

Highlights: Scientific Review of Findings Regarding Cancer

Smoking can cause cancer in the lungs, trachea, bronchus, esophagus, oral cavity, lip, nasopharynx, nasal cavity, larynx, stomach, bladder, kidney, pancreas, uterine cervix, and other organs and can initiate processes in the body that lead to acute myeloid leukemia and other cancers. A third of all cancer deaths in the United States are linked to tobacco use.

Toxicants and Chemicals in Cigarette Smoke

- The toxicants in cigarette smoke spread quickly from the lungs through the bloodstream and reach cells throughout the body. Smoking causes immediate damage to tissue and cell structure and interferes with the body's normal processes.
- Many of the more than 7,000 chemicals in cigarette smoke are carcinogenic individually and in combination with each other. The chemicals affect key components within the body and bring about processes that lead to cancer. These chemicals enable mutated cells to grow and develop and discourage normal mechanisms that fight proliferation of mutated cells.

DNA Damage

- DNA is the genetic code for every cell in the human body. DNA adducts are bonds between carcinogenic molecules and DNA. Smokers have higher levels of DNA adducts in their tissues than do nonsmokers. Smoking can lead to the production of cancer cells through DNA adduct formation and genetic damage, which drives the process of tumor formation.
- Familial predisposition may also play a role in how smoking causes cancer. Carcinogens from cigarette smoke interact with the body's DNA. Current scientific studies support a possible connection between specific genes, smoking, and the risk for lung and bladder cancer.

Reduced Ability to Fight Cancer

- Apoptosis is a form of natural cell death that allows the body to eliminate unnecessary cells without releasing harmful substances into the body. This important function is suppressed in lung cancers, of which more than 85% are attributable to smoking. Suppressed apoptosis correlates with increases in cancer cell survival and proliferation. This means that smoking can cause cancer and then interfere with the body's ability to fight it.
- Nicotine promotes survival and proliferation of cancer cells in the lungs and leads to an increase in growth of new blood vessels from pre-existing ones. This can lead to the transition of tumors from a benign state to malignancy.

Even One Cigarette is Harmful

- All cigarettes are harmful, and any exposure to tobacco smoke has the potential to cause both immediate and long-term damage within the body. There is no safe level of exposure to tobacco smoke, and there is no safe cigarette.
- Smoking cessation remains the only proven strategy for reducing the pathogenic processes leading to cancer.

Disclaimer: Data and findings provided on this page reflect the content of the 2010 Surgeon General's Report (*How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*). More recent information may exist elsewhere on the Smoking & Tobacco Use Web site (for example, in fact sheets, frequently asked questions, or other materials that are reviewed on a regular basis and updated accordingly).