



Miracle foods

myths and the media

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A Behind the Headlines report
January 2011

Analysing food studies in the media

“Curry could save your life.” “Beetroot can fight dementia.” “Asthma risk linked to burgers.” Every day there’s a new crop of seemingly life-changing headlines about how the food we eat affects our health.

We all know that a good diet is an essential part of a healthy lifestyle, so it’s not surprising that newspapers, magazines and the internet are full of stories about miracle superfoods and killer snacks.

Of course, there’s more to it than that. There’s a vast industry devoted to finding new ways to persuade us to eat this or that food and an army of scientists bent on exploring the links between what we eat and how healthy we feel.



Beetroot has been called [‘the elixir of life’](#)

Unfortunately, much of what is reported can be either inaccurate or unhelpful. The news is full of contradictory reports and often the same food is declared healthy one day and harmful the next.

Take alcohol. Sometimes it’s reported to be good for your health, while other times it’s bad. Some days we’re told to drink in moderation, while on others even a single glass is too much.

The facts about the latest dietary discoveries are rarely as simple as the headlines imply. Accurately testing how any one element of our diet may affect our health is fiendishly difficult. And this means scientists’ conclusions, and media reports of them, should routinely be taken with a pinch of salt.

That’s where Behind the Headlines fits in. For the past three years, we have reviewed health science stories in the media and checked the reported claims against the research on which they are based.

Food stories are one of the most frequently occurring topics that Behind the Headlines covers, featuring in about a fifth of the 1,750 appraisals since mid 2007.

A quick analysis shows just how confusing these stories can be. Of the 1,750 Behind the Headlines appraisals carried out up to January 18 2011, based on stories in the national press, 344 were about foods that had repercussions for health. We analysed those that reported on a single food or drink, grouping them into 106 single foodstuffs. Categorising these stories into whether the food was reported to be good for health or harmful gives a crude yet revealing indication of how food science is portrayed in the press.

As shown in the diagram overleaf, although some stories highlight the potential harms of particular foods, most proclaim benefits.

When grouped as foodstuffs, 27 foods had been labelled harmful by headline writers, while 65 had been declared beneficial. Fourteen, however, have been labelled both healthy and harmful in different headlines. Chocolate, for example, can reportedly cause weak bones and depression, but other studies have claimed that it can also help fight cancer.

Behind the Headlines

Behind the Headlines provides an unbiased and evidence-based analysis of health stories that make the news. The service picks two popular health stories from the national media every day and aims to respond to them the same day they appear in the press. The service is intended for both the public and health professionals, and endeavours to:

- explain the facts behind the headlines and give a better understanding of the science that makes the news
- provide an authoritative resource that GPs can rely on when talking to patients
- become a trusted resource for journalists and others involved in the dissemination of health news

Bazian, a provider of evidence-based healthcare information, produces impartial evidence-based analyses, which are edited and published by NHS Choices.

How foods have been reported in the media

65 foods were good for health

14 foods were both good and bad for health

27 foods were bad for health

bitter melon blackcurrant chillies fruit passion
 fruit pomegranate purple fruit purple tomatoes
 rosehip tomatoes beetroot broccoli broccoli
 sprouts carrots cauliflower celery garlic ginger
 mushrooms onions spinach whole cooked
 carrots dairy organic milk skimmed milk yoghurt
 caveman diet fatty food low-fat diet Mediterranean
 diet veganism whole cooked carrots binge drinking
 champagne red wine beetroot juice black tea cherry juice
 green tea hot drinks mint tea tomato juice bacon and eggs
 breakfast cereal fry-ups meat and potatoes porridge chewing
 gum curcumin gummy bears honey jam ketchup marmite
 olive oil peanut butter popcorn turmeric almonds nuts
 rice wholegrains cod liver oil fibre probiotics protein

eggs
 bacon
 alcohol
 grapefruit
 low carb diet
 vegetarianism
 beer white
 wine hot
 tea chocolate
 nut products
 caffeine
 fish oils
 salt

5 a day high carb
 diet organic food
 Western diet burgers
 (three a week) chicken
 processed meat
 red meat sausages coffee
 energy drink fruit juice
 sugary drinks
 water fast food packed
 lunch pre-packed
 sandwiches takeaways
 cake chewing gum
 soya-based foods
 sweets unsoaked
 potato chips nut
 products fructose
 polyunsaturates
 sweeteners

What is a superfood?

So more than half of the articles discussing a foodstuff focus on some sort of benefit.

But what really seems to capture the imagination of journalists and consumers is the idea that a single food, sometimes called a superfood, can confer remarkable health benefits.

There is no official definition of a superfood and the EU has banned the use of the word on product packaging unless the claim is backed up by convincing research. A number of well-known brands have been forced to drop the description. However, there are still some proponents of the term, in spite of its loose definition.

News headlines, meanwhile, abound with claims that certain foods have super health benefits. Celery, broccoli, jam, popcorn and cereals have all been hyped as superfoods in the past couple of years. Other foods are said to be packed with chemicals that can ward off major killers such as cancer and heart disease.

Wine, for example, can allegedly:

- [“add five years to your life”](#)
- [“help keep teeth healthy”](#)
- [“protect your eyes”](#)
- make women [“less likely to gain weight”](#)

While broccoli can allegedly [“undo diabetes damage”](#), [“stop breast cancer spreading”](#) and [“protect the lungs”](#).



Popcorn is reputedly high in antioxidants



The health benefits of chocolate are debatable

Even our beloved cuppa has been given superfood status. Black tea has been alleged to [protect against heart disease](#). Green tea can supposedly [cut the risk of prostate cancer](#). And it has been claimed that [camomile can keep diabetes under control](#).

Miracle claims are also made for chocolate, including that a daily bar [“can cut the risk of heart attack and stroke”](#).



The nation's favourite drink is supposedly good for you

And it's not uncommon for headlines to claim the most miraculous health benefit of all – that a food can save your life. The following are all genuine claims from UK media from the past two years:

- [“2½ bottles of wine a week can save your life”](#)
- [“A daily dose of garlic can save your life”](#)
- [“Just one bite of chocolate a day can help save your life”](#)
- [“Beetroot juice could save your life”](#)
- [“Curry could save your life”](#)

You could be forgiven for thinking the secret of eternal life is a daily vindaloo, washed down with a glass of wine or two and a chocolate dessert.

The trouble with food research

Of course, the truth is that these claims are almost always overstated. Unfortunately, research into the effects of single foods on our health is notoriously tricky to carry out. We have complex diets and it is difficult to disentangle the effects of one particular food or compound from all of the others we consume. This means that many of the studies behind the superfood claims have limitations. These limitations are rarely reported in the media, and even more rarely given their true significance.

Some of these limitations are discussed below. Knowing about them will help you to sort science fact from news fiction.



Red wine features regularly in the news

Confounding factors

Confounding is a common problem in health research. Confounding is where something other than the main factor that is being assessed (a confounding factor) may be responsible for effects.

Take the story about [half a glass of wine a day adding five years to your life](#). The results of this study of 1,373 Dutch men who were followed for over 40 years certainly sounded promising. The study found that men who consumed an average of about half a small glass of either red or white wine a day lived about five years longer than those who didn't drink alcohol. It also found a lower risk of death from cardiovascular disease among those who drank a small amount of wine compared with teetotallers. In humans, this type of study, called a cohort study, is often used to find out more about diet and health. Cohort studies enable researchers to follow large groups of people for many years to find out if a specific food or supplement is

associated with a particular health outcome. A long follow-up period is particularly important when researchers are looking at the relationship between diet and outcomes such as cancer and heart disease.

The difficulty is that there are many things that can affect how long we might live or whether we're at risk of cardiovascular disease. They probably include, for example, social status, physical activity, body mass index (BMI) and the overall quality of our diet. Therefore, if the groups being compared (in this study those who drank a small amount of wine and teetotallers) differ in any of these other factors this could be contributing to the differences in lifespan, rather than just wine consumption.

Researchers call things that can affect the results of a study in this way confounders, and the best cohort studies adjust their findings to take into account as many confounders as possible. The wine study, for example, adjusted its findings for several possible confounders, such as smoking status, BMI, medical history and socioeconomic status. Surprisingly, however, it didn't adjust for how much physical activity the men did. If more wine drinkers than teetotallers exercised regularly, then this could be why the former lived longer than the latter.

A study that suggested that [green tea could reduce the likelihood of developing prostate cancer](#) had a similar weakness. It found that men who drank five cups of green tea a day were about half as likely to develop advanced prostate cancer as those who drank only one cup. This study involved nearly 66,000 men in Japan, who were followed for 14 years. It was a study with a large number of participants and a



Green tea is part of the traditional Japanese diet

long follow-up, both of which are strengths. But it's possible that men who drink lots of green tea are also more likely to adhere to a traditional Japanese diet. This means diet may be a confounding factor. In fact, this is partly what the researchers found – that men who drank more green tea also ate more miso and soy, as well as fruit and vegetables. They also differed in other ways from men who drank less green tea. So it's difficult to say for certain whether the green tea is responsible for the lower risk of cancer or whether other elements in the diet were involved.



People react differently to different things

Inaccurate memories

Many studies looking at foods rely on people being able to recall what they have been eating and drinking in some detail, sometimes several months or more in the past. Recall bias is an important problem. Do you remember how many eggs you ate last year? Do you think your memory of those eggs would be affected if you found out you had high cholesterol? In the Dutch study of alcohol and mortality mentioned above, men were asked to recall how much they were eating and drinking up to a year ago. This is not unusual in studies of food. Estimating how much alcohol a person has consumed is especially tricky as the alcohol content varies between drinks. There are many reasons why people may look back with rose-tinted spectacles (and rosy cheeks) at their alcohol consumption and may underestimate the amount they consumed. Some may do this deliberately because they don't want to look bad when they complete their questionnaire.

Recall bias wouldn't be such a problem if it affected all people in a study equally, but often those with a particular outcome will remember

their consumption differently from those who don't have that outcome. The eggs/high cholesterol example above is one, but the same may happen to people with food poisoning. People who have had food poisoning are much more likely to remember the evening out and the funny tasting curry than someone who didn't get ill. This inconsistency in recall depending on the outcome leads to bias in studies.

Additionally, what we eat and drink can vary from day to day and from year to year. So, if we are asked about our current eating habits, our answers may not be representative of what we have eaten throughout the rest of our lives. Food questionnaires often also ask about how many portions or cups of certain foods are eaten per week, and people may have different ideas about portion or cup sizes.

Proxy outcomes

Often, studies measure outcomes that aren't directly relevant to people's health. Instead, they choose a proxy, which is something that is easier to test and which may be an indicator of a health benefit. The trouble is that media reports often confuse these proxy measures with the real thing.

Let's look at an example. A claim that [omega-3 fats may be an "elixir of youth"](#) was based on research in heart patients that didn't look primarily at patients' health, but at the length of telomeres, which are regions of DNA at the ends of chromosomes.

Telomeres shorten each time a cell divides, so telomere length is often used as a proxy measure for (an indicator of) biological ageing.



Our memories aren't always very reliable

The study found that people with higher omega-3 levels in their blood also had less shortening of their telomeres. That's interesting, but it tells us nothing about whether omega-3 fats had any impact on the patients' health or on the cardiovascular disease process.

Similarly, one study that reportedly showed that [oily fish could reduce memory loss](#) did not measure people's memory. It scanned people's brains for areas starved of oxygen (called infarcts) and other abnormalities, to find out if there was any association between fish consumption and brain changes.

Eating fish three times a week was associated with a non-statistically significant reduction in risk of these brain abnormalities. Even if the difference had been significant, the study could not say whether oily fish prevents memory loss, as memory was not measured. Only a trial that directly measures people's memory can tell us about the link between oily fish and memory.



Testing on mice is not the same as testing on humans

Animal and laboratory studies

Using a study in humans to link an indirect outcome measure to a disease is one thing, but many of the health stories reported in the press have not been carried out in people at all. Animal and laboratory studies are often used to test what researchers suspect to be the active components of foods, which might in time be developed into drug treatments or supplements.

There's been a lot of excitement, for example, about resveratrol, a compound found in red wine that has been shown to extend the life of yeasts, roundworms, fruit flies and also [obese mice fed a high-calorie diet](#). Studies of this compound have suggested that resveratrol may cause cellular changes that have a positive

effect on age-related processes, and may possibly have other benefits.

However, the doses of resveratrol used in lab studies may bear no relation to how much resveratrol humans can realistically get from drinking red wine. In one study, which found resveratrol [helped stop abnormal growth of blood vessels in the eyes of mice](#), the human equivalent of the dose given would be several bottles of wine a day.

Before you reach for the resveratrol supplements (which do exist), bear in mind that just because this compound was associated with cellular changes in mice and some invertebrates, that doesn't mean it will have the same effect in humans. Animal studies are a valuable first step in finding out more about the active ingredients in a food or drink, but we need to wait for the results of clinical trials to find out if the same results hold true for humans.

Studies on cells or tissues in the laboratory may give useful clues to a food's properties, but they are often overinterpreted by the media. There is often a long way to go before we know whether lab findings could be relevant to humans eating food in real-life situations.

In one lab study that inspired the headline ["Broccoli may undo diabetes damage"](#), researchers applied sulforaphane, a compound found in broccoli, to human blood vessels incubated with sugar. Their aim was to find out whether sulforaphane could prevent damage to small blood vessels caused by high blood sugar (which can happen if you have diabetes). They found that sulforaphane did seem to protect cells from potentially damaging chemicals. This is an interesting finding, but a far cry from the claims of the news headline.

In another study, [sulforaphane was applied to human breast cancer and mouse cancer cells in the laboratory](#) and injected into mice with mammary gland tumours. The results suggested that the compound may be able to target cancer stem cells and stop them from dividing as much. This finding is promising and certainly warrants further research, but it would be misleading, possibly dangerous, to assume it means that eating broccoli can stop cancer in its tracks.

Who gets it wrong?

Sometimes it's not newspapers that are at fault in misinterpreting these kinds of studies, but researchers and press officers anxious to garner publicity. One study found that [broccoli improved heart muscle function](#) in rats whose hearts had been removed and subjected to a simulated heart attack. The title of the study called broccoli a "unique vegetable", when it is unknown if other vegetables might have the same result. It also implied that the results could apply to mammals generally, when that remains to be seen.

Sometimes, a suggested association between a food and a health outcome looks doubtful on the basis of common sense. In such cases we have to ask ourselves whether the association seems plausible. For instance, in the study linking [chocolate consumption to better cardiovascular health](#), people who ate the most chocolate had a 39% lowered risk of heart attack or stroke compared with those who ate the least chocolate. However, the difference in consumption between those who ate the most and those who ate the least chocolate was minimal: less than one small square (5g) of a 100g bar. Common sense tells us that this difference is unlikely to account for a 39% reduction in cardiovascular risk. The idea that helping yourself to a bar of chocolate a day will stop you having a heart attack or stroke may sound attractive, but this research does not provide any basis for it.



Compounds in food may react differently in the body

Funding and independence

It's important to know the source of funding in food studies, as with drug studies. One study that claimed chocolate lowered stress levels involved only 30 healthy young adults and had numerous flaws, including a very short follow-up period (14 days). It was also funded by a large chocolate manufacturer.

But just because a study is funded by the food industry doesn't necessarily mean it will be of poor quality. However, there may be a vested interest in giving a positive spin to results or getting it into the newspapers for a little publicity.



Oily fish is part of the Mediterranean diet

Overcoming bias

Generally, the best type of study for finding out if a food has any effect is a randomised controlled trial (RCT). RCTs can avoid some of the problems of other studies and there is usually more confidence in their results. In RCTs, participants are assigned randomly to different groups to decide which intervention (in food studies, which diet or dietary supplement) they will receive. This is the best way to generate groups that are balanced for known and unknown factors that could affect the results. A control group that is not exposed to the intervention is used as a comparison. This means that any differences seen between the groups can be attributed to the differences in diet or dietary supplement used.

RCTs are not always feasible for looking at the long-term health effects of a specific food. RCTs are expensive and people may not be willing to alter their diet for an extended period. Therefore, the randomised trials that are performed usually measure the results of short-term consumption of a food or test the active component of a food taken as supplement.

Interestingly, one randomised trial that looked at [fish oil and cognitive function](#) in 867 elderly people, found no significant difference in cognitive function between fish oil supplements and placebo. There's been much excitement surrounding the possible effect of fish oils on cognitive function, yet this study, one of the few RCTs looking at this area, came up with negative results. This may be because this is a better quality study, but it also lasted only two years, which, as the researchers say, may have been too short a period to detect any effect.

Are any foods especially good for me?

By now you may well be despairing of any research ever being able to prove anything about our diet or about so-called superfoods. Finding out about the effects of particular foods on health is a bit like doing a jigsaw. It's a gradual and painstaking process in which, by conducting different types of studies, researchers gradually fit together the pieces so that a tentative picture begins to emerge.

The best way to get a look at this overall picture is by looking at what systematic reviews have to say about diet and health. Systematic reviews take the best quality available data from individual studies and see how the evidence stacks up. By looking carefully at all the research, systematic reviews can give an accurate picture of the state of the evidence so far and are, therefore, more reliable than looking at a single study in isolation.

It would be a huge undertaking to carry out a comprehensive review of all the studies investigating the potential health properties of food. But, here's what systematic reviews (considered to be the strongest type of evidence) have found up to the end of 2010.

Drinking alcohol increases cancer risk

A [systematic review](#) by the World Cancer Research Fund (WCRF) in 2007 concluded that alcohol consumption is associated with an increased risk of some cancers, with apparently similar effects for different types of alcoholic drinks. Their recommendation was that alcohol consumption should be limited, even taking into account the likely link between moderate alcohol consumption and reduced risk of heart disease. In the UK, current guidance from the NHS recommends avoiding binge drinking and for women to consume no more than 2-3 units a day, and men no more than 3-4 units a day on a regular basis.



Alcohol consumption should be limited

Eating greens reduces cancer risk

Eating more non-starchy vegetables, such as broccoli, is associated with a reduced risk of cancer according to the WCRF systematic review on cancer prevention (see above). It is possible that some of the compounds in broccoli may have health benefits, but clinical trials are needed to investigate this.



Broccoli is good for you as part of a healthy balanced diet

No evidence that oily fish boosts brain power

A [Cochrane systematic review](#) from 2006 found that at that point there was no evidence from RCTs about whether omega-3 fats (thought to be one of the "active ingredients" in oily fish) could reduce the risk of cognitive impairment or dementia. As we mentioned earlier, a subsequent placebo-controlled RCT has found that a daily fish oil supplement given for two years did not improve [cognitive function in cognitively healthy older adults](#). This single RCT does not rule out the possibility that longer-term supplementation might affect cognitive performance or help those who are already cognitively impaired, but it does suggest that the effects of omega-3 fats on cognitive performance are not clear-cut.



Children should eat a healthy balanced diet

A Mediterranean diet increases the chance of living to a healthy old age

There's also good evidence supporting the health benefits of a Mediterranean-style diet. The Mediterranean diet is high in fish, olive oil and fruit and vegetables, while containing relatively little meat. One [systematic review](#), published in the *British Medical Journal*, shows that this type of diet can reduce the risk of some chronic diseases and increase the chance of living to a healthy old age.

Oily fish may reduce age-related macular degeneration (ARMD)

One systematic review we covered in 2008 found that there was evidence from observational studies that [eating oily fish two or more times a week reduced the risk of age-related macular degeneration](#), a common cause of blindness in older people. However, the review suggested that this should be interpreted cautiously due to weaknesses in the underlying studies.

The jury's out on green tea

As yet, green tea cannot be recommended to stave off cancer because, according to a Cochrane [systematic review](#) from 2009, the evidence from studies is "highly contradictory". It appears to be safe in moderate amounts, so lovers of green tea can continue to enjoy it.

Chocolate may lower blood pressure but...

Systematic reviews of RCTs in [The American Journal of Clinical Nutrition](#), [Archives of Internal Medicine](#) and [Nature](#) have found that cocoa or chocolate can reduce blood pressure. However, they identified no RCTs looking at the effects on important clinical outcomes such as cardiovascular disease or mortality. Chocolate of any variety is high in fat, sugar and calories and, if eaten to excess, is likely to increase the risk of obesity, heart disease and diabetes. Whether any potential benefits of eating a moderate amount of chocolate can outweigh the potential harms remains to be seen.



Eating plenty of fruit and veg will help to keep you healthy

A balanced diet

You will have gathered by now that there's no real evidence that superfoods exist, if by that we mean a single food or compound that will keep us healthy, stop illness in its tracks or save our life.

When it comes to keeping healthy, it's best not to concentrate on any one food in the hope it will work miracles. Current advice is to eat a balanced diet with a range of foods, to ensure you get enough of the nutrients your body needs. Limiting your intake of alcohol and high fat, high sugar, salty and processed foods, keeping to a healthy weight and regular physical activity are also important.