



*Institute of Food Research*

# Fruit and Vegetables: Health perspectives

Sue Southon



# Definition of a scientist...

...someone who knows more and more about less and less

- The history of nutrition has been the history of the role of individual food components in human health
  - Foods are dissected into their component parts
  - The biochemistry of each part is investigated and
  - A biological role ascribed



# On the positive side

Catalogued symptoms

Devised clinical tests to detect them

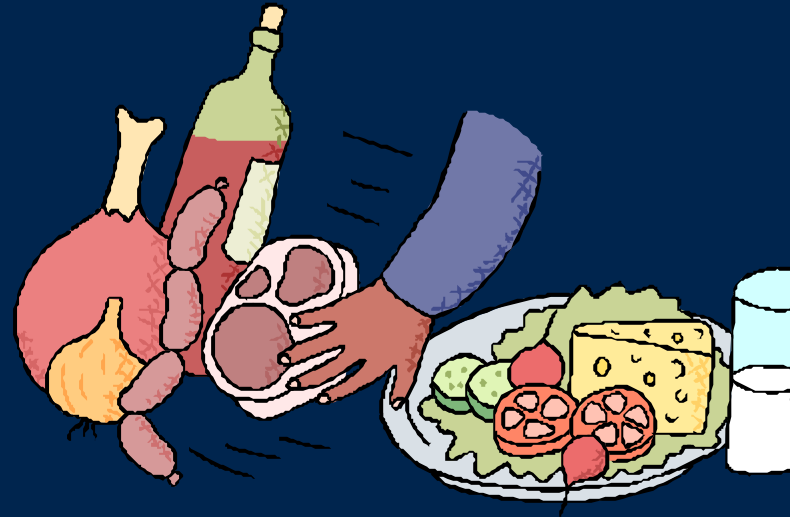
Formulated remedies to cure them.



# On the negative side

Lost an appreciation of...

- ... the qualities of whole foods
- ... that diet is more than the sum of its parts



- Researchers have developed a large dose of researcher bias
- Funds for nutrition research have been directed to Nutraceutical research
- Healthy eating messages have become focused on compounds not foods

# Adequate nutrition versus optimal health



- Nutrients and non-nutrients
- Role: essential for life or important for supporting health?

- The impact of optimal nutrition on public health is questionable



WHY?

# Endpoint and Intervention

- **Clinical deficiency**

- Corrected in relatively short periods of time

- **Optimum nutrition**

- Long-term response
- Intervention trials usually short-term/ high dose studies
- Using early biomarkers of disease as an end-point
- The relationship between biomarkers and disease are unclear

# Synergism

Clinical deficiency is related to single compounds but the key to optimal health lies in complex foods

Foods contain a bewildering array of compounds each with a part to play in human health

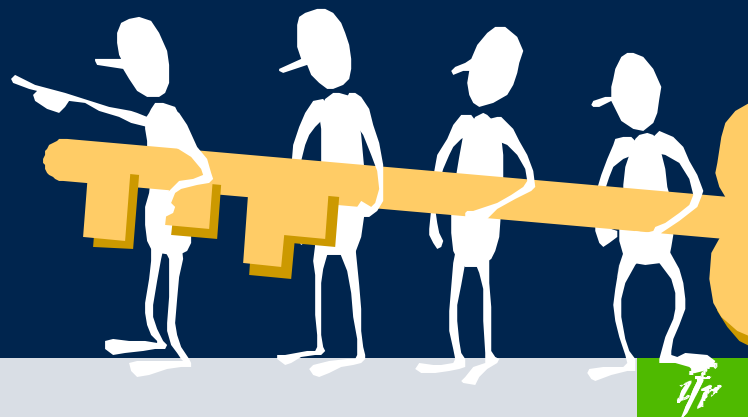
Some may be deleterious

Some may overcome the adverse effects of others

Some may be beneficial in their own right

Complex foods may have different affects than 'compounds'.

Whole diets may have different affects than 'foods'.



# "Eat up your greens..."



- Fruits & vegetables are good for you
  - Strong epidemiological evidence for benefits
  - Higher consumption of a range of fruits vegetables in many different social and cultural settings is associated with better health
- Many biologically active substances
  - Nutrients and non-nutrients
  - May be involved in reducing cancer, CV disease, stroke, diabetes, cataracts, arthritis, memory deficit, inflammatory bowel

# Active ingredients?

Vitamins C and E

Folic acid

Carotenoids

Calcium, selenium and other trace minerals

Dietary fibre including resistant starch

Dithiolthiones

Glucosinolates

Indoles

Isothiocyanates and thiocyanates

Coumarins, flavonoids, phenols,  
isoflavones, saponins & plant sterols

Allium compounds

Limolene



## Mechanism?

- Regulate detoxifying enzymes
- Prevention of DNA damage
- Stimulate DNA repair enzymes
- Improve immune response
- Decrease inflammatory response

# Controlled versus real data?

Controlled model systems – compound effects

Introduce the human – little response or adverse response

Changing the diet to include larger amounts of fruits and vegetables has resulted in response where none seen for individual component



# Eat up your greens, reds, oranges & yellows.

- Most beneficial effect to be derived from amount and variety
- Ensures a spread of intake of all the minerals, vitamins etc.
- Not new thinking – fruit and vegetables have been pivotal to the human diet since our early ancestors



# Modern agriculture – modern disease?

Cereals have displaced fruits and vegetables in the diet

- Contribute 40-90% of human calorie requirement
- No primates other than humans ordinarily consume cereal grain

Humans are the only free-living species to consume:

- A profusion of commercially prepared foods, of obscure origin, which contain salt, refined flour, sugar or corn sweeteners and process induced fatty acids at extraordinary concentrations
- More sodium than potassium

Humans are the only free-living species to:

- Experience Increased blood pressure with increasing age
- Develop hypertension
- Have a blood cholesterol concentration double that of our nearest primate relatives

# Energy: Availability and Expenditure

Unprecedented availability of food energy



- Minimal expenditure in its procurement

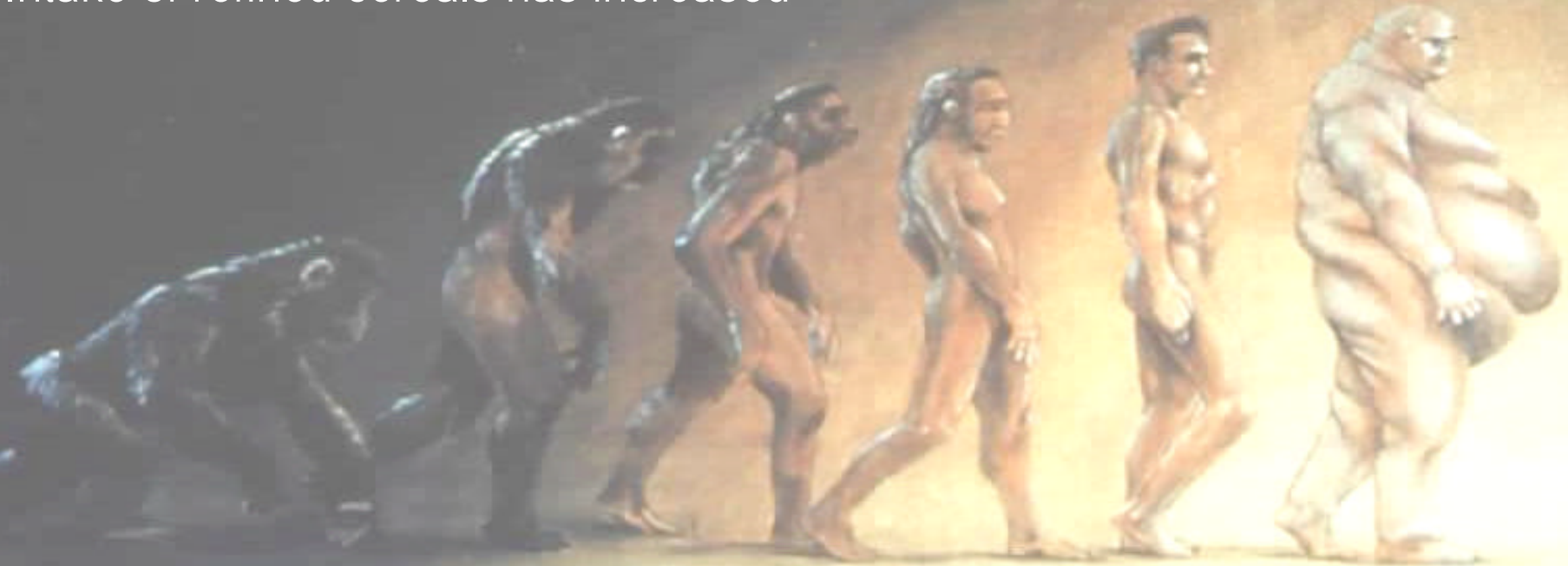
# The rise and fall ...

The rise of agriculture and industry has allowed easy access to food

Science and technology have allowed the formulation of foods and food ingredients that pander to love of salt, sweet and fatty foods

Our intake of fruits and vegetables has plummeted

Intake of refined cereals has increased



# Too little, too late?

Very little resource is directed towards longer-term experimental studies of whole foods

In truth such studies are very difficult to plan and undertake

- Do not fit comfortably within the normal 1- 3 year funding of research
- Require the concerted effort of a number of different disciplines and organisations
- Do not attract industry funding because the study does not focus on a single “commodity”
- Little scientific glory or merit attached to their conduct

- Eat "at least five portions of fruit and vegetables a day"
  - Web-sites and leaflets and educational material & campaigns
- Evidence from European surveys show that everyone knows that they should eat more fruits and vegetables
- Vegetable consumption fell by 7% (2001-2002)
- Predicted that fruit consumption is likely to increase slightly but vegetable consumption will probably decline further



# Failure of the nutrition message (?)

- The message is getting through BUT
- Enticed by high budget promotions to eat other foods of higher market value
- Surrounded by food outlets selling foods we are asked to eat less of

F&V campaigns have probably slowed declining consumption

Reversing the trend – when what the consumer wants to eat is different from what the consumer needs to eat – is the problem

# Political will and consumer awareness

Governments and agencies are more concerned with microbiologic and chemical food safety than diet and health

Disability and death from such causes is relatively trivial compared diet-induced ill-health

Emphasis on food safety is because of consumer outcries about BSE, food poisoning, GM, use of pesticides etc

Food safety issues are more acute and probably more sensationally reported by the media

Consumer is more aware and more nervous of food safety, and expects something to be done

**Healthy diet is not headline news!!**

# Diet must have the same high profile

- Poor marketing
  - Healthy diet
  - Fruit and vegetables
- Lack of will (or power)
  - agencies encourage people to eat more fruits and vegetables but...
  - ... allow a food retail sector that surrounds people with high-fat, high salt, high sugar foods
  - Alternatives are not offered
  - Temptation is promoted
- Unrealistic health targets (not supported with process)
- Get serious!

# Votes that count

Pressure groups are more effective than individuals

Scientists have confused the consumer (and the government) and lost their trust

Science needs to communicate more effectively with society at large!

