Tumor Grade: Questions and Answers

Key Points

- Tumor grade is a system used to classify cancer cells in terms of how abnormal they look under a microscope and how quickly the tumor is likely to grow and spread (see Question 2).
- A pathologist (a doctor who identifies diseases by studying cells under a microscope) determines whether the tumor is benign or malignant. The pathologist also determines the tumor grade (see Question 3).
- Each type of cancer is graded using a different grading system (see Question 5).
- Doctors consider tumor grade and other factors when developing an individual treatment plan for a patient (see Question 6).

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1.   What is a tumor?

In order to understand tumor grade, it is helpful to know how tumors form. The body is made up of many types of cells. Normally, cells grow and divide to produce new cells in a controlled and orderly manner. Sometimes, however, new cells continue to be produced when they are not needed. As a result, a mass of extra tissue called a tumor may develop. A tumor can be benign (not cancerous) or malignant (cancerous). Cells in malignant tumors are abnormal and divide without control or order. These cancerous cells can invade and damage nearby tissue, and spread to other parts of the body (metastasize).

2.   What is tumor grade?

Tumor grade is a system used to classify cancer cells in terms of how abnormal they look under a microscope and how quickly the tumor is likely to grow and spread. Many factors are considered when determining tumor grade, including the structure and growth pattern of the cells. The specific factors used to determine tumor grade vary with each type of cancer.

Histologic grade, also called differentiation, refers to how much the tumor cells resemble normal cells of the same tissue type. Nuclear grade refers to the size and shape of the nucleus in tumor cells and the percentage of tumor cells that are dividing.

Tumor grade should not be confused with the stage of a cancer. Cancer stage refers to the extent or severity of the cancer, based on factors such as the location of the primary tumor, tumor size, number of tumors, and lymph node involvement (spread of cancer into lymph nodes). (More information about staging is available in the NCI fact sheet *Staging: Questions and Answers,* which can be found at http://www.cancer.gov/cancertopics/factsheet/Detection/staging on the Internet.)

3.   How is tumor grade determined?

If a tumor is suspected to be malignant, a doctor removes a sample of tissue or the entire tumor in a procedure called a biopsy. A pathologist (a doctor who identifies diseases by studying cells under a microscope) examines the tissue to determine whether the tumor is benign or malignant. The pathologist can also determine the tumor grade and identify other characteristics of the tumor cells.

4.   What do the different tumor grades signify?

Based on the microscopic appearance of cancer cells, pathologists commonly describe tumor grade by four degrees of severity: Grades 1, 2, 3, and 4. The cells of Grade 1 tumors resemble normal cells, and tend to grow and multiply slowly. Grade 1 tumors are generally considered the least aggressive in behavior.

Conversely, the cells of Grade 3 or Grade 4 tumors do not look like normal cells of the same type. Grade 3 and 4 tumors tend to grow rapidly and spread faster than tumors with a lower grade.

The American Joint Commission on Cancer recommends the following guidelines for grading tumors (1):

        Grade
        GX   Grade cannot be assessed   (Undetermined grade)
        G1   Well-differentiated   (Low grade)
        G2   Moderately differentiated   (Intermediate grade)
        G3   Poorly differentiated   (High grade)
        G4   Undifferentiated   (High grade)

5.   Does the same grading scale apply to all tumors?

Grading systems are different for each type of cancer. For example, pathologists use the Gleason system to describe the degree of differentiation of prostate cancer cells. The Gleason system uses scores ranging from Grade 2 to Grade 10. Lower Gleason scores

describe well-differentiated, less aggressive tumors. Higher scores describe poorly differentiated, more aggressive tumors. Other grading systems include the Bloom-Richardson system for breast cancer and the Fuhrman system for kidney cancer.

6.   Does tumor grade affect a patient's treatment options?

Doctors use tumor grade and many other factors, such as cancer stage, to develop an individual treatment plan for the patient and to predict the patient's prognosis. Generally, a lower grade indicates a better prognosis (the likely outcome or course of a disease; the chance of recovery or recurrence). However, the importance of tumor grade in planning treatment and estimating a patient's prognosis is greater for certain types of cancers, such as soft tissue sarcoma, primary brain tumors, lymphomas, and breast and prostate cancer. Patients should speak with their doctor about tumor grade and how it relates to their diagnosis and treatment.

Selected References

1.   American Joint Committee on Cancer. *AJCC Cancer Staging Manual.* 6th ed. New York, NY: Springer, 2002.

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Related Resources

Publications (available at http://cancer.gov/publications)
- National Cancer Institute Fact Sheet 5.32, *Staging: Questions and Answers*
- National Cancer Institute Fact Sheet 6.7, *Cancer: Questions and Answers*
- National Cancer Institute Fact Sheet 8.2, *Understanding Prognosis and Cancer Statistics*
- *What You Need To Know About™ Cancer*

National Cancer Institute (NCI) Resources

Cancer Information Service (toll-free)
Telephone: 1–800–4–CANCER (1–800–422–6237)
TTY: 1–800–332–8615

Online
NCI's Web site: http://cancer.gov
LiveHelp, NCI's live online assistance:
https://cissecure.nci.nih.gov/livehelp/welcome.asp

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