

This is how tobacco damages our cells

February 12 2024, by Guillermo López Lluch



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My father smoked a pipe for some time, and I vividly remember that sticky black substance—tar—which stuck to the device's filter. Now imagine this stuff going into your lungs, and coating their walls. The picture is unpleasant, to say the least.

With the countless studies available today on the effects of tobacco use, we should have no trouble convincing ourselves and others of how harmful it is. The cells that make up our tissues, organs and body systems are sensitive to the effects of external toxic agents, many of which can be found in tobacco.

Many smokers not only accept this, but also ignore the serious danger it poses to the people around them.

In this article, we are going to follow [tobacco smoke](#) as it enters and travels through our bodies from the mouth, to the lungs, cells, and on to our nervous systems. At every step, we will see the scientifically proven effects that it has on our bodies, on a microscopic, cellular level.

Initial effects in the mouth and pharynx

When tobacco smoke enters our body, the first cells to receive it are in the mouth, nose and throat. This smoke contains [as many as 50 carcinogenic substances](#) that are quickly dissolved in saliva and nasal fluids. This means that they reach practically all the cells in this area.

Among other things, these substances cause [oxidative damage](#) and [cell death](#). In the worst case, they enter DNA, causing breakages and other damage that, when repaired, give rise to mutations that can trigger cancer.

Though tobacco may be infamous for causing [lung cancer](#), it is also one of the most important risk factors in the eighth deadliest type of cancer: [oral cancer](#).

Moreover, tobacco causes changes in the functions of the immune system that [aggravate the response of various microorganisms to infections](#). These effects on the immune system are also [linked to a](#)

[higher likelihood of developing cancer.](#)

We also cannot forget that tobacco smoke robs us of our sense of taste and smell, leaving an almost continuous bitter taste in the mouth. This is the result of [lost nerve transmission capacity](#) in our sensory organs.

Lung damage

It practically goes without saying that tobacco smoke causes a number of symptoms in the lungs, many of which are grouped together under the umbrella of [chronic obstructive pulmonary disease, or COPD](#). In this disease, the imbalance caused by tobacco on cells in the mouth, nose and throat causes them to generate more, thicker mucus.

Furthermore, due to the direct damage caused by tobacco on the tissue that maintains the structure of the lungs, the bronchi and bronchioles become blocked, generating symptoms similar to suffocation.

As if that were not enough, [people with COPD are also more likely to develop cardiovascular disease, and lung cancer.](#)

Black tar and macrophages

We can cast our minds back to the previous image of my father's pipe, black and sticky with tar.

It so happens that the lungs are rich in macrophages—special cells that play a key role in our immune systems by reacting to attacks, producing inflammatory responses. These cells end up ingesting the tar from tobacco, and they eventually die loaded with this substance which builds up and gives a smoker's lungs their characteristic blackened appearance.

Tobacco smoke also disrupts macrophage activity. Specifically, it reduces their ability to [defend the body against different agents, especially viruses](#), but also cancer cells. This greatly increases the risk of developing lung cancer.

There is no doubt as to the direct relationship between tobacco use and lung cancer, which is one of the most aggressive forms of cancer. Its [5-year survival rate can vary \(depending on the type of cell affected\) between 60% and 25%](#), and it causes [more than one million deaths per year worldwide](#).

Nicotine's effects on neurons: dependence and addiction

Smoking's pleasant effects are the result of [nicotine](#), a chemical present in tobacco. It works by stimulating [receptors](#) in neurons, the channels that transmit information in our brains.

As with any other compound that stimulates neurotransmitter receptors, permanent stimulation desensitizes neurons. This means that the neurons reduce the number of receptors, or change their sensitivity to the stimulant. As a result, increasingly larger amounts of stimulation are needed to obtain the same response. This is how substance addiction comes about.

This desensitization process can lead not only to nicotine dependence, but also to other diseases such as memory loss.

One especially serious consequence can be [myasthenia gravis](#), a disease characterized by [muscle weakness](#) and fatigue due to a lack of effective communication between nerves and muscles. This condition has been associated with an [increased risk of schizophrenia, psychosis, depression](#)

and anxiety. Moreover, the neuronal condition can cause neuropathic pain, meaning pain related to the nervous system.

In short, any benefits that tobacco use may bring are null compared to the innumerable damages it inflicts on cells and the serious health problems that it triggers. Nevertheless, many people voluntarily introduce all of tobacco's harmful compounds into their bodies. This is, at least in part, due to a lack of information.

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