Folic acid, also known as folate, is a B vitamin essential for the formation of red blood cells. It is also necessary for the formation of DNA within every body cell, allowing each cell to replicate perfectly. Together, folic acid and vitamin B12 are needed to form red blood cells. A deficiency in folic acid can lead to 'macrocytic' (large cell) anaemia, where red blood cells become larger than normal and less able to carry oxygen effectively.

Sources of folic acid

Folate is naturally found in a variety of foods and is also present in foods fortified with folic acid. However, as folic acid is a water-soluble vitamin (meaning it dissolves easily in water), it can be lost during cooking. To retain its nutritional value, it's recommended to avoid overcooking and steam or microwave vegetables instead of boiling.

How much folic acid do I need?

For most adults, obtaining sufficient amounts of folic acid through a healthy diet containing a wide variety of foods is sufficient. However, if you are pregnant or planning to become pregnant, you need to ensure adequate levels of folic acid are consumed.

What happens if I don’t get enough?

Folic acid deficiency can result in some general symptoms - tiredness, weakness, diarrhoea, loss of appetite, and weight loss. A lack of folic acid can also cause headaches and heart palpitations, a sore tongue, and behavioural disorders. Deficiency can occur if you are not getting enough folic acid in your diet or if requirements increase (such as during pregnancy). Sometimes you can become deficient because you are losing lots of folic acid (such as in Crohn’s disease or untreated coeliac disease), if you are using some medications such as water tablets (diuretics), or in alcoholism.

Pregnancy and lactation (breastfeeding)

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 increase the risk of the baby’s spine developing a ‘neural tube defect’, resulting in spinal malformation called spina bifida.

Daily recommendations for folate (folic acid) intake

(μg = micrograms)

Adults and children over 11 years: 200μg
Anyone considering pregnancy: 200μg plus a supplement* containing 400μg
Pregnant people: 300μg plus a 400μg supplement* during the first 12 weeks of pregnancy
Lactating people: 260μg

(* You may need to take 5mg/d of folic acid preconception and up to 12 weeks of pregnancy i.e. if you have had a pregnancy previously affected by neural tube defects or if you have diabetes or take anti-epilepsy medication - ask your doctor.)

For this reason, anyone considering pregnancy, and up to 12 weeks of pregnancy, is advised to:
• Take a folic acid supplement, or pregnancy specific vitamin supplement providing 400μg every day
• Eat a diet rich in folates and folic acid from foods naturally containing the vitamin and from fortified foods

During the whole of pregnancy and lactation, it is advisable to eat a diet rich in folate as requirements for the vitamin are higher.

**Folic acid and heart disease**

Research has demonstrated that folic acid supplements can reduce high levels of homocysteine – an amino acid in the blood that irritates blood vessels – which has been associated with increased risk of heart attack or stroke.

A high level of homocysteine is found in populations with a high incidence of heart disease, which is the main cause of death in the UK. However, reducing homocysteine levels does not reduce rates of heart attacks or deaths from any cause. Homocysteine level is thought to be an indicator rather than a risk factor for heart disease.

Recent research has shown a slight reduction in stroke with folic acid supplementation but results are inconclusive and more research is required to understand this finding.

**Folic acid supplements and food fortification**

Despite recommendations, many people do not take folic acid supplements in early pregnancy and many pregnancies are unplanned. Routine fortification of flour with folic acid is a simple way to increase folic acid intake for everyone. Many countries, such as the USA and Canada, have introduced mandatory fortification of flour with folic acid, and seen a significant reduction of the number of neural tube defect births. The UK government is currently considering mandatory fortification of flour with folic acid. A recent review of scientific research has not found evidence of increased health risks. The UK Chief Medical Officers and the British Dietetic Association strongly support mandatory fortification of flour with folic acid.

**Good sources of folic acid**

• Spinach, kale, Brussels sprouts, cabbage, broccoli
• Beans and legumes (e.g. peas, blackeye beans)
• Yeast and beef extracts
• Oranges and orange juice
• Wheat bran and other whole grain foods
• Poultry, pork, shellfish and liver
• Fortified foods (e.g. some brands of breakfast cereals – check the label)

**Can I take too much?**

It is advisable for those aged over 50 years or those with a history of bowel cancer, not to take folic acid supplements containing more than 200μg/day. For other people, long-term intakes of folic acid from fortified foods and supplements should be below 1mg/day for adults (lower amounts for children), although this limit is currently being reviewed.

**Summary**

Most people (other than people who are or could become pregnant) should be able to obtain sufficient folate in their diet by eating plenty of vegetables, fruit, beans and wholegrains. These foods will be naturally high in folate and may protect against bowel cancer and heart disease.