

Psychological Stress and Cancer: Questions and Answers

Key Points

- Psychological stress affects the body in many ways (see Question 2).
- A direct relationship between psychological stress and the development of cancer has not been scientifically proven (see Question 3).
- Researchers have suggested that psychological factors may affect cancer progression (increase in tumor size or spread of cancer in the body) in patients who have the disease (see Question 5).

Introduction

The complex relationship between physical and psychological health is not well understood. Scientists know that psychological stress can affect the immune system, the body's defense against infection and disease (including cancer); however, it is not yet known whether stress increases a person's susceptibility to disease (1).

1. What is psychological stress?

Psychological stress refers to the emotional and physiological reactions experienced when an individual confronts a situation in which the demands go beyond their coping resources. Examples of stressful situations are marital problems, death of a loved one, abuse, health problems, and financial crises (2).

2. How does stress affect the body?

The body responds to stress by releasing stress hormones, such as epinephrine (also called adrenaline) and cortisol (also called hydrocortisone). The body produces these stress hormones to help a person react to a situation with more speed and strength. Stress hormones increase blood pressure, heart rate, and blood sugar levels. Small amounts of stress are believed to be beneficial, but chronic (persisting or progressing over a long period of time) high levels of stress are thought to be harmful (1).

Stress that is chronic can increase the risk of obesity, heart disease, depression, and various other illnesses. Stress also can lead to unhealthy behaviors, such as overeating, smoking, or abusing drugs or alcohol, that may affect cancer risk.

3. Can stress increase a person's risk of developing cancer?

Studies done over the past 30 years that examined the relationship between psychological factors, including stress, and cancer risk have produced conflicting results. Although the results of some studies have indicated a link between various psychological factors and an increased risk of developing cancer, a direct cause-and-effect relationship has not been proven (3, 4).

Some studies have indicated an indirect relationship between stress and certain types of virus-related tumors. Evidence from both animal and human studies suggests that chronic stress weakens a person's immune system, which in turn may affect the incidence of virus-associated cancers, such as Kaposi sarcoma and some lymphomas (5).



X 3 0 1 7

More recent research with animal models (animals with a disease that is similar to or the same as a disease in humans) suggests that the body's neuroendocrine response (release of hormones into the blood in response to stimulation of the nervous system) can directly alter important processes in cells that help protect against the formation of cancer, such as DNA repair and the regulation of cell growth (6).

4. Why are the study results inconsistent?

It is difficult to separate stress from other physical or emotional factors when examining cancer risk (3, 4). For example, certain behaviors, such as smoking and using alcohol, and biological factors, such as growing older, becoming overweight, and having a family history of cancer, are common risk factors for cancer. Researchers may have difficulty controlling the presence of these factors in the study group or separating the effects of stress from the effects of these other factors (3). In some cases, the number of people in the study, length of follow-up, or analysis used is insufficient to rule out the role of chance (4). Also, studies may not always take into account that cancer is not a homogeneous (uniform in nature) disease.

5. How does stress affect people who have cancer?

Studies have indicated that stress can affect tumor growth and spread, but the precise biological mechanisms underlying these effects are not well understood. Scientists have suggested that the effects of stress on the immune system may in turn affect the growth of some tumors (7). However, recent research using animal models indicates that the body's release of stress hormones can affect cancer cell functions directly (8).

A review of studies that evaluated psychological factors and outcome in cancer patients suggests an association between certain psychological factors, such as feeling helpless or suppressing negative emotions, and the growth or spread of cancer, although this relationship was not consistently seen in all studies (3). In general, stronger relationships have been found between psychological factors and cancer growth and spread than between psychological factors and cancer development (6).

6. Where can a person find more information about psychological stress?

Additional information about stress can be found on the National Institute of Mental Health's (NIMH) Web site at <http://www.nimh.nih.gov> on the Internet. The NIMH, a part of the National Institutes of Health, provides national leadership in the study of mental and behavioral disorders, including the causes and effects of psychological stress.

The National Women's Health Information Center (NWHIC), a service of the Office on Women's Health, provides information on stress and health on its Web site at <http://www.womenshealth.gov> on the Internet. In particular, the fact sheet *Stress and Your Health* provides answers to frequently asked questions about causes of stress, how women react to stress, and ways to handle stress. This resource is available at <http://www.womenshealth.gov/faq/stress.htm> on the Internet.

Selected References

1. Segerstrom S, Miller G. Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin* 2004; 130(4):601–630.
2. Venes D, Thomas C, editors. *Taber's Cyclopedic Medical Dictionary*. 19th ed. Philadelphia: FA Davis Company, 2001.
3. Garssen B. Psychological factors and cancer development: Evidence after 30 years of research. *Clinical Psychology Review* 2004; 24(3):315–338.
4. Dalton SO, Boesen EH, Ross L, Schapiro IR, Johansen C. Mind and cancer: Do psychological factors cause cancer? *European Journal of Cancer* 2002; 38(10):1313–1323.
5. Reiche EM, Nunes SO, Morimoto HK. Stress, depression, the immune system, and cancer. *The Lancet Oncology* 2004; 5(10):617–625.

6. Antoni MH, Lutgendorf SK, Cole SW, et al. The influence of bio-behavioural factors on tumour biology: Pathways and mechanisms. *Nature Reviews Cancer* 2006; 6(3):240–248.
7. Andersen BL, Farrar WB, Golden-Kreutz D, et al. Stress and immune responses after surgical treatment for regional breast cancer. *Journal of the National Cancer Institute* 1998; 90(1):30–36.
8. Thaker PH, Han LY, Kamat AA, et al. Chronic stress promotes tumor growth and angiogenesis in a mouse model of ovarian carcinoma. *Nature Medicine* 2006; 12(8):939–944.

#

Related NCI materials and Web pages:

- National Cancer Institute Fact Sheet 10.3, *Quitting Tobacco: Handling Stress ... Without Smoking* (<http://www.cancer.gov/cancertopics/factsheet/Tobacco/stress>)
- *Understanding Cancer Series: The Immune System* (<http://www.cancer.gov/cancertopics/understandingcancer/immunesystem>)
- *What You Need To Know About™ Cancer* (<http://www.cancer.gov/cancertopics/wyntk/overview>)

How can we help?

We offer comprehensive research-based information for patients and their families, health professionals, cancer researchers, advocates, and the public.

- **Call** NCI's Cancer Information Service at 1–800–4–CANCER (1–800–422–6237)
- **Visit** us at <http://www.cancer.gov> or <http://www.cancer.gov/espanol>
- **Chat** using LiveHelp, NCI's instant messaging service, at <http://www.cancer.gov/livehelp>
- **E-mail** us at cancergovstaff@mail.nih.gov
- **Order** publications at <http://www.cancer.gov/publications> or by calling 1–800–4–CANCER
- **Get help** with quitting smoking at 1–877–44U–QUIT (1–877–448–7848)

This fact sheet was reviewed on 4/29/08