12-29-2010

MIRSKY HOLIDAY LECTURES ON SCIENCE 2010

The Rockefeller University

51ST ANNUAL ROCKEFELLER UNIVERSITY
HOLIDAY LECTURES ON SCIENCE
ESTABLISHED BY ALFRED E. MIRSKY

When Good Cells Go Bad

How Cancer Cells Gain the Power to Multiply and Spread

Lecture by **Sohail Tavazoie**, Leon Hess Assistant Professor

As both a physician and a scientist, Dr. Tavazoie's research is based on molecular and cellular research as well as observations from animal models of cancer and studies of human patients. Dr. Tavazoie joined Rockefeller as assistant professor in 2009 after four years as a research fellow at Memorial Sloan-Kettering Cancer Center. He received his undergraduate degree from the University of California, Berkeley, his Ph.D. from Harvard University and his M.D. from Harvard Medical School and the Harvard-MIT Division of Health Sciences and Technology. He completed his residency and internship at Brigham and Women's Hospital and Harvard Medical School. The goals of the Tavazoie lab are to generate predictors of cancer outcomes that will guide clinical decision making and to identify and therapeutically target critical nodes required for cancer progression and resistance to chemotherapy.

WEDNESDAY, DECEMBER 29, 2010

10:30 A.M. – 2:30 P.M.

Lunch served
12 – 1 p.m.

Lecture will be held
in **Caspary Auditorium**
The Rockefeller University
1230 York Avenue
(at East 66th Street)
New York, NY 10065

Online registration at
www.rockefeller.edu/holidaylecture

"The reason cancer is so deadly is that cancerous cells have the ability to grow rapidly and move throughout the body. If we can understand how they do this we can make death from cancer a thing of the past."

Every cell in the human body — all 100 trillion of them — has the potential to become a killer. Many of them are just one mistake away from becoming cancerous. The only reason they haven't gone rogue yet is that the body has precise and diligent mechanisms to ensure they all divide at the right times and each of them ends up in the right place.

Because mistakes sometimes happen, we are equipped with backup mechanisms. Our cells have self-destruct sequences that can detect when growth programs go awry, and activate a suicide routine. Our bodies are set up to restrict access to nutrients that cells need to grow rapidly. If all else fails, our immune system can recognize rogue cells and eliminate them.

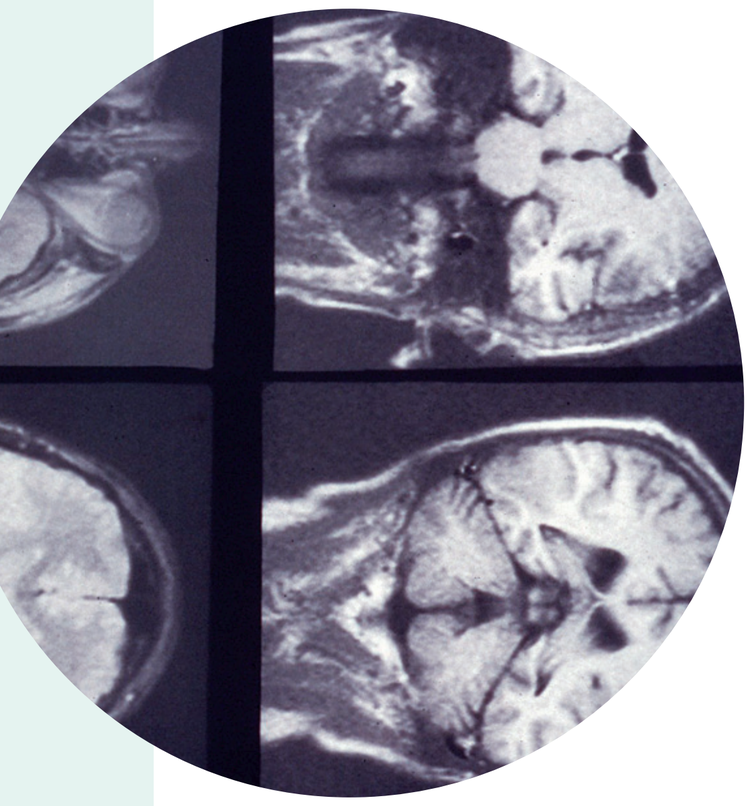
And still, mistakes slip through.

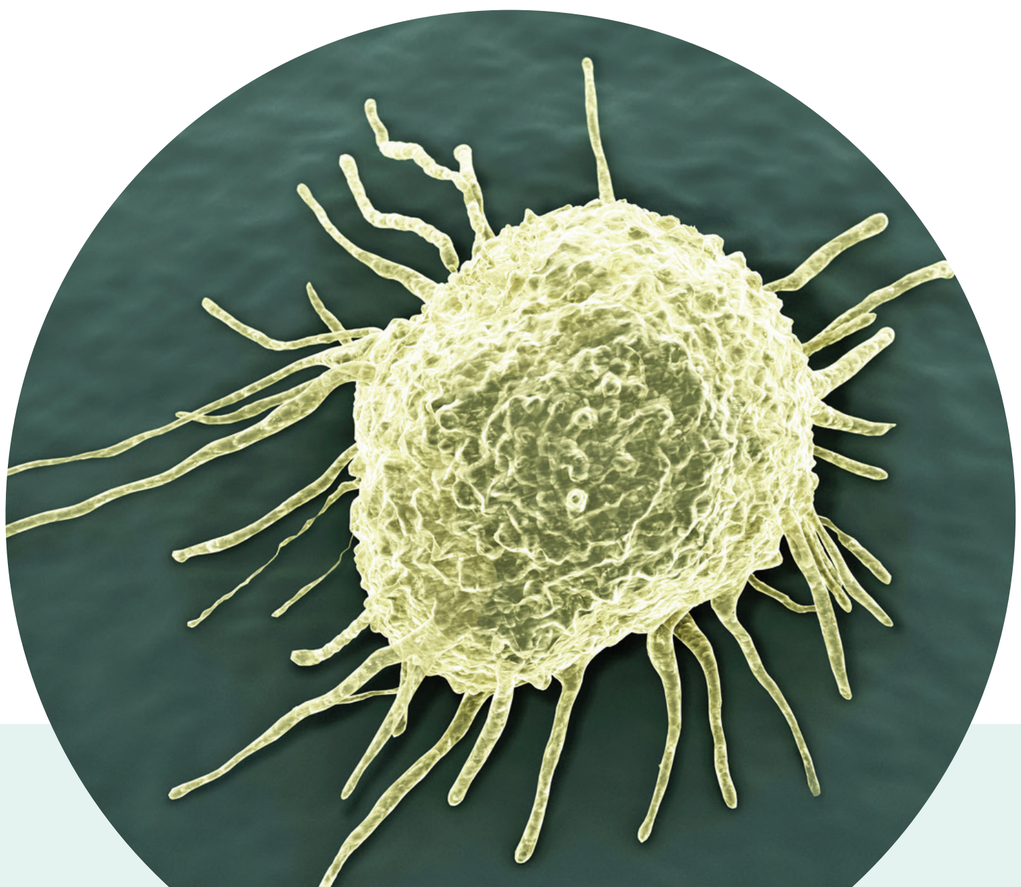
Particularly as we age, these backup systems become less and less effective. At the same time, more and more cells develop the tendency to make errors. Such failures can result in the abnormal growth of cells. You might know it as cancer.

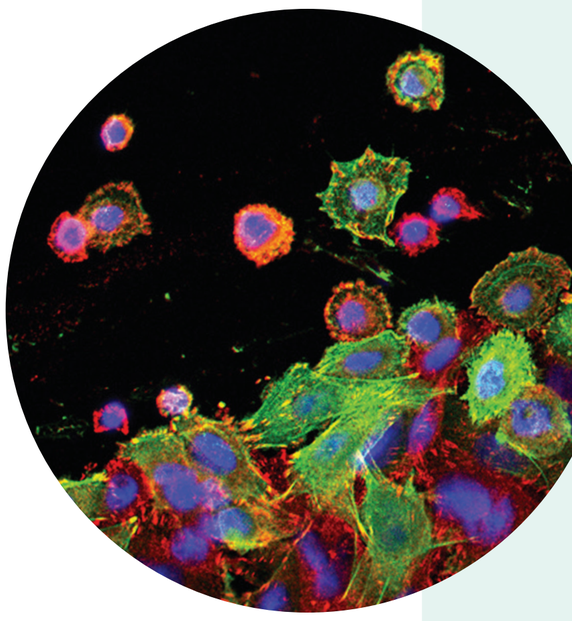
And that's where a bad situation gets far worse. As cancerous cells begin to grow, they can access genes that were meant to be active only during embryonic development and available only to unspecialized stem cells that have the potential to become any type of cell in the body. The genetic programs that instruct stem cells and their progeny are extremely powerful, and they ultimately allow cancerous cells to do what stem cells once did: to travel and divide, but now on their own terms, without restriction.

The process by which cancers gain the ability to grow and spread — to metastasize — is biologically complex, therapeutically daunting and, to Dr. Tavazoie, scientifically fascinating. By understanding the events that lead to the spread of cancer, Dr. Tavazoie hopes to help develop sophisticated drugs that block this process — and hopefully to someday end the ability of cancer to cause death.

Learn more about cancer and metastasis and see a video of Dr. Tavazoie at www.rockefeller.edu/holidaylecture.







Left: *Metastasized cancer in the brain*
Middle: *Migrating cancer cell*
Right: *Cancer cells breaking off a tumor*