Sodium/salt science

Norm Campbell
Sodium science

A substantive but incomplete evidence base suggests the widespread addition of large amounts of sodium to food is one of the largest public health disasters of industrialization killing 3.1 million/yr. in 2010.
Sodium science

- A wide variety of animal species when exposed to higher levels of sodium in the diet than are physiologic
  - Develop hypertension and vascular disease
    - In none is the increase in blood pressure innocuous
  - Some of the increase is irreversible
  - Maternal high salt can induce increased BP in offspring
  - Causes vascular disease independent of increased BP
  - Is a pro carcinogen
  - Increases asthma severity
Sodium science

• Human physiological needs are estimated to be 100’s of mg sodium/day
• Current intakes where assessed in the Americas since 2000 are $\geq 3200$ mg/day
Sodium science

• High sodium intake in humans
  – Causes hypertension
    • 30% of hypertension is attributed to high sodium intake, (estimated 9% of the adult American population has hypertension related to sodium with very high management costs)
    • Hypertension is the leading risk for death and disability
  – Causes recurrent kidney stones
  – Is associated with markers of osteoporosis
  – Is associated with gastric cancer
Sodium science

- Hunter gather societies did not develop hypertension or vascular disease if consuming less than 1500 mg/day sodium
- Migration studies indicate migrating to high sodium areas was associated with hypertension and vascular disease
- Communities and countries that reduced dietary sodium had reduced blood pressure and vascular disease
- Meta analysis of cohort studies in healthy populations show association with stroke and ischemic heart disease death
- Randomized trials are consistent with vascular disease reduction but do not achieve statistic significance.
Sodium science

• No level of adding sodium to diets above physiological levels found naturally in food has been shown not to cause harm.
Cerebrovascular disease in the Americas

• 387,913 deaths or 8.7% of total mortality
• Regionally 2nd most common cause of death
• Most common cause of death in Brazil, Chile, Paraguay, Suriname and Uruguay
• Non fatal stroke is a most expensive, feared and disabling disease
Cerebrovascular disease mortality (age-adjusted rates/100,000).
Region of the Americas*, 2007

Source: Information Mortality System/HA/HSD/PAHO (updated May 2011)
*Included data for 43 countries
The Burden of Hypertension
Blood Pressure* as a Vascular Risk

• Attributable Risk
  – Stroke 60-70%*
  – Heart failure 50%
  – Heart attack 25%
  – Kidney failure 20%
  – Dementia
  – Many other vascular diseases
  – Total mortality 13%

* Systolic blood pressure greater than 115 mmHg
Sodium and Salt

CONFUSING TERMINOLOGY !!!!

2300 mg sodium is about

- a teaspoon of salt (sodium chloride)
- 100 mmol of sodium or salt
- 5.8 gm (5800 mg) of salt (NaCl)

5 gm salt is 2000 mg sodium
Salt: Meta-analyses

The Cochrane Library 2006;3:1-41;
Key features: random allocation; >2.3 g/day reduction in salt; >4 weeks duration; isolated intervention

Hypertensive Median age 50 (range 24-73)
Reduction of BP 5.1 (5.8 – 4.3) / 2.7 (3.2-2.2) mmHg;
Reduction of 4.5g salt/day,
Baseline salt intake 7g – 11g
Treatment salt intake 3.25g – 7.2g

Normotensive median age 47 (range 22-67)
Reduction of BP 2.0 (2.6 –1.5) / 1.0 (1.4-0.6) mmHg;
Reduction of salt 4.25g/day
Baseline salt intake 7.25g – 11.5g
Treatment salt intake 3.25g – 7.75g
Meta analysis on different levels of reduction in dietary salt on blood pressure

Hypertension 2003;42:1093-1099
Salt and other health issues

- Direct (non BP related) vascular and cardiac damage
- Obesity and related diseases (e.g. diabetes)
- Asthma
- Kidney stones
- Osteoporosis
- Gastric Cancer (promoter)
- Reversibility and in utero effects
Salt intakes in the Americas

• With few exceptions, the average consumption of populations worldwide is over 5.8 g/day and in many of 10g/day
  – Argentina 12 g/day
  – Brazil 11 g/day
  – Chile 9 g/day
  – Canada 8/day
  – United States 8.7 g/day