

# Best Foods for Healthy Lungs

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✓ Fact Checked

March 16, 2022

## STORY AT-A-GLANCE

- › Lung function tends to peak around the age of 30, after which it starts to decline. The rate of decline varies depending on factors such as smoking, exercise, exposure to pollutants, medical conditions and diet
- › Anthocyanins, a type of flavonoid, have been shown to improve symptoms of chronic obstructive pulmonary disease, and help slow the gradual decline in lung health associated with aging
- › Recent research shows those in the highest quartile of anthocyanin intake, compared to those in the lowest quartile, had a significantly reduced annual decline in three lung function measurements over time
- › Polyphenols – plant compounds that give fruits, vegetables and berries their vibrant colors – also lower your risk of hypertension, diabetes, heart disease, erectile dysfunction and cancer, and boost bone and brain health
- › Vitamin C has been found to reduce the health risks to babies born of mothers who smoke, and nanoparticles derived from tea leaves have been found to destroy up to 80% of lung cancer cells

**This article was previously published June 4, 2018, and has been updated with new information.**

Flavonoids are a group of polyphenols, phytonutrients found in most fruits and vegetables. There are more than 6,000 unique flavonoids, but as a group, they're most

well-known for their antioxidant and anti-inflammatory effects and have been found to lower the risk of many chronic conditions rooted in inflammation. Anthocyanins,<sup>1</sup> specifically – found in red-blue plant pigments that give berries and other foods their red, blue and purple color – have been shown to:

Improve blood sugar control	Normalize blood pressure and enhance capillary strength
Lower oxidative stress and inflammation	Inhibit platelet formation
Prevent buildup of arterial plaque	Increase NAD+ level

Previous animal studies have shown anthocyanins reduce the production of mucus and inflammatory secretions in animals with chronic obstructive pulmonary disease. Some of the latest research suggests the plant compound can also help slow the gradual decline in lung health associated with aging.

## Anthocyanins Protect Lung Health

The study<sup>2</sup> in question analyzed data from 463 British and Norwegian adults who participated in the second and third European Community Respiratory Health Surveys. The average age was 44. The data included dietary information and a spirometry test, which measures the volume of air you can forcefully exhale in one second (FEV1), the total volume of air you can exhale after taking a deep breath (FVC) and the ratio of the two (FEV1/FVC).

According to lead author Vanessa Garcia Larsen, Ph.D., assistant professor in the Human Nutrition Division of the Department of International Health at the Johns Hopkins Bloomberg School of Public Health, lung function tends to peak around the age of 30, after which it starts to decline.

The rate of speed of that decline varies depending on factors such as smoking, your exercise level, exposure to pollutants and the presence of other medical conditions.

Your diet also plays a significant role. Processed foods in general, and processed meats in particular, have previously been linked to a more rapid decline in lung function.<sup>3</sup>

Here, those in the highest quartile of anthocyanin intake, compared to those in the lowest quartile of intake, had a significantly reduced decline in all three lung function measurements. In the highest quartile of anthocyanin intake, FEV1 declined at an average rate of -9.8 milliliters per year (mL/yr) compared to -18.9 mL/yr for those in the bottom quartile of anthocyanin intake. FVC declined at a rate of -9.8 mL/yr compared to -22.2 mL/yr.

On average, the annual decline of FEV1/FVC among those consuming the highest amounts of anthocyanins was just -0.02 per year. No association between anthocyanin intake and lung function was found among smokers, however. According to Garcia-Larsen:<sup>4</sup>

*"Our study suggests that the general population could benefit from consuming more fruits rich in these flavonoids like berries, particularly those who have given up smoking or have never smoked. For smokers, quitting remains the best thing they can do to protect their health."*

## **Flavonoid-Rich Diet Has Many Other Health Benefits**

Aside from protecting your lung function with age, polyphenols – the plant compounds that give fruits, vegetables and berries their vibrant colors – have numerous other health benefits as well. This includes lowering your risk of "middle-age spread," the weight gain around the midsection that is so common with age.

In one study,<sup>5</sup> which included more than 124,000 people, those with the highest flavonoid intake had the least weight gain with age. Certain types of flavonoids were more effective for weight maintenance than others, particularly after the researchers accounted for fiber intake. Anthocyanins, proanthocyanidins and total flavonoid polymers (found in tea and apples) showed the most significant effect after adjusting for fiber.

Overall, for each standard deviation above average in terms of flavonoid consumption, the study participants gained one-tenth to three-fifths of a pound less over four years. This might not sound striking, but you can consider it the icing on the cake, as this is just one of many benefits. Other health benefits associated with higher intake of flavonoids include:

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### **Reduced risk of diabetes<sup>6</sup>**

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### **Improved blood pressure<sup>7</sup>**

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**Lower risk of heart disease<sup>8</sup>** – Six classes of flavonoids were identified as having a significant impact on heart disease risk, namely flavonols, anthocyanidins, proanthocyanidins, flavones, flavanones and flavan-3-ols.

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### **Lower risk of erectile dysfunction among men<sup>9</sup>**

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**Improved memory consolidation, learning and overall brain function<sup>10</sup>** – The flavonoid responsible for this effect was apigenin, found in many herbs, including parsley, thyme and chamomile. Cocoa flavonoids are also associated with both cardiovascular and brain benefits.

In one study,<sup>11</sup> those who ate dark chocolate at least once a week had better mental performance than those who did not, and previous research<sup>12</sup> has found epicatechin in dark chocolate also helps protect your brain after a stroke by increasing cellular signals that shield nerve cells from damage.

Further, when diabetic patients were given a special high-flavonol cocoa drink for one month, it brought their blood vessel function from severely impaired to normal.<sup>13</sup> The improvement was actually as large as has been observed with exercise and many common diabetic medications.

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**Cancer protection<sup>14</sup>** – When mice implanted with cells of a particularly deadly, fast-growing human breast cancer were treated with the flavonoid apigenin, the

cancerous growth slowed and the tumors shrank.

Apigenin may even be one reason why drinking chamomile tea has been found to reduce thyroid cancer risk by up to 80%.<sup>15</sup> Interestingly, the compound was also found to bind to 160 proteins in the human body, which suggests it has far-reaching health effects.

Additionally, treatment of cells with apigenin or quercetin inhibits CD38 and promotes an increase in intracellular NAD<sup>+</sup> levels.<sup>16</sup> CD38 is the primary enzyme that lowers NAD<sup>+</sup> levels, so by inhibiting it, NAD<sup>+</sup> levels are increased.

Onions and garlic are also rich in flavonoids, including quercetin, which inhibits the growth of cancer cells.<sup>17</sup> Unlike anthocyanins, which had no effect on lung function in smokers, quercetin<sup>18</sup> has been shown to reduce the risk of lung cancer in smokers. It also reduces your risk of heart disease, lowers blood pressure, relieves symptoms of interstitial cystitis and reduces symptoms of prostatitis.

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**Bone health**<sup>19</sup> – In fact, flavonoids have been said to have "the most potential of dietary components for promotion of bone healthy beyond calcium and vitamin D," and research suggests they have a stronger association with bone health than even general fruit and vegetable consumption.<sup>20</sup>

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## Mediterranean Diet Cuts Health Effects of Air Pollution

The health effects of flavonoids and other polyphenols are likely part of why a Mediterranean diet helps protect against the ravages of air pollution. Data from nearly 550,000 individuals followed for 17 years was collected by researchers at the NYU School of Medicine.

Their aim was to assess how closely the diet of the participants mirrored the Mediterranean style diet – which is high in antioxidants and healthy fats – and how this eating pattern influenced the effect of air pollution exposure. The results were recently

presented at the American Thoracic Society's international conference in San Diego. As reported by Time:<sup>21</sup>

*"Death from all causes increased by 5% for every 10 parts per billion increase in long-term average nitrous oxide exposure among people who least adhered to the eating pattern, compared to only 2% among people who most followed the diet.*

*Cardiovascular disease deaths increased 17% for every 10 micrograms per cubic meter increase in long-term average particulate matter exposure among the people who did not closely follow the diet, compared to 5% among the people who did. Similar patterns were seen for heart attack deaths."*

## **Vitamin C Protects Babies From Maternal Smoking Effects**

In related news,<sup>22</sup> vitamin C — another powerful antioxidant — has been found to reduce the health risks to babies born of mothers who smoke. When a woman smokes during pregnancy, her child is at increased risk of wheezing, caused by an obstruction in the lower respiratory tract. Essentially, their lungs and airways are stiffer than normal.

Recent research<sup>23,24</sup> has found that when smoking mothers also took 500 milligrams of oral vitamin C on a daily basis during pregnancy (in addition to their prenatal vitamins), their children had better lung function compared to those whose mothers received a placebo.

An estimated 450,000 smoke-exposed babies are born in the U.S. each year,<sup>25</sup> and according to lead author Dr. Cynthia McEvoy, professor of pediatrics in the division of neonatology at Oregon Health & Science University, while quitting smoking is a priority, for those who cannot quit despite best efforts, vitamin C supplementation may be a simple way to protect the lung function of their children.

## **Tea Derivation Destroys Lung Cancer Cells**

Another recent study<sup>26</sup> found that nanoparticles derived from tea leaves can destroy up to 80% of lung cancer cells. The discovery was made while testing a novel method of producing quantum dots, a type of nanoparticle measuring less than 10 nanometers. For comparison, a single strand of human hair is 40,000 nanometers thick.

While quantum dots – used in a wide variety of products, from computers to cancer treatment, can be made chemically – they have toxic side effects. So, the team was investigating new ways of producing nontoxic quantum dots from plants. As reported by Science Daily:<sup>27</sup>

*"The researchers mixed tea leaf extract with cadmium sulphate (CdSO<sub>4</sub>) and sodium sulphide (Na<sub>2</sub>S) and allowed the solution to incubate, a process which causes quantum dots to form. They then applied the dots to lung cancer cells.*

*They found:*

- *Tea leaves are a simpler, cheaper and less toxic method of producing quantum dots, compared with using chemicals, confirming the results of other research in the field.*
- *Quantum dots produced from tea leaves inhibit the growth of lung cancer cells. They penetrated into the nanopores of the cancer cells and destroyed up to 80% of them. This was a brand-new finding, and came as a surprise to the team."*

The finding suggests plant-derived quantum dots may be a promising field of exploration for cancer researchers. Next, the team plans to explore the role of tea leaf extract in cancer cell imaging, and investigate how quantum dots interface with various cancer cells.

The quantum dots may also have other health related applications, such as sun lotions and nontoxic antimicrobial paint used in operating rooms. The team, led by Sudhagar Pitchaimuthu, Ph.D., of Swansea University, are exploring the possibility of setting up a quantum dot factory to fully explore the many ways in which quantum dots may be used.

## **How to Get More Flavonoids Into Your Diet**

While this is certainly not an exhaustive list, to naturally increase the flavonoids in your diet, consider eating more of the following foods:<sup>28,29,30,31</sup>

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**Flavonols** – Onions, apples, kale, broccoli, garbanzo beans, almonds, turnip greens, sweet potatoes, quinoa

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**Flavan-3-ols** – Apples, tea (including black, green, white and oolong), blueberries, peaches, pears, strawberries, cocoa

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**Flavones** – Parsley, bell peppers, celery, apples, oranges, watermelon, chili peppers, cantaloupe, thyme

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**Flavonones** – Oranges, grapefruit, lemons, tomatoes

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**Anthocyanins**<sup>32</sup> – Strawberries, cherries, red cabbage, cranberries, plums, raspberries, blueberries, bilberries, black currants, purple grapes, purple potatoes

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**Quercetin** – Garlic, apples, plums, red grapes, citrus fruit, dark cherries and dark berries such as blueberries, blackberries and bilberries, capers, olive oil. Small amounts also found in parsley, sage, elder flower, ginkgo biloba and St. John's Wort

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**Apigenin** – Celery, parsley, thyme, basil, oregano, cilantro, chamomile, broccoli, leeks

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**Epicatechin** – Cocoa, dark chocolate, apples, black grapes, blackberries, black tea, cherries

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