
AMGenex
Life Giving Energy
WELCOME

The Sulforaphane Story
Q & A

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Q 1. What is Sulforaphane?

A. Sulforaphane is a compound formed in plants of the Broccoli vegetable family. The vegetables of this plant family are known as *Cruciferous Vegetables.* Sulforaphane has been extensively researched for its health-promoting benefits.

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Q 2. How much Sulforaphane is found in Broccoli?

A. In fact, there is no Sulforaphane found in Broccoli or any other Cruciferous Vegetable. The plant cell contains 2 different types of sacs that contain the 2 substances that produce Sulforaphane only when mixed together.

When the plant is cut or chewed, the contents of the 2 sacs combine, producing a chemical reaction that leads to the production of the Sulforaphane.

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Q 3. Why don't the 2 sacs react in a powdered broccoli product, given that the powder been produced by milling the plant and the sacs must have already broken?

A. Enzymes such as Myrosinase can only react when they are in contact with water. Because the powder is dry, there can be no reaction. However, when the powder is added to a glass of water, the chemical reaction begins immediately and the sulforaphane is produced.

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Q 4. What happens to the Sulforaphane if I mix the powder in water and leave the glass on the bench or in the fridge?

A. Sulforaphane is only stable over a short period, so it always wise to consume the mixture as soon as possible and certainly within 30 minutes of mixing.

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Q 5. Is broccoli the best source of Sulforaphane?

A. The highest source of Sulforaphane is not the broccoli vegetable. The highest source is the broccoli sprout, which is between 20-50 times higher in Sulforaphane than the mature vegetable. For this reason, Broccoli Sprouts have been actively researched as a source of the cell-protective bioactive compound, Sulforaphane.

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Q 6. Why are Cruciferous vegetables considered so important?

A. Health authorities across the world encourage us to consume more vegetables, recommending at least 5 serves of vegetables daily plus 2 serves of fruit.

Research shows that, of all vegetables, the cruciferous vegetables have the most protective effect against humans developing serious illness. When we select vegetables, we should regularly include this family of vegetables.

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Q 7. Do most people eat Cruciferous vegetables?

A. Actually, of all the vegetables we could choose to eat, the very valuable cruciferous vegetables like broccoli make up less than 1% of average consumption.

Clearly, most people are not taking advantage of the benefits of this well-researched vegetable.

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Q 8. What does Sulforaphane do?

A. Sulforaphane is a small molecule that is easily taken up by human cells. Once inside the cells, it acts as a 'signalling molecule', sending messages to other parts of the cell. One of Sulforaphane's most important functions is that it activates a 'switch' within the cell. This 'switch' (a special molecule known as Nrf2) releases a small fragment which then travels into the nucleus, the part of the cell in which the genes are housed.

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Q 8. What does Sulforaphane do ?*contd*

A. Once inside the nucleus, it locates the genes of the cell's internal defence activities. In some cases, the DNA in sections of these genes can be completely 'switched off'; in other cases, the genes may be just 'lazy' or 'sleepy'.

Certainly as we age or are unwell, the activity of these genes declines. In any case, Sulforaphane is capable of restoring the gene's activity towards normal.

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Q 9. How many different genes does Sulforaphane influence?

A. To date, Scientists have found that there are around 200 genes of the cell's defence system known to be influenced by Sulforaphane.

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Q 10. What is meant by the *'Cell's Defence System'*?

A. Our body cells use many different processes to defend themselves against attack. Two of the most important of these protective processes are:

- ANTIOXIDANT BALANCE
- DETOXIFICATION

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Q 10. What is meant by the *'Cell's Defence System'*? *contd*

A.

1. ANTIOXIDANT BALANCE To provide the appropriate level of Antioxidant balance to stop free radicals from damaging the cell's delicate systems.
2. DETOXIFICATION To produce specialised Detoxification Enzymes that break down toxins quickly, before they have a chance to damage the cell.

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Q 11. What is a ‘free radical’?

A. A ‘free radical’ is a chemical substance that is very unstable, missing an electron in its outer layer. It attacks other chemicals, ‘stealing’ an electron from this other substance. The 2nd substance then becomes unstable; it becomes a free radical itself.

This creates a chain reaction of free radical activity and this chain reaction leaves a trail of damage wherever it goes. Scientists call this Oxidative Stress.

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Q 12. Where do free radicals come from?

A. Free radicals are found all around us in the environment in the form of pollution, radiation, hazardous chemicals, barbecued meat, cigarette smoke and so on.

Not all free radical activity is harmful and the body uses them to send signals to other parts of the cell.

It is when they are uncontrolled that they are dangerous to our health.

This state of uncontrolled activity is what we call Oxidative Stress.

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Q 13. How do humans deal with Oxidative Stress?

A. Nature has provided the cell with a series of Antioxidant Enzymes whose task it is to quench (or neutralise) excessive free radical activity. These are very powerful antioxidants.

The healthy cell also produces a constant supply of another Antioxidant compound, Glutathione that bathes every part of the cell. Glutathione is also essential in the detoxification of drugs like paracetamol.

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Q 13. How do humans deal with Oxidative Stress? *contd*

A. Yet other kinds of Antioxidants are found in food, especially in brightly-coloured fruits and vegetables.

One of the reasons that Nutritionists recommend that we regularly consume a wide variety of brightly-coloured fruits and vegetables is so that we can obtain a variety of these Antioxidant compounds.

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Q 13. How do humans deal with Oxidative Stress? *contd*

A. Quenching free radicals in the digestive tract minimises the numbers of these harmful substances entering the bloodstream.

It is best to consume brightly-coloured fruits and vegetables with a meat-containing meal or other foods such as deep fried foods where there is likely to be increased free radical activity.

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Q 14. What Antioxidants are increased by Sulforaphane?

A. One of the most important antioxidant molecules increased because of Sulforaphane's presence in the cell is Glutathione. Glutathione is a bit like an 'antioxidant bath' within the cell.

As long as there is adequate Glutathione in the cell, it is protected against many potentially-damaging molecules.

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Q 15. Can I just take Antioxidant supplements like Vitamin C?

A. The Antioxidants produced naturally within the cell are many times more powerful than Vitamin C and other Vitamin-based Antioxidants

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Q 16. Why not just eat broccoli vegetable more often?

A. In practice, most people simply don't eat enough broccoli to make a difference. More importantly, cooking the broccoli destroys the Myrosinase enzyme so essential for the conversion to Sulforaphane. Broccoli sprout is so much more concentrated than the vegetable, only a small amount of the sprout is needed daily.

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Q 17. How does Sulforaphane activates the cell's Detoxification Enzymes?

A. All cells produce waste materials every day. These wastes will poison the cell if it doesn't detoxify and then eliminate them. Some of these waste products are so toxic that they must be neutralised before they can be passed out of the body. Uncontrolled toxins lead to cell damage and disease.

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Q. 18 Sulforaphane – a powerful compound ?

A. Research over the past 15 years has shown that the most powerful known natural substance capable of ‘switching on’ or ‘upregulating’ these Detoxification Enzymes is Sulforaphane.

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Q.19 What are Sulforaphane's '*epigenetic* effects'?

A. The chemicals in a healthy diet send different signals to our DNA. We have already seen that Sulforaphane activates the 'switch' in the cell that activates the cell's internal defences. Sometimes, we say that Sulforaphane talks to the DNA.

We say that a substance that is capable of favourably interacting with our cellular DNA has an epigenetic effect. Sulforaphane has an epigenetic effect.

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Q. 20 How does this help me?

A. This new and exciting branch of Nutritional Science opens up a whole new arena of personal health care, whereby individuals can take back control of their own health by carefully selecting foods for their epigenetic advantage.

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