«Agricoltura biologica: nutrizione e salute»
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crea
Consiglio per la ricerca in agricoltura
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Flavio Paoletti

Centro di ricerca per gli alimenti e la nutrizione

Research Centre for Food and Nutrition

Rome, Italy

Why the interest in comparative studies on chemical and nutrient composition?

Some factors that discriminate between organic and conventional methods, such as

- plant growing method (fertilization, soil management, cultivation procedures)
- plant defense
- animal rearing system
- animal feeding

can affect

chemical and nutrient content and composition

A main problem in comparative studies is the variation in outcomes

- fertilization type and amount
- maturity stage at harvest
- plant age
- climate conditions
- soil characteristics
- sunlight exposure
- cultural procedures
- ……..

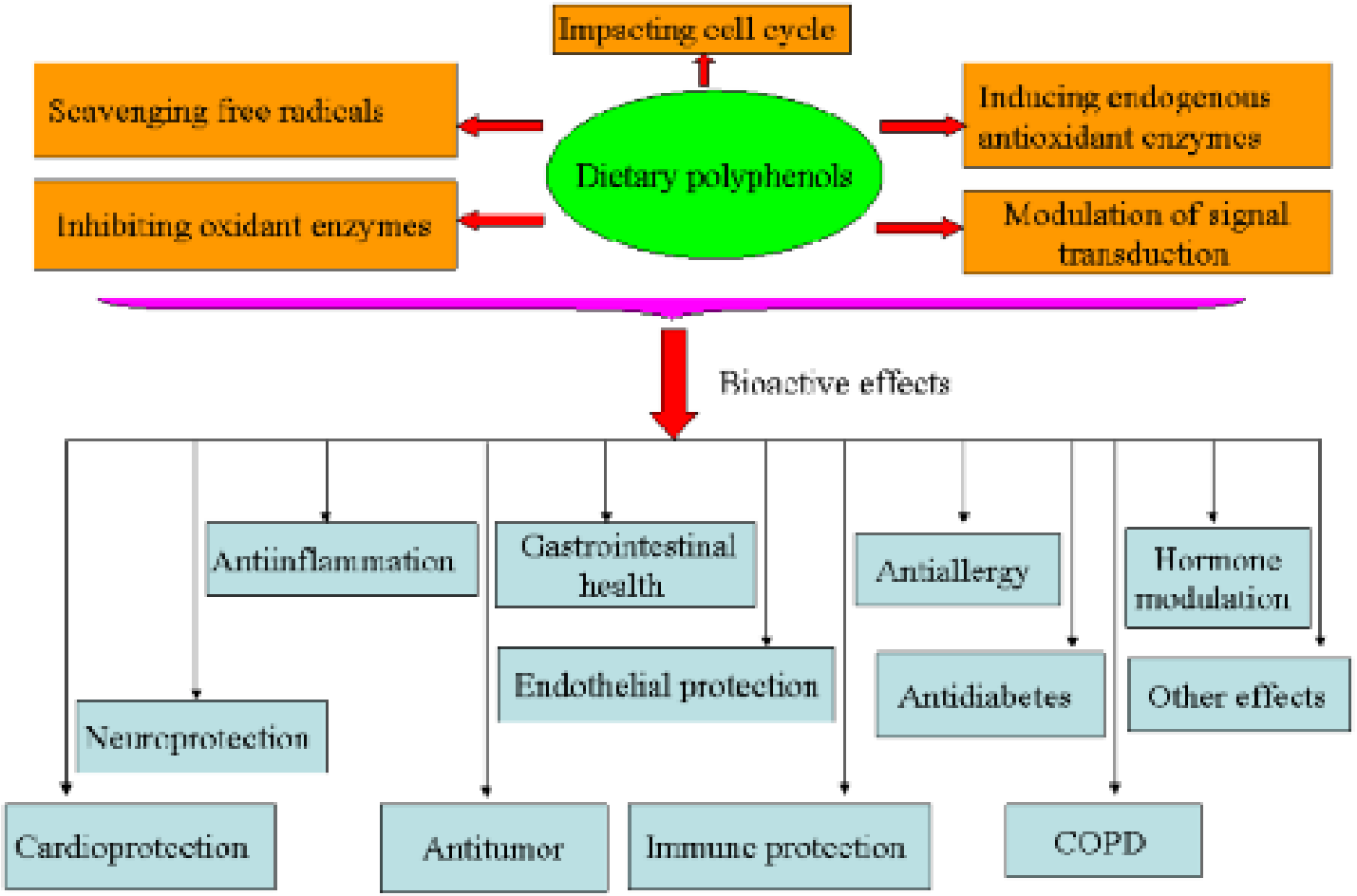
to draw conclusions
is a difficult task

Meta-analysis helps

organic vs. conventional

+ ascorbic acid
+ phenolic compounds
- protein
+ ω-3 fatty acids
+ conjugated linoleic acid

The potential effects of phenols on human health are known, ….



…., but …

……. *chemical and nutrient composition may provide only indications for possible health effects*

- Plant physiologists estimate the plant world to contain up to 75,000 or even 100,000 different compounds that act synergistically
- The way in which compounds are absorbed by an organism, has to be considered. Bioavailability
- Compounds are components of a food matrix
- Foods can be prepared for consumption
- It is not predictable how an individual will react to a food product

Studies that measure factual effects of food/diet are needed

Types of studies to analyse the effects of organic products (single food or diet) on health

Intervention studies on humans
In this study design as many factors as possible need to be controlled for a group of people and only the food under study is clearly varied in order to make possible effects become visible. Health effects will be measured using «biomarkers»

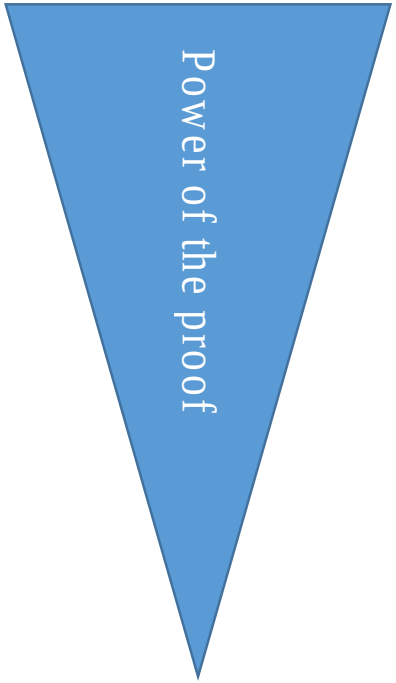
Intervention studies on animals
In such experiments laboratory animals are fed organically or conventionally grown feeds, and selected physiological parameters reflecting measurements of health status are analysed.

Observational (or epidemiological) studies
A large group of people is studied using questionnaires, usually supplemented with some measurements in a smaller part of the group. Investigations can look back at eating habits in the past («retrospective») or follow a group from a certain moment into the future («prospective») Questions need to address many more factors than food, e.g. life-style, social status, etc.

In vitro studies
This type of research aims at describing the effects of experimental variables on the organism's constituent parts (e.g., organs, tissue or cell cultures, etc.) in a controlled environment outside the organism (test tuber, Petri dishes)

Scientific value of different type of studies

Study design	*Examples*
Intervention studies	*Controlled studies in humans*
Observational or epidemiological studies	*Prospective cohort studies*
	Retrospective cohort studies
Intervention studies	*Controlled studies in animals*
Supportive studies	*Bioavailability studies*
	In vitro studies



Da: Huber M. et al., NJAS – Wageningen Journal of Life Sciences (2011), 58, 103-109

There is still much to be done

Too few studies are currently available to draw the conclusion that health benefits can result from the consumption of organic foods.

- Compositional data from comparative studies to get more info about the relation between cultivation procedures and nutritional content
- Intervention studies on humans: to define specific biomarkers for the expected effects.
- Observational studies to confirm health effects within a large population
- In vitro models: to individuate/elaborate mechanisms by which organic foods might influence health studies

Food choice

E. Kesse-Guyot, S. Péneau, C. Méjean, F. Szabo, P. Galan, S. Hercberg, D. Lairon

Profiles of organic food consumers in a large sample of French adults: results from the Nutrinet-Santé Cohort Study

***PlosOne, October 2013**: doi 10.1371/journal.pone.0076998*

54.311 subjects (>18 years)

Questionnaire:

- opinions about organic foods (price, quality, taste, impact on health and environment)
- *frequency of use/consumption of 16 foods*

- *Consumption of food products*
- *Nutrient intake (calculated through composition tables)*
- *Calculation of a score of adherence to nutritional recommendations*
- *Anthropometric measurements*

5 groups of consumers individuated:

- regular organic food consumers
- occasional organic food consumers
- non-organic food consumers (avoidance, too expensive, no interest)

Compared to non organic food consumers, regular organic food consumers showed:

- higher educational level
- less smoking
- more physical activity

} ***healthier life-style***

Income levels were comparable among the consumer groups

Regular organic consumers showed a better dietary pattern:
• higher consumption of fruit, vegetables, legumes, vegetable oils, whole cereals (higher fiber intake)
• lower consumption of sweet soft drinks, alcoholic beverages, neat products, meat, milk and dairy products

Better fitting food-based and nutritional recommendations

Lower incidence of over-weight and obesity

In the near future:
- ❑ presence of pesticide residues in urine will be analyzed;
- ❑ the relation between organic food consumption and markers of the health status will be studied

Thanks for the attention