

## Salt, potassium and the control of blood pressure

01 December 2006

Salt is the common name we use for sodium chloride (NaCl). Salt is essential for life and for good health. High blood pressure is a risk factor for cardiovascular disease, and stroke. It is related to high sodium and low potassium intakes, but can recommendations to reduce our salt intakes make a difference?

### The importance of salt

Salt, or sodium chloride, is used to preserve and flavour food. It is also present naturally in all food. As a rough guide, 1 g sodium is equivalent to 2.5 g salt.

Sodium and chloride help to regulate blood pressure, control fluid balance and maintain the right conditions for muscle and nerve functioning. Sodium facilitates absorption of nutrients such as glucose and amino acids.

An average adult man's body contains about 90 g sodium of which half is in blood and other body fluids, over a third is in bone and the rest inside the body's cells.

Average sodium intakes range from 2 to 6 g per day, although health in adults can be maintained on less than 0.5 g. Requirements increase when losses are high such as during menstruation, lactation and heavy sweating.

Salt intake is of high priority in the public health response to hypertension because of the potential to shift downwards the blood pressure distribution in the entire population.

### Potassium

Potassium is naturally present in most foods, fruits and vegetables being especially good sources.

In our body, potassium is mainly found inside the cells. It has important roles throughout the body and is involved in the same functions as sodium but with a complementary role and the balance between the two elements is critical.

### Blood pressure – contrasting effects of sodium and potassium

The kidney's ability to excrete or conserve sodium is a key factor for blood pressure regulation.

Most studies show that a reduction in salt intake reduces blood pressure, the effect being greatest in those with high blood pressure, the elderly and people with obesity. Response to salt reduction is highly variable between individuals and may not provide measurable benefits to people already within normal ranges.

In contrast, reduced blood pressure is linked to increased potassium intakes which may be due to potassium's ability to increase sodium excretion and the vasoactive effects of potassium on blood vessels.

## Foods High in Potassium, Low in Sodium

The best sources of potassium are fresh foods with limited processing, because processing can impact the potassium level. On the other hand, raw foods are naturally low in sodium and processed foods are our main dietary source of sodium.

The table below indicates food sources high in potassium and low in sodium.

Table 1 : A selection of Foods High in Potassium, Low in Sodium (when unprocessed)

Avocado, apricot & other stone fruit	Banana	Beans as lentils, kidney beans, split peas	Dates, raisins & other dried fruits
Herbs & spices e.g. parsley and chilli : fresh or dried	Kale, spinach, lettuce and other green leafy vegetables	Fish such as cod, sardines, trout, tuna	Mushrooms : fresh or dried
Orange and other citrus fruits & juices	Melon, watermelon, apple, and other seeded fruits	Peanuts, walnuts and other nuts	Potato and sweet potato
Red and white meat	Soy beans, curd, milk	Tomato and tomato products	Yoghurt & low fat dairy (except cheese)

## The biggest effect on blood pressure is our lifestyle

Obesity, low levels of physical activity and low intakes of potassium have greater effects on blood pressure than high sodium intakes. Low calcium and magnesium intakes and a high ratio of saturated fats to n-3 polyunsaturated fats have also been implicated. Most recent interest has been in the benefits of the DASH (Dietary Approaches to Stop Hypertension) diet, rich in fruits, vegetables and grain products (to increase potassium and fibre) and including low fat dairy products, fish, legumes, poultry and lean meats. When salt intake was kept constant, blood pressure fell significantly.

The table below illustrates potential benefits to blood pressure of various lifestyle modifications.

Table 2: Potential blood pressure benefits, by lifestyle change

Modification	Recommendation	Approximate Systolic Blood Pressure Reduction (Range)
Weight Reduction	Maintain normal body weight (body mass index 18.5 – 24.9)	5 -20 mmHg/10 kg weight loss

	kg/m <sup>2</sup> )	
Adopt DASH Eating Plan	Consume a diet rich in fruits, vegetables and low-fat dairy products with a reduced content of saturated and total fat	8 – 14 mmHg
Dietary Sodium Reduction	Reduce dietary sodium intake to no more than 2.4g sodium or 6 g salt per day	2 – 8 mmHg
Physical Activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week)	4 – 9 mmHg
Moderation of Alcohol Consumption	Limit consumption to maximum 3 units of alcohol per day in men and 2 units of alcohol per day for women and lighter weight men. (1 unit of alcohol = 10 gr of pure alcohol = 1 glass of beer (25 cL) or wine (10 cL) or whiskey (3 cL))	2 – 4 mmHg

## Experts recommend reductions in salt intake

The evidence linking dietary salt to blood pressure has been exhaustively reviewed in the scientific literature over the past two decades, and the public health policy implications of this evidence have been carefully considered by expert committees in many countries worldwide, including the UK and the USA.

As we do not need our current high intakes, reductions to 5-6 g salt (2-2.4 g sodium) per day are recommended. It is also recommended to consume 5 portions of fruit and vegetables per day which has been shown to have many health benefits including increasing potassium intake.

## Practical implications

The body can adapt to reduced sodium intakes from salt; acceptance of a sodium intake half of that accustomed to takes 2-3 months. We are turning to alternative ways of flavouring foods with greater use of pepper, fresh and dried herbs and spices. Salt substitutes, based on potassium compounds, can help too whilst also contributing to an increased potassium intake. Although taste and a lower food preservative value compared with salt have limited their usage, more recently products have been developed by the food industry to overcome these problems.

## Further Information

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