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# Q&A: Functional Imaging

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**Q:** In addition to diagnosing cancer, how can doctors use imaging to determine if treatment is working?

**A:** New imaging technologies that measure the extent of drug-target interactions are the latest in biomarker discoveries. Biomarkers can also be used to predict cancer recurrence, indicate the presence of cancer—such as prostate-specific antigen (PSA) for prostate cancer or CA-125 for ovarian cancer—or to determine which patients will respond to certain therapies, as is the case for Herceptin (trastuzumab) in HER2-positive breast cancer.

The National Cancer Institute, the Food and Drug Administration and the Centers for Medicare & Medicaid Services—all part of the U.S. Department of Health and Human Services—are collaborating on a project to determine if dynamic, functional imaging technology can be used to measure change in a tumor following treatment, thus making it a biomarker of therapeutic response.

Ongoing projects include fluorodeoxyglucose- positron emission tomography (FDG-PET) scanning of patients being treated for lung cancer or non-Hodgkin's lymphoma. The technique employs an imaging tool used to diagnose cancer (PET) with a fluorescent marker (FDG) to reveal tumor growth. Cancer cells, particularly those from aggressive tumors, consume significantly larger amounts of FDG, a type of sugar, than surrounding normal tissue. Presence of FDG can be detected by PET imaging in tumors as small as 1 centimeter.

FDG-PET studies could have an enormous impact on patient care by validating a tool to identify treatment response. Doctors would be able to compare PET scans taken before and after therapy to determine if metabolic activity of cancer cells has increased or decreased rather than waiting for the volume of the tumor to change, which could take weeks or months. Results from these trials will be available on the NCI's cancer Biomedical Informatics Grid™ website at [cabig.cancer.gov](http://cabig.cancer.gov).

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