.64
Riboflavin, mg		0.078 (0.003)		3.83
Niacin, mg		1.82 (0.06)		8.56
Vitamin B6, mg		0.132 (0.004)		7.49
Total folate, µg		3.37 (0.11)		0.90
Vitamin B12, µg		0.99 (0.03)		19.73
Calcium, mg		5.72 (0.18)		0.74
Phosphorous, mg		78.0 (2.6)		6.53
Magnesium, mg		8.7 (0.3)		3.24
Iron, mg		0.98 (0.03)		6.66
Zinc, mg		2.23 (0.08)		20.42
Sodium, mg		32.8 (1.9)		1.07
Potassium, mg		126.7 (4.4)		4.71

Abbreviations: MUFA = monounsaturated fatty acids; NHANES = National Health and Nutrition Examination Survey; PUFA = polyunsaturated fatty acids; RAE = retinol activity equivalents; SEM = standard error of the mean.
[a] Data are presented as sample-weighted means ± SEM and percentages using PROC DESCRIPT of SUDAAN. Mean total and lean beef intake was 37.1 ± 1.2 and 34.4 ± 1.2 g, respectively. Lean beef was defined by MyPyramid Equivalents Database as beef that contains no more than 9.28 g of total fat/100 g total beef (after cooking).

Table 2
Lipid results from the Beef in Optimal Lean Diet (BOLD) study.
Adapted from Roussell et al., 2012.

	Healthy American Diet	DASH Diet	BOLD Diet	BOLD + protein Diet
	Mean (SEM)			
Total-C, mg/dL	203 (3.5)	192 (3.5)	193 (3.5)	192 (3.5)
LDL-C, mg/dL	133 (3.1)	124 (2.7)	125 (2.7)	125 (2.7)
HDL-C, mg/dL	51 (1.9)	47 (1.5)	48 (1.5)	48 (1.5)
Non-HDL-C, mg/dL	150 (2.7)	143 (3.1)	143 (3.1)	141 (2.7)
Triglycerides, mg/dL	94 (5.3)	96 (5.3)	93 (6.2)	88 (4.4)

Abbreviations: DASH = Dietary Approaches to Stop Hypertension; HDL-C = high-density lipoprotein cholesterol; LDL-C = low-density lipoprotein cholesterol; Non-HDL-C = non-high-density lipoprotein cholesterol; SEM = standard error of the mean; Total-C = total cholesterol; TG = triglycerides.

8. Conclusions

Generally, U.S. dietary guidance has implied or directly recommended reducing red meat intake, primarily citing its SFA content as a reason for doing so. However, a broader examination of the science reveals the benefits of including lean red meat, as an important source of high quality protein and essential nutrients, in a wide variety of dietary patterns for cardiovascular health, achieving and maintaining a healthy body weight and composition, and improving vitality and stamina.

The role of reducing intakes of saturated fat in the prevention of cardiovascular disease: where does the evidence stand in 2010?[1–4]

Arne Astrup, Jørn Dyerberg, Peter Elwood, Kjeld Hermansen, Frank B Hu, Marianne Uhre Jakobsen, Frans J Kok, Ronald M Krauss, Jean Michel Lecerf, Philippe LeGrand, Paul Nestel, Ulf Risérus, Tom Sanders, Andrew Sinclair, Steen Stender, Tine Tholstrup, and Walter C Willett

ABSTRACT

Current dietary recommendations advise reducing the intake of saturated fatty acids (SFAs) to reduce coronary heart disease (CHD) risk, but recent findings question the role of SFAs. This expert panel reviewed the evidence and reached the following conclusions: the evidence from epidemiologic, clinical, and mechanistic studies is consistent in finding that the risk of CHD is reduced when SFAs are replaced with polyunsaturated fatty acids (PUFAs). In populations who consume a Western diet, the replacement of 1% of energy from SFAs with PUFAs lowers LDL cholesterol and is likely to produce a reduction in CHD incidence of ≥2–3%. No clear benefit of substituting carbohydrates for SFAs has been shown, although there might be a benefit if the carbohydrate is unrefined and has a low glycemic index. Insufficient evidence exists to judge the effect on CHD risk of replacing SFAs with MUFAs. No clear association between SFA intake relative to refined carbohydrates and the risk of insulin resistance and diabetes has been shown. The effect of diet on a single biomarker is insufficient evidence to assess CHD risk. The combination of multiple biomarkers and the use of clinical endpoints could help substantiate the effects on CHD. Furthermore, the effect of particular foods on CHD cannot be predicted solely by their content of total SFAs because individual SFAs may have different cardiovascular effects and major SFA food sources contain other constituents that could influence CHD risk. Research is needed to clarify the role of SFAs compared with specific forms of carbohydrates in CHD risk and to compare specific foods with appropriate alternatives. *Am J Clin Nutr* 2011;93:684–8.

1) The specific macronutrient sources of energy to which SFAs are compared and the possibility that the replacement of SFAs with *trans* fats or highly processed refined carbohydrates could have little positive effect or even an adverse effect
2) Whether specific SFAs have different relations with CHD risk
3) Whether advice should focus more on the major food sources of SFAs because they may contain high amounts of protein, calcium, and other components that also influence the risk of CHD, so the effect of particular foods on CHD cannot be predicted solely by their content of SFAs
4) Whether the effect of replacing SFAs with carbohydrate has changed over time as populations have become more obese

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Specific research issues

1) Foods and dietary patterns in relation to CVD endpoints and risk factors
2) Thorough evaluations of the effects of modified oils rich in stearic fat or other fatty acids as a replacement for cholesterol-raising SFAs
3) Intervention studies to assess the effects of short-chain and medium-chain (4:0–10:0) SFAs on CVD risk
4) Prospective cohort studies from different countries; country-specific data for making dietary recommendations
5) Pooling studies across multiple cohorts conducted in different populations
6) Biological interactions between insulin resistance, reflected by obesity and physical inactivity, and carbohydrate quality and quantity
7) The effects of early-life nutrition, especially different types of fatty acids, on developmental programming with respect to future risk of type 2 diabetes and CVD
8) Biomarkers of SFA-rich food intake (eg, 15:0, 17:0, and 14:0) for use in intervention studies to assess the effect of dairy foods on health outcomes, although there is also a need for better biomarkers that allow distinction of dairy foods from beef and lamb
9) Evaluation of the effect of dietary recommendations on eating behaviors and disease risk in the population
10) Translation of nutrient-based recommendations to food-based recommendations
11) The effects of food labeling, taxation, and global trade on diets

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Red meats: Time for a paradigm shift in dietary advice

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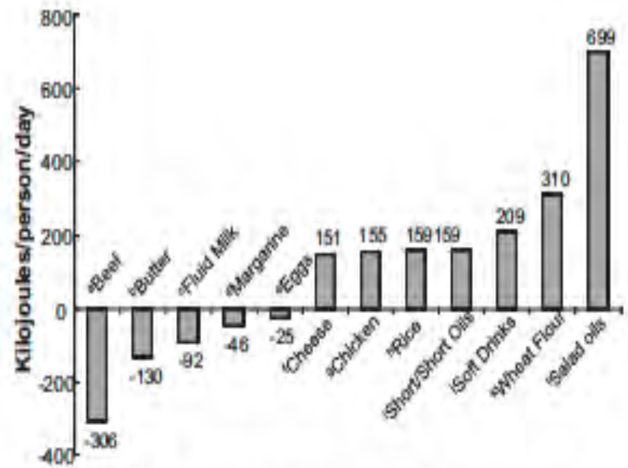
ABSTRACT

Recent evidence suggests dietary advice to limit red meat is unnecessarily restrictive and may have unintended health consequences. As nutrient-rich high quality protein foods, red meats can play an important role in helping people meet their essential nutrient needs. Yet dietary advice to limit red meat remains standard in many developed countries, even though red meat intakes appear to be within current guidelines. Meanwhile, energy intakes from processed foods have increased dramatically at the expense of nutrient-rich foods, such as red meat. Research suggests these food trends are associated with the growing burden of obesity and associated diseases in recent decades. It is time for dietary advice that emphasizes the value of unprocessed red meat as part of a healthy balanced diet.



[a]Beef: all beef for human consumption including veal
[b]Butter: butter only
[c]Fluid milk: standard milk (3.25%), buttermilk, partly skimmed 1% and 2% milk, skim milk, chocolate drink.
[d]Margarine: margarine only
[e]Eggs: chicken eggs
[f]Cheese: cheddar, variety cheeses, processed cheese (excludes cottage cheese)
[g]Chicken: all chicken for human consumption including stewing hens
[h]Rice: all human food types of rice and wild rice
[i]Shortening and shortening oils: shortening and oils used to produce solid shortening products
[j]Soft drinks: carbonated soft drinks, mineral waters and aerated waters containing sugar or sweetener, or flavoured.
[k]Wheat flour: all wheat flour for human consumption
[l]Salad oils: liquid vegetable oils

Source: Slater, J et al. (2009) The growing Canadian energy gap: more the can than the couch? *Public Health Nutrition*, 12, 2216–2224

Fig. 1. Major foods contributing to net per capita energy availability (1976–2003) Statistics Canada, Agriculture Division (2004).

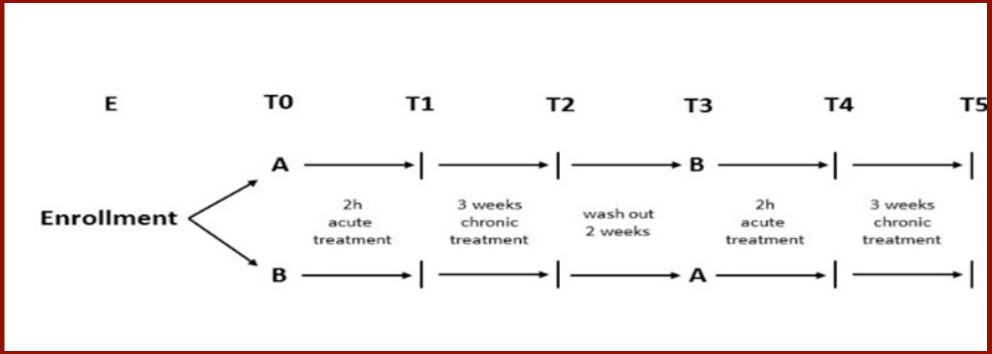
Valutazione Impatto sulla Salute-VIS

LO STUDIO

Studio cross-over randomizzato

Miglior approccio per studi d'intervento (Kaput, 2008)

A norma dell'Allegato I Reg. 353/2008

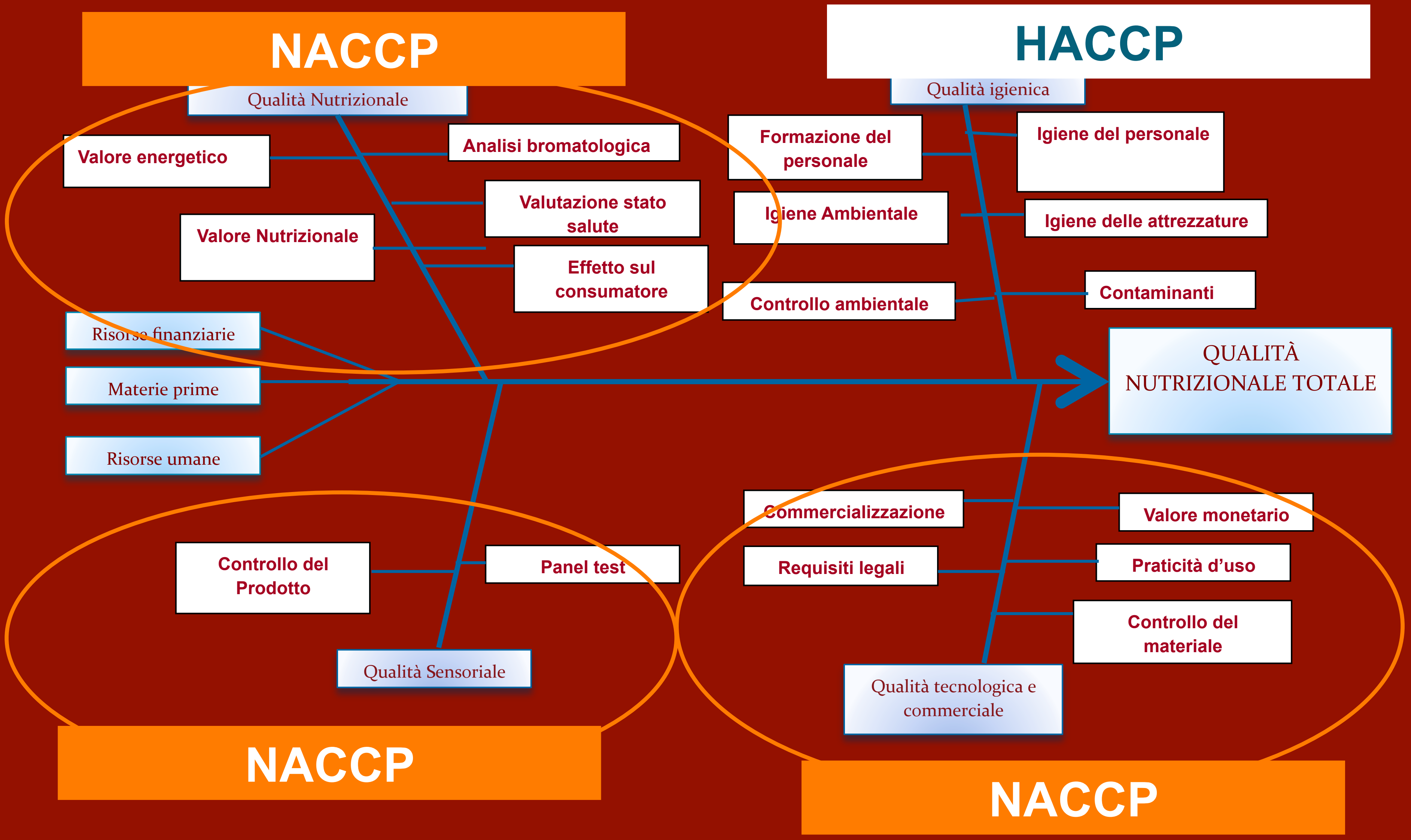


ClinicalTrials.gov

METHODOLOGY Open Access

Food safety and nutritional quality for the prevention of non communicable diseases: the Nutrient, hazard Analysis and Critical Control Point process (NACCP)

Laura Di Renzo[1*], Carmen Colica[2], Alberto Carraro[1], Beniamino Cenci Goga[3], Luigi Tonino Marsella[4], Roberto Botta[5], Maria Laura Colombo[6], Santo Gratteri[7], Ting Fa Margherita Chang[8], Maurizio Droli[8], Francesca Sarlo[9] and Antonino De Lorenzo[1,10]



Ministero delle politiche agricole alimentari e forestali

PIANO DI SETTORE DELLA FILIERA DELLE PIANTE OFFICINALI 2014-16

Tavolo Tecnico del Settore piante officinali – Istituito con D.M. 15391 del 10 dicembre 2013
http://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/7038

Gruppi di Lavoro del Tavolo Tecnico del Settore piante officinali - Istituito con D.D. 66563 del 20 dicembre 2013
http://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/7064

6.1.19 Obiettivo - migliorare la competitività del settore attraverso l'adozione e lo sviluppo di un processo innovativo per l'analisi e la sorveglianza nutrizionale e igienico-sanitaria, denominato sistema di analisi dei punti critici di controllo della qualità salutare e nutrizionale delle piante officinali (NACCP, Nutrient Analysis of Critical Control Point), con innovazioni tecnologiche, di processo, organizzative e gestionali.

Azione - Sviluppare e/o utilizzare metodi analitici innovativi per la valutazione della qualità e sicurezza del prodotto; stabilire i punti e i limiti critici che debbono essere osservati per assicurare che ogni punto critico della filiera fino al consumatore sia sotto controllo, per minimizzare la probabilità che si abbia una riduzione dei valori qualificanti dei parametri di qualità; stabilire dei sistemi di monitoraggio; identificare i marcatori quali-quantitavi specifici del prodotto; valutare le proprietà del prodotto; identificare e quantificare le componenti; valutare l'impatto della qualità sulla salute dei consumatori.

PIANO STRATEGICO PER L'INNOVAZIONE E LA RICERCA NEL SETTORE AGRICOLO ALIMENTARE E FORESTALE

AREA 4 - Qualità, tipicità e sicurezza degli alimenti e stili di vita sani

4.a Produzione di alimenti di qualità per tutti

Descrizione

Alimenti igienicamente sicuri (*food safety*), nutrienti e gradevoli dovrebbero essere disponibili per tutta la popolazione (*food security*). Cambiamenti nelle abitudini alimentari, nelle tecnologie (es. intensificazione delle pratiche agricole) e sociali (es. globalizzazione dei mercati, incremento demografico senile) sono le principali cause che ciclicamente favoriscono l'emergenza e ri-emergenza di problemi igienico-sanitari. Il rischio può essere variamente ascritto a fattori biotici (es. microrganismi, virus) e abiotici (es. sostanze chimiche), evidenziando che, oltre il 70% delle patologie legate al consumo di alimenti, ha carattere di zoonosi. La sicurezza igienico-sanitaria è un diritto e, nello stesso tempo, un problema economicamente rilevante e dinamico. Essa richiede un'evoluzione nell'approccio e nelle tecniche analitiche per il monitoraggio e controllo, partendo dai siti di produzione e dai prodotti primari, attraverso la Valutazione dell'Impatto Ambientale (VIA) fino alla Valutazione dell'Impatto sulla Salute (VIS), così da individuare non solo potenziali rischi, ma anche le "cause delle cause".

Come procedura innovativa di monitoraggio nutrizionale, è auspicabile lo sviluppo di un sistema di controllo che consideri la tracciabilità del nutriente (*Nutrient Analysis of Critical Control Point*, NACCP), attraverso la messa a punto di nuovi metodi analitici, biomarcatori quali- e quanti-tativi, e la realizzazione di una piattaforma multidisciplinare.