Nutrition and Aging
The perennial search for eternal life and youth

(550 BC) Empedocles & the Blessed Laurel
(500 BC) Hyppocrates and the benefits of “farro”
(150 AD) Galenus and the mix “garlic + onions”

Middle - ages: The prescription of the witches
Romanticism: The legend of Doctor Faust and…

Today…

Life extension with restricted diet (14-1500 cal/day)
Feeding Requirements

• Are we herbivores? carnivores? omnivores?

• For dental structure, intestinal length and digestive enzymes, we are definitely…. 

....OMNIVORES!
The Caloric Requirement

1. The calorie and the kilocalorie

2. The basal requirement = 1600 kcal

3. Requirements for moderately active adult
   - 1800 kcal
   - 2200 kcal

4. For a very active adolescent or adult: 3000 kcal or more

5. Memo the THYROID EFFECT !!!!
NUTRITIONAL STATUS of the Elderly Patient

1) WEIGHT

2) BIOCHEMICAL PARAMETERS

especially: folic acid, B12, albumins and PRE-ALBUMINS, iron levels a.s.o.
Supply of Calories

• From ATP = 1 kcal (walk 10 meters)
• From CP = 10 kcal (walk 100 meters)
  • From blood glucose = 80 kcal
  • From liver glycogen = 400 kcal
  • From muscle glycogen = 1600 kcal

_All of the above enough for a marathon!

• Lipids only a very slow turnover to energy
• Proteins a very very slow turnover to energy
Caloric production

- **FATS** : 1 gm = 9 kcal
- **PROTEINS** : 1 gm = 4 kcal
- **CHO** : 1 gm = 4 kcal
Velocity of Utilization

• CHO very fast via:
  – Complete utilization
  – Lactate shuttle
  – Gluconeogenesis

• LIPIDS slower energetic transformation

• PROTEINS very slow energetic transformation
  (in fact, carnivores sleep a lot!)
The Drive for Food

• The control by “dynein”
  – A neuro-opiod
  – Decreases in some aged people
  – Nitric oxide and the relaxation of the fundus
  – Appetite and grelin + vs. YY3
  – Insulin and leptin effects
The Drive for Food in the Elderly

• Frequently may be diminished due to decreased secretion of NO by the stomach
The Macronutrients: Carbohydrates

Starches, grains, etc (cereals from Cereres)
Hydrolyzed in monosaccharides (glucose)
and
Utilized as immediate energy source
or
Stored in reserve as glycogen
The Macronutrients: Lipids

- Saturated, no double bonds, usually solid
- Trans-fats, from liquid to solid format (usually commercial only)
- Mono-unsaturated, like olive oil
- Poly-unsaturated, like most other oils
- OMEGA 3, fatty acids, like many fish oils
The Macronutrients: Proteins

• Protein intake at least 11-12% of the total

• Intakes below 8.7% carry severe risk of serious deficits
The Macronutrients: Fibers

• High risk for the “vegans”

• Benefits and risk of the fibers

• The good and the not so good vegetables

• CONCLUSION: long live the Mediterranean diet but....with some cracks!!!
The Micronutrients

- Salt, Na+ (<5 mg/day) and K+ (deficits, excesses, need)
- Ca+ (1800 mg/day), P and Fl (bone metabolism)
- Fe++ (deficit and excess), Cu, Mn, and Mg
- Other metals: Cr, Se, Zn and the Metalloid I
- *Memo the hidden aspects of hypothyroidism*
RDA
(for some micronutrients)

Ca++ : 1800 mg or more
P : 1200 mg
Fe++ : 10-12 mg
I : 150 µg
Se : 45-50 µg
Vitamins: Liposoluble

**A**: RDA = 900 µg
Toxicity > 10,000

*Memo the carotenoid excesses*

**D**: RDA = 600 to max of 800 I.U./day
Necessary for some UV exposure to activate dehydrocholesterol

**K**: activates prothrombin

**E**: 8 to 10 I.U./day
Toxicity > 800 I.U.
Vitamins: Hydrosoluble

- **THE B COMPLEX**
  - Pyridoxin (Vitamin B6): RDA 2 mg
  - Folic acid: RDA 200 µg
  - B12 (cobalamine): RDA 2.5 µg (up to 2000 µg)
    - *Memo the homocysteine effect*
- B1 (thiamine)
- B2 (riboflavin)
- PP (anti-pellagra)
- C (ascorbic acid): RDA 60 mg but up to 1000 mg; if more then excess is toxic
The Elderly Patient & VITAMINS

RDA for hydrosoluble & liposoluble ones but...

...all that may be insufficient without a physically active LIFESTYLE and some SUN EXPOSURE
Treatment of Obesity in the Elderly

- Evaluate the risk/benefit ratio
- A walk of 1 mile (1.6 km) burns 100 kcal
  - So walk 2-3 miles, 4x weekly or/and resistance

Weight reduction diets in the elderly ?!

Risk for the protein deficits!
Addicting Substances

Coffee and Tea (caffeine and teine)
Memo: aminophylline and brochospasm

ALCOHOLIC BEVERAGES!!!
The benefits and the…….

Disasters!!!!
CONCLUSIVE NOTES

The WATER, how much?

Exercise before or after a meal?

Or “Grandpa, it is more important when you eat than what you eat.”

But…how much to eat???

According to Professor G. Brooks: “tell me what you do and I will tell you what to eat.”

and…a little ITALIAN ADVICE:

DO NOT EAT ALONE but with pleasant & smiling company