

# Metastasis Research Center

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## THE CHALLENGE

Of the nearly 8 million deaths caused by cancer worldwide each year, more than 90 percent are due to metastasis—the spread of cancer from its original, or primary, tumor site to other parts of the body. Despite significant advances in early diagnosis and treatment of many types of cancer, metastasis remains difficult to overcome. Virtually all metastases become resistant to conventional therapies, and many are far advanced even before primary tumors are diagnosed.

## THE OPPORTUNITY

To find new solutions to this lethal problem, scientists at The University of Texas MD Anderson Cancer Center are working together within the



Metastasis Research Center (MRC)—one of the world's largest research programs devoted solely to the study of metastasis. Led by **Lee M. Ellis, M.D.** (left), professor of surgical oncology and cancer biology, the MRC is among seven centers of excellence in

the multidisciplinary Red and Charline McCombs Institute for the Early Detection and Treatment of Cancer.

The foundation for improving cancer therapy lies in enhanced understanding of the biology of the disease. The MRC seeks to capitalize and expand on new knowledge of cancer and molecular biology resulting from basic science research—and translate this knowledge into new, personalized therapies for patients with metastasis. Research here is subdivided into three areas, each led by a center co-director: 1) the **tumor microenvironment** (headed by Menashe Bar-Eli, Ph.D.); 2) **cancer stem cells and epithelial mesenchymal transition** (Senduri Mani, Ph.D.), a process which enables cancer cell dissemination; and 3) **genomics and genetics of**

## WHY NOW?

Innovations in molecular technology, such as the identification of specific genes and proteins, has opened the door to pinpointing the precise molecules involved in uncontrolled cell growth and metastasis. These molecules are promising new targets for personalized cancer therapy. Once developed, these new therapies will help our experts forecast—before any treatment begins—the metastatic properties of an individual patient's cancer and its probable response to specific therapies. Based on this information, doctors can then select the most effective therapy for that patient's individual cancer.

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**metastasis** (Elsa Flores, Ph.D.), which can reveal the complex genetic changes that occur within a tumor and fuel its spread to distant sites. Within these areas, experts are working to impact many types of metastatic cancer, including colorectal, thoracic/head and neck, genitourinary, gynecologic, breast, childhood cancers and brain tumors.

## THE BIOLOGY OF METASTASIS

Metastasis occurs via select cancer cells that travel through the body's bloodstream or lymphatic system. While these metastatic cells can take root and thrive in multiple locations, they seem to prefer certain organs. Lung cancer, for instance, commonly spreads to the brain or bones; colon cancer frequently metastasizes to the liver. Explained in a theory dubbed "seed and soil," cancer cells (the seeds) use nutrients and growth factors from their host organs (the soil or microenvironment) to stimulate tumor growth.

## THE IMPACT OF GIVING

The leadership of MD Anderson has deemed the center's initiatives a fundraising priority. Gifts to the MRC will help defeat the leading cause of cancer deaths by providing support for promising research projects (which require additional data to compete successfully for traditional sources of funding such as National Institutes of Health grants); lectures, retreats and other education tools which are vital to training tomorrow's metastasis researchers; and essential equipment purchases.