

Broccoli helps clear damaged lungs

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Here's another reason to eat your greens. As well as [helping to prevent cancer](#), broccoli may also help the immune system to clean harmful bacteria from the lungs. A compound found in the vegetable is now being trialled as a treatment for people with lung disease.

To ensure that the lungs function correctly, white blood cells called macrophages remove debris and bacteria that can build up in the lungs and cause infection.

This cleaning system is defective in smokers and people with [chronic obstructive pulmonary disease](#) (COPD) – a combination of emphysema and bronchitis – who suffer from frequent infections.

Now, researchers have figured out that a chemical pathway in the lungs called NRF2, involved in macrophage activation, is wiped out by smoking. They also found that sulphoraphane, a plant chemical that is made by broccoli, cauliflower and other cruciferous vegetables when damaged, such as when chewed, can restore this pathway.

Service restored

[Shyam Biswal](#) at Johns Hopkins University in Baltimore, Maryland, and colleagues, exposed defective macrophages from the lungs of 43 people with COPD to two bacterial strains that are common causes of COPD-associated infections.

In the presence of sulphoraphane, the NRF2 pathway was boosted and the macrophages' ability to recognise and engulf bacteria was restored.

The researchers then exposed mice to smoke for one week or six months. Both groups were found to have increased bacterial colonisation of the lungs, similar to that seen in COPD. After treating the mice with sulphoraphane, they found that bacterial clearance increased. Rather than activate more macrophages, sulphoraphane appeared to improve the functionality of the cells already present.

Good greens

Sulphoraphane is present in broccoli in its precursor form and is converted to the active compound by enzymes present in saliva and intestinal bacteria, says Christopher Harvey, co-author of the research.

The levels of enzyme vary between people, and it would therefore be expected that the dose of sulphoraphane obtained by dietary consumption would vary between people too. Further human studies are required to establish beneficial effects of a sulforaphane-rich diet on immune defenses, he says.

Biswal's team has started phase 2 clinical trials to test the compound in people with COPD to see if it improves their lung function, but says it will be three years before they have results. "There are many diseases that have defective lung function as a result of increased bacterial function in the lungs," he says, "so this study can be extrapolated to those diseases too."

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