



The truth about... Folic Acid

What is it?

Folic acid (often called 'folate' or 'folacin') is the group name for many forms of a water-soluble B vitamin, taking its name from the Latin word folium, meaning 'leaf'. Dark green leafy vegetables provide a rich source of folic acid in food. Yeast extract helped researchers identify folic acid nearly 70 years ago, and it remains a good source of folic acid today.

Sources of folic acid

Dietary intake comes from foods rich in natural versions of folic acid, or from folic acid supplemented foods:

- Spinach, kale, Brussels sprouts, cabbage
- Beans and legumes
- Yeast and beef extracts
- Citrus fruits and juices
- Wheat bran and other grains
- Broccoli and parsnips
- Poultry, pork, shellfish and liver
- Fortified foods (e.g. breakfast cereals, breads, juices)



Daily recommendations for folic acid: RDA/RNI

Adults	200µg (mcg)
Any woman considering pregnancy	200µg (mcg) (plus 400µg (mcg) extra)
Pregnant Women (plus 400µg extra* during the first 12 weeks of pregnancy)	300µg (mcg)
Lactating Women	260µg (mcg)
Children over 11years	200µg (mcg)
Children 7-10 years	150µg (mcg)
Children 4-6 years	100µg (mcg)
Children 1-3 years	70µg (mcg)
Babies 0-12 months	50µg (mcg)



* some women may need more eg. women with diabetes - check with your GP

What does folic acid do?

Folic acid, together with vitamin B12, can prevent 'macrocytic' (large cell) anaemia. Both nutrients together help nerves to function properly. Folic acid is also essential in the formation of genetic material (called DNA) within every body cell, allowing each cell to replicate perfectly. Folic acid is of particular interest in conditions where cell numbers rapidly increase such as during pregnancy, or in the protection against cancer cell growth. Of recent interest is the role of folic acid in protein metabolism, particularly in its ability to lower the level of the blood protein homocysteine, implicated in heart disease risk.



Pregnancy and Lactation

The foetus rapidly develops spine and nerve cells in the first few weeks of pregnancy. Inadequate blood levels of folic acid at this crucial time increases the risk of the baby spine developing a 'neural tube defect', resulting in spina bifida. For this reason, every woman considering pregnancy, and up to the 12th week of pregnancy is advised to:



- Take a folic acid supplement, or pregnancy-specific vitamin supplement providing 400µg (or mcg) a day
- Eat a folic acid rich diet
- Take more folic acid supplemented foods

During the whole of pregnancy, it is advised to increase folic acid intake from 200mcg to 300 mcg per day, (ie 700mcg total during the first 12 weeks; 300mcg total thereafter) which can be achieved by eating foods rich in folic acid - either naturally rich or fortified. During lactation, 260mcg of folic acid is recommended to meet the demands of breastfeeding.

Folic acid and heart disease

Heart disease is the main cause of death in the UK. Damage to blood vessels from poorly managed high blood pressure, raised blood cholesterol levels or high sugar levels causes narrowing and hardening of the arteries (atherosclerosis) leading to an increased risk of heart attack or stroke. For many people, however, this narrowing means living with the pain of angina, leg pain developing with exercise (intermittent claudication), or disability after surviving a stroke.

Homocysteine (Hcy) is a blood protein that irritates blood vessels. A high level of Hcy is found in populations with a high incidence of heart disease. Populations with less heart disease have lower blood Hcy levels. Folic acid can lower homocysteine levels, and recent medical research demonstrated that folic acid supplements could reduce high homocysteine levels. However, lowering of raised homocysteine levels fails to translate into lower rates of heart disease or stroke. Homocysteine level is thought to be a marker - rather than a risk factor - for heart disease

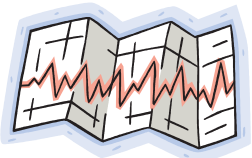
Folic acid and bowel cancer

A 'Mediterranean' style diet - rich in vegetables, fruit and wholegrain cereals - is naturally rich in folic acid and appears protective against bowel cancer. Emerging research suggests a folic acid intake (from food or supplements) above 400µg a day for at least 10 years lowers the risk of bowel cancer, although not all studies support this.



Deficiency symptoms

Folic acid deficiency presents with subtle signs - tiredness (caused by folic acid-deficiency anaemia), weakness, diarrhoea, loss of appetite and weight loss are non-specific symptoms not confined to folic acid deficiency. Lack of folic acid can also cause headaches, heart palpitations, a sore tongue and behavioural disorders. Deficiency can occur if the diet is inadequate, if requirements increase, or if folic acid losses are excessive. Pregnancy and breast feeding increases folic acid need, and malabsorption of folic acid from the digestive tract may occur in conditions such as untreated coeliac disease and Crohns disease. Increased losses of folic acid in the urine can occur with water tablet (diuretic) use, or in alcoholism.



Folic acid supplements and food fortification

Despite strong recommendations many women fail to increase folic acid intake in pregnancy. Routine fortification of UK flour with folic acid would be a simple way of supplementing the diet, increasing baseline folic acid intake from flour-based foods.

Many countries have introduced mandatory fortification of flour with folic acid, significantly reducing the number of neural tube defect births. This public health measure is not without potential health risks.

First, deficiency of Vitamin B12 can cause nerve damage, and anaemia. Folic acid supplements can correct this anaemia but masks the ongoing damage to nerves, spinal cord, or brain until irreversible nerve damage occurs. This is of particular risk in the older population as uptake of vitamin B12 from diet diminishes with age. However, countries with mandatory folic acid flour fortification have little proof of this theoretical health risk. Secondly, folic acid may lower blood levels of the anti-epileptic drug phenytoin leading to poorer epileptic seizure control. Canadian research has failed to demonstrate this side effect with mandatory fortification of flour providing around 200mcg of additional folic acid each day.

Higher levels of folic acid intake (over 740mcg of folic acid daily) appear to increase the risk of cognitive decline, equivalent to advancing brain ageing by around 7 years. The effect appears most pronounced in those taking supplements providing more than 400mcg a day, rather than folic acid derived from food. The significance of this finding is unknown.

It is likely that should mandatory folic acid fortification be introduced in the UK, there would be a need for adequate monitoring of over 65 year-olds to monitor adverse effects.



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