

New Ideas in Dementia

The Food for the Brain Foundation has estimated one-third of cases of dementia could be prevented. See Alzheimer's is Preventable: A Manifesto for Change (this can be downloaded from the Food for the Brain Foundation).

We know that only one in a hundred cases of dementia are due to genes. Dementia (of which two-thirds is Alzheimer's disease) is rare in China and Japan and yet Japanese who migrate to the USA have higher levels; this is strong evidence it is caused by our lifestyle rather than our genes. Leading dementia experts have made a statement that half these risk factors are modifiable. Most of the risk factors are linked to brain inflammation.

Risk factors include the following:

1) **Sugar and Refined Carbohydrates.**

Those with higher blood sugars and higher HbA1Cs (a measure of sugar control used mainly in diabetics) have higher rates of dementia. There is a correlation between sugar intake and memory loss. Sugar is the number one dermatogen. Those with high insulin (as found in metabolic syndrome, also related to high intake of sugar and refined carbohydrates -see separate leaflet) have double the rate of dementia. The majority of Alzheimer's patients have metabolic syndrome. Diabetes almost doubles the risk of dementia too. **High glycaemic load (foods that release sugar quickly) are linked with cognitive decline and are predictive of the changes found in Alzheimer's, including amyloid formation.**

The danger is from foods high in sugars and refined carbohydrates (white flour, baked potatoes, white rice, baked products). Sugar reacts with proteins in the brain (this is called glycation which is measured in HbA1C) and denatures them. Sugar also reduced levels of neurotransmitters.

The Mediterranean diet has been found to reduce the risk of dementia (see below). **A Scandinavian study compared those with a healthy and unhealthy diet and found those on the healthiest diet had a 89% decreased risk of developing dementia and 92% reduced risk of Alzheimer's. So, diet makes a huge difference.** Adding fruit and vegetables and other healthy foods is also important (see below)

2) **AGEs**

These are advanced glycation products and are produced when food is heated or when sugar reacts with proteins. HbA1C is a measure of the latter. If laboratory animals are fed food high in AGEs, they develop cognitive decline and amyloid plaques in their brains. AGEs cause chronic inflammation and are also linked with cardiovascular disease, diabetes and cancer. **AGEs are high in processed foods, processed meats, baked goods, and where food is cooked at high temperature with browning such as frying, barbecuing** but is less likely to occur with steaming and boiling.

3) **Ultra-processed foods (UPFs).**

Often called fast foods; these are foods usually made up of sugar, refined carbohydrates, denatured fats, salt and chemicals. They have a long shelf-life. One recent study in JAMA Neurology found people having just 20% of their calories from UPFs (the average amount of UPFs in the UK diet is 55%) had a **much higher risk of cognitive decline**. 20% is just 400 calories; for example, a large bowl of cereal would count as 20%.

4) **Toxic substances.**

Today we are exposed to more toxic substances than ever before, and this may be one of reasons dementia is getting commoner. There is an important principle here: **the more toxicity you are exposed to the more nutrients you need (to detoxify them) and the lower your nutrient level the more vulnerable you are to toxicity.**

Important sources of toxicity are pesticides (which directly target cholinesterase, known to be low in dementia), chemicals and heavy metals including mercury, aluminium and copper –all three have been positively linked with Alzheimer's.

Note Alzheimer's is commoner in hairdressers (probably from exposure to hair dyes and other chemicals), dentists (probably from mercury exposure) and farmers (probably from pesticide exposure).

Toxic Metals: Aluminium can be found leaching from aluminium pans, antiperspirants and some antacid tablets (though not usually in antacid solutions). Aluminium is found in all vaccines

and some, like the flu jab, also contain mercury. The risk of Alzheimer's increases as the aluminium concentration increases in drinking water. Experiments have shown an aluminium coffee pot can leach 1600mcg of aluminium into a litre of water.

Mercury can come from amalgam fillings and from eating certain predatory fish like tuna, halibut and swordfish which can be high in mercury. Some shellfish can have high amounts.

Another toxic metal is **fluoride** and research has shown lower IQ in areas where the water is fluorinated. This is also one of the easiest metals to avoid. Beware of toothpastes and other products containing fluoride, filter your water and take iodine daily to remove fluoride and other related toxins (see iodine leaflet). Note many drugs are fluorinated.

The brain protects itself against heavy metals with an antioxidant called glutathione. However, this antioxidant is regenerated by a process called methylation and this depends on B vitamins and our genes (especially one called MTHFR). Keeping a good supply of glutathione on board and making sure methylation is adequate is central to protecting against Alzheimer's disease. Nutrients that assist in this process are B vitamins, Alpha Lipoic acid, N Acetyl Cysteine, zinc and selenium.

Particulates from air pollution have been estimated to contribute 10% towards the causes of dementia. Those in the top-fifth most polluted areas have a 40% increased risk of dementia. Particulates may be difficult to avoid but there is one area you can make a difference. That's in the home. Wood burners are an important source of particulates, putting out more than an old diesel car, although regulations on the sale of stoves have been tighter since 2022. Open fires are even more polluting.

Electro-magnetic Fields (EMFs). These come mainly from mobile phones, wifi and smart meters. (The power of the signal in smart meters exceeds any other form of EMF radiation and this exposure is continuous, day and night). There is no question that EMFs damage the brain. The ECOLOG report of 2005 and Bioinitiative Report of 2012 both found EMFs damaged cognitive abilities in humans and animals at levels below current safety guidelines.

Leif Salford in Sweden showed that a mobile phone disrupts the blood-brain barrier within 2 minutes. In teenage rats, a single

one-to-two-hour exposure caused permanent brain damage in 2% of all neurons. Salford described the findings as “terrifying”.

In a later experiment he exposed rats to exposure to mobile phone exposure for two hours, once a week. This led to memory deficits in all exposed rats. In 2015, Turkish scientists exposed 8-week-old rats (equivalent to children) to mobile phone exposure for one hour a day for a month. They found rats had 10% fewer brain cells in the hippocampus (the hippocampus is a key area affected in Alzheimer’s disease) and many of the brain cells were abnormal. The team then exposed pregnant rats to a similar regime and their offspring developed degenerative changes in the brain and nervous system.

Basically, research is showing early-onset dementia in rodents at relatively low levels of EMF exposure and that the greater the exposure the greater the brain damage.

It is difficult today to avoid EMFs but it makes sense to keep your exposure down as much as you can. I would suggest keeping mobile phone calls as short as possible and using the phone on speaker where possible.

5) **Drugs.**

Some commonly used drugs are associated with dementia. These include **PPI drugs** used for reflux (such as omeprazole and lansoprazole). A study of 74,000 people above the age of 75 years on these drugs found a 44% increased incidence of dementia (these drugs lower levels of B12, B6 magnesium and other nutrients). PPIs block the brain enzyme V-ATPase that clears amyloid from the brain. They also block nitrous oxide which can lead to restriction of blood flow.

Another study of 40,770 people found that **anticholinergic drugs** increased the risk of dementia. The drugs with the largest effect were anticholinergic drugs used for Parkinson’s disease (45% increase in dementia). However, these are not often used today. Next were bladder drugs such as oxybutynin and tolterodine (23% increase) and lastly antidepressants (especially amitriptyline, dosulepin and paroxetine (13% increase).

Several studies have shown benzodiazepines such as diazepam and sleeping tablets increase the risk of dementia, but only with heavy use. However not all studies have shown this effect and sleep loss itself is a risk factor for dementia.

Cholesterol drugs (see below).

6) **Unhealthy Microbiome.**

The microbiome is the name for the collection of microbes in our gut. Ideally, it should consist of 90% beneficial bacteria and less than 10% harmful. Unfortunately, many factors in modern life are making it less healthy (too much sugar, refined carbohydrates, alcohol and drugs like PPIs -which allow harmful microbes to breed and too little fibre from fruit and vegetables to feed the beneficial ones). Recent evidence suggests this could be far more important in Alzheimer's than we previously thought, and that the unhealthy microbiome could be the underlying cause of the disease.

In King's College, London they transplanted the microbiome of an Alzheimer's patient into rats. This stopped the growth of new nerve cells in the rats and generated inflammatory compounds. The damage found in the rats correlated to the severity of the Alzheimer's disease in the patient they had received the transplant from. In a similar experiment at Lund University, they transplanted the microbiome of mice with Alzheimer's and those without Alzheimer's into mice with no gut bacteria. Those receiving the transplant from the Alzheimer's mice developed plaques similar to that seen in Alzheimer's but those that received transplants from healthy mice had little change.

All this suggest Alzheimer's is originating in the gut.

7) **Exposure to Artificial Sweeteners**

Artificial sweeteners are found in diet drinks, juices and processed foods. A study that followed 2000 adults over the age of 60 years for 10 years was published in 2017 in Stroke. **It found that artificial sweeteners increased the risk of dementia and stroke by nearly 300%.** Aspartame is a particular concern as it is known to be neurotoxic being converted into formaldehyde in the body.

8) **Low cholesterol.**

The brain needs a lot of cholesterol and LDL (sometimes known as bad cholesterol) is crucial to deliver cholesterol to the neurones. A report from Boston University in 2005 found a whole

range of brain functions (verbal fluency, concentration, attention, abstract reasoning) correlated with cholesterol levels. **They found that the higher the cholesterol the greater the better the brain worked.** Some drugs that lower cholesterol, such as statins, are known to impair memory. I have personally seen patients whose mental function declined markedly with statins.

Sadly, they are sometimes prescribed in vascular dementia, despite the findings of a review in 2009 of two major studies of over 26,000 individuals at risk of Alzheimer's. The study found statins give no protection against dementia.

9) **ApoE4 gene**

At the moment this cannot be tested on the NHS but it increases the risk of dementia between 30-50% depending whether you have one or two copies of the gene. The gene encodes for transporting cholesterol and other fats through the body. (Most of us - 80% - have the Apo E3 gene). However even those with this gene can lower their risk by having a diet lower in sugars and refined carbohydrates, avoiding smoking, having a plant-based diet, taking exercise and eating plenty of antioxidants (from fruit, vegetable, herbs and spices).

10) **Elevated homocysteine.** (see below)

11) **High Cortisol** (from chronic stress)

12) **Sleep deprivation.**

This is often difficult to correct so I would be reluctant to over-emphasise this. Certainly, it is best to correct sleep loss, but this is not always possible. I think stressing the risk of dementia can create an additional worry. In fact, sleep loss is associated with only a 27% reduction in cognitive function.

13) **Lack of mental stimulation.**

(Note: mental stimulation is not as effective as exercise in protecting the brain.)

What can Help:

Over 200 drugs have been tested and failed to produce benefits in the last decade. Only 4 are licensed and none of these prevent the decline

typical of Alzheimer's disease (in fact a recent study found they could accelerate decline).

Four more drugs have recently been developed to treat Alzheimer's disease: aducanumab, lecanemab, donanemab and solanezumab although they have not yet become available. Solanezumab was not found to give any benefit. Unfortunately, the benefits of these drugs are small and a recent editorial in the BMJ stated "the evidence of benefit probably does not outweigh the negatives and they would not be justified by the evidence currently available". Adverse effects (which occur in one quarter to one-third) are brain oedema and brain haemorrhages, and these can be life-threatening. Other disadvantages are that they are extremely expensive, have to be given by infusion and need regular MRI scans, (the last two are by no means easy in Alzheimer's patients).

However, the first trial ever to show a reversal of cognitive decline in Alzheimer's disease was published in Aging in 2014. Dr Dale Bredesen's trial showed a reversal in 9 out of 10 patients. A further trial of 100 patients found 90% had reversal of their mental decline. Since then, he has treated over 1000 patients successfully. However, this involves treating 36 different risk factors (called the Bredesen protocol). He also discovered there are 5 different types of Alzheimer's and the best way to prevent these subtypes will be somewhat different.

This is a complex treatment matched to each individual and it means it is unlikely that a single drug will be found to cure Alzheimer's in the future. The disease is too complex. Unfortunately, this protocol is not available on the NHS. (See separate Alzheimer's leaflet to find more about this protocol).

The Right Diet

We have discussed how high carbohydrate diets, and foods linked with AGEs contribute to Alzheimer's.

An optimal diet is **low in sugar and refined carbohydrates** but also high in anti-oxidants (fruit, vegetables, spices) and essential fats (oily fish, seeds and nuts). The **Mediterranean diet** has been found to protect against dementia and it is interesting that rates of dementia are lower in Mediterranean countries. Eating healthy foods, such as fruit and vegetables and other foods with protective polyphenols, such as tea, olive oil and nuts will help. **Those in the top fifth for the consumption for eating healthy foods have half the risk of dementia.** The most protective effect was eating six portions (500 grams) of fruit and vegetables.

Curcumin, which comes from turmeric, deserves a special mention. It has been shown to stop the accumulation of beta amyloid in the brain and has powerful anti-inflammatory properties. It is known that dementia is very low in India and doctors believe it may be to do with the protective properties of turmeric and other spices.

A number of studies have found the Mediterranean diet reduces the risk of dementia. A study in 2002 found those who ate the highest number of antioxidants had a 70% reduction in dementia. The most important antioxidants come from fruit and vegetables; ideally with a range of colours (different antioxidants are often associated with different colours).

The Bredesen protocol also uses diet. It involves a ketogenic diet (low in sugar and carbohydrates but high in fat & protein). It involves stopping eating for at least 12 hours (between evening meal and breakfast). The enzyme that breaks down amyloid and other harmful brain toxins also breaks down insulin. This means if the body has too much sugar to deal and hence too much insulin then the enzyme gets used up and can't help with breaking down toxins in the brain.

More on Ketosis

When we stop carbohydrates, we develop ketosis. When we fast for over 12 hours (for instance if we leave over 12 hours between the last food in the evening and the first in the morning) we will have burned up all the carbohydrates in our body and will be "running on fats". In other words, we will be burning ketones, especially one called betahydroxybutyrate.

A study from the University of Kansas looked at 14 patients with mild Alzheimer's who were put on a ketogenic diet plus medium chain triglycerides (MCT) which helps trigger ketosis. All 9 kept on the diet improved. However, they deteriorated after stopping the diet for 1 month confirming it was the ketosis that was causing the improvement. In a further study of 152 patients with mild to moderate Alzheimer's, those given betahydroxybutyrate, which produces mild ketosis, improved.

The bottom line here is that **leaving a big gap between the last food in the day and the first in the morning appears to protect against Alzheimer's**. Periodic fasting is another good strategy as it also produces ketosis.

Avoid Anything that Harms the Brain

This includes pesticides, heavy metals, chemicals, artificial sweeteners, suspect drugs (such as PPIs, anticholinergics and statins).

B Vitamins

A groundbreaking study from Oxford University published in Proceeding of the National Academy of Sciences found that in patient with cognitive decline and raised homocysteine (above 11), taking three B vitamins slowed brain shrinkage by 30%. In the medial temporal lobe (where shrinkage occurs in Alzheimer's), brain shrinkage was reduced nine-fold. Their mental function also improved. These B vitamins were vitamin B12 500mcg daily, folic acid 800mcg daily and Vitamin B6 20mg daily. Improvements occurred in those with mild but not moderately severe Alzheimer's.

Researchers at the University of California gave mice, with the rodent form of Alzheimer's disease, large amount of Vitamin B3 – the human equivalent of 2000-3000mg of niacin daily. The authors said that mentally they were cured. Of course, animal studies don't always translate into human benefits, but it was a fascinating piece of research.

We already know that niacinamide (vitamin B3) prevents demyelination of nerve cells in the animal equivalent of multiple sclerosis. In a study of over 6000 Chicago residents over 65, those with the lowest niacin intake (a form of B3) had the greatest risk of Alzheimer's disease. **The group with the highest intake of Vitamin B3 had 70% less Alzheimer's.** We also know that vitamin B3 along with Vitamin B12 and folic acid will reduce homocysteine, a substance which damages nerves (and the heart). **A review of 33 studies found there was a consistent association between dementia and cognitive decline on the one hand and raised homocysteine on the other and an inverse relationship with B vitamins.**

Vitamin B3 can be taken as niacinamide (high doses can cause nausea), niacin (can cause flushing at high doses) or as inositol hexanicotinate (which causes no flushing).

However, some studies have noted only those with the highest Omega 3 fats benefit from B vitamins. Those with the highest Omega 3 had a 73% reduction in brain shrinkage (similar to healthy elderly) and they had greatest benefit from B vitamins. In other words, you may need both. In other words, B vitamins and Omega 3 fats

worked synergistically. Oily fish are the main source of Omega 3 fats and a further study found **those with higher levels of DHA (an Omega 3 fat essential for brain function) have a reduced risk of dementia.**

The brain is made up of 60% fat and the quality of the fat makes a difference. The wrong types of fat, such as hydrogenated fats, accelerate brain inflammation. Omega 3s, especially DHA, and good quality Omega 6s are protective (see below).

The Bredesen protocol involves testing **homocysteine**, but this is not always available on the NHS. Homocysteine goes up as Vitamins B12 and folic acid goes down. Dutch researchers gave adults over 50, who had raised homocysteine, folic acid. Those given this vitamin had highly significant improvement in memory and information processing.

Homocysteine increases with age, and those in their 70s with a homocysteine below 9 have half the risk of dementia compared to those with a level above 14. 25% of those with a homocysteine of above 15 develop dementia. Apart from folic acid and Vitamin B12, garlic lowers homocysteine.

In the USA people with mild to moderate Alzheimer's were given folic acid (5mg daily), vitamin B12 (1mg daily) and vitamin B6 25mg daily for 18 months. Those with milder Alzheimer's had virtually no decline over 15 months –an astonishing result. Those using placebo all declined.

In a long-running study of nuns, there was a striking correlation between folic acid and brain atrophy: **the higher the folic acid the lower the brain atrophy.**

In Hong Kong volunteers with mild to moderate Alzheimer's dementia and vascular dementia were given folic acid (5mg daily) and Vitamin B12 (1mg daily) for 2 years. The group given supplements had significantly less mental decline than those on placebo as measured on a dementia rating scale.

There is a consistent pattern here. B vitamins have an important role to play in preventing dementia, especially if combined with Omega 3 fats.

What else can help:

Exercise.

There's a lot of data on exercise and mental function in both people and animals. Basically, exercise makes you cleverer. The 10% who do least exercise have two to three times the risk of dementia compared with the 10% that do the most. **Almost any exercise increases brain-derived neurotrophic factor (BNDF) and reduces brain inflammation.** Brisk walking, resistance or weight training and exercises that improve co-ordination and balance (such as dancing) have all been shown to improve brain function.

Vitamin D

Vitamin D deficiency predisposes to Alzheimer's disease and deficiency is widespread.

A study of 912 elderly patients in France over 12 years found that vitamin D deficiency was associated with a three-fold risk of Alzheimer's disease.

Other Nutrients

Lithium is an essential nutrient and higher levels in the water are associated with reduced mortality. There has been a lot of interest in its role in dementia. Lithium causes the formation of new brain cells and protects the brain against toxins. Three different studies, including one published in the Lancet, showed it increased grey matter. A ten-year Danish study on those at high risk of dementia given lithium found they had no more dementia than the general population whereas a similar high-risk group not given lithium developed significantly more dementia. The normal dose is lithium orotate 5-20mg daily.

There are also studies on other vitamins. A study in Utah of nearly 5000 residents over 65 found that **those given both Vitamin C and Vitamin E had a 64% reduction in Alzheimer's disease.** This was most marked in those taking at least 1000mg of both. There was no benefit for those taking Vitamin E alone.

Dennis Crouse has described how he reversed his mother's Alzheimer's disease by removing sources of aluminium and using silica water.

Aluminium is removed from the body by a naturally occurring substance called **orthosilicic acid (OSA)** sometimes called silica water.

The major source of this is vegetables and certain types of water. Silica supplements have poor bioavailability so don't resolve the problem.

Many vegetables and herbs contain OSA and to a lesser extent they can be found in fruits. Typically, the skin and husks contain more OSA. Good sources are oats, wholegrains, beans and basil. Beer often contains OSA but beware as much beer comes in aluminium cans.

Water is an important source of OSA. Some waters are naturally high in OSA: these include Fiji and Volvic water. However bottled water is bulky and environmentally unfriendly. Another solution is to make your own which can be done cheaply (see Dennis Crouse on you tube: Silica Water: How to make it at home).

Saunas, including infrared saunas can also help remove aluminium and other heavy metals (see toxicity leaflet).

Giving the supplement **N Acetyl Cysteine** for 6 months was found to have a beneficial effect in Alzheimer's disease. This increases the level of glutathione, an important nutrient in detoxification.

Researchers in Chicago followed 815 people over 65 and found a low intake of fish or low intake of Omega 3 fatty acids was strongly linked with the risk of Alzheimer's. The higher the intake of **docosahexaenoic acid (DHA)**, an omega 3 fat found in oily fish, the lower the risk of Alzheimer's. There was no benefit at doses below 1000mg daily.

In the Framlingham study 899 men and women, free of dementia, were followed for nine years and those with the highest levels of DHA had a 50% lower risk of developing dementia. In another study, people with cognitive decline given DHA and EPA supplements (both Omega 3 fats) had improvement in recall and brain processing. Omega 3 fats also lower levels of a toxic compound called Tau which builds up in Alzheimer's. (Note fish contain beneficial Omega 3 fats but can also contain harmful mercury so the type of fish can be important). Omega 3 fats are highest in herrings, sardines and mackerel, pilchards and anchovies and wild, but not farmed, salmon (farmed salmon have lower levels of Omega 3 fats and **very high toxicity** and it is food best avoided). The suggested dose of combined EPA/DHA is 3 grams daily.

The **Lions Mane Mushroom** contains substances (hericenones and DLPE) known to stimulate nerve growth factor (NGF) which is necessary for brain function and healing. We know lack of NGF causes amyloid formation and an Alzheimer's-like condition in mice. Studies in humans

have shown this mushroom improves cognitive function significantly. In a rat study lion's mane was superior to the drug donepezil and reversed the effect of dementia. It also improves well-being. It is early days, but this looks like a promising compound for dementia.

A study this year (2023) of 3500 older adults in The American Journal Of Clinical Nutrition found those taking a **multi-vitamin/multimineral supplement** had better memory at one year and three years than those taking placebo.

Other

Some types of mental stimulation such as learning a language, a new skill, puzzles and specific programs like Brain HQ have been shown to protect against dementia. Brain HQ do a free daily program. Other programs include Elevate. Social stimulation is also protective.

Summary

I think there is an emerging pattern developing giving us new ideas about how to prevent Alzheimer's disease based on research evidence.

Our main protection against these is as below.

- 1) Having a good diet.**
- 2) Avoid ultra-processed foods (UPFs).**
- 3) Regularly having a 12 hour period without food.** Also consider fasting.
- 4) Taking exercise.**
- 5) Avoiding harmful drugs**
- 6) Reducing exposure to toxic chemicals, especially heavy metals and pesticides, as these are stored in fatty tissues such as the brain.**
- 7) Reduce exposure to EMFs and limit mobile phone calls to a minimum.**
- 8) Numerous studies now show the protective effects of supplements, notably B vitamins and essential fats.** Keeping up protective levels of nutrients and protecting the efficiency of our methylation pathways. B vitamins can help prevent and even treat dementia. This is well worth knowing as pharmaceutical treatment has proved disappointing with no new drugs in sight.
- 9) Consider types of brain stimulation**

- 10) For those at high risk it is worth looking at the Bredesen protocol or ReCODE which covers other factors (see book The End of Alzheimer's by Dale Bredesen).