



VANDERBILT PRIZE IN BIOMEDICAL SCIENCE LECTURE

ANGELIKA AMON, Ph.D.

EFFECTS OF ANEUPLOIDY ON CELL PHYSIOLOGY
AND ITS ROLE IN TUMORIGENESIS

JANUARY 31, 2019

4:00 P.M.

208 LIGHT HALL



SPONSORED BY:
OFFICES OF THE EXECUTIVE VICE PRESIDENT FOR RESEARCH
AND THE DEAN OF BASIC SCIENCES

Upcoming Discovery Lecture:

LLOYD B. MINOR, M.D.

The Carl and Elizabeth Naumann Dean of the Stanford University School of Medicine

Professor of Otolaryngology–Head and Neck Surgery,

Professor of Bioengineering and of Neurobiology, by courtesy, Stanford University

February 21, 2019

208 Light Hall / 4:00 P.M.

VANDERBILT  UNIVERSITY
MEDICAL CENTER

EFFECTS OF ANEUPLOIDY ON CELL PHYSIOLOGY AND ITS ROLE IN TUMORIGENESIS

Aneuploidy is a hallmark of cancer, but how whole chromosome gains and losses contribute to tumorigenesis remains controversial. To address the role of aneuploidy in tumorigenesis we have developed yeast and mouse models to study the effects of aneuploidy on normal cell physiology. Our analysis shows that aneuploidy is largely detrimental at the organismal and cellular level and causes a stereotypical set of phenotypes known as the aneuploidy associated stresses. Our data further show that aneuploidy drives tumorigenesis by causing multiple forms of genomic instability, which facilitate the evolution of malignant karyotypes. We also study how specific chromosome gains and losses drive tumorigenesis of specific cancers. Given the potential of cells with abnormal karyotypes to become cancerous, we also investigate whether pathways exist that limit the prevalence of aneuploid cells in an organism. We find that cells with highly aneuploid karyotypes induce an inflammatory gene expression signature and are eliminated by natural killer(NK) cells. Our data indicate that cells with abnormal karyotypes generate a signal for their own elimination by the innate immune system that may serve as a means for cancer cell immune surveillance.



ANGELIKA AMON, Ph.D.

KATHLEEN AND CURTIS MARBLE
PROFESSOR OF CANCER RESEARCH
PROFESSOR OF BIOLOGY, KOCH INSTITUTE
FOR INTEGRATIVE CANCER RESEARCH AT MIT

Dr. Amon obtained her PhD in 1994 from the University of Vienna where she studied cell division with Kim Nasmyth. She then joined the laboratory of Dr. Ruth Lehmann at the Whitehead Institute as a Postdoctoral Fellow to investigate germ cell formation in *Drosophila*. In 1996, Dr. Amon accepted a Whitehead Fellow position to study the mechanisms governing chromosome segregation and exit from mitosis. Dr. Amon joined the faculty of the Department of Biology and the Koch Institute for Integrative Cancer Research at MIT in 1999, where she now holds the Kathleen and Curtis Marble Chair of Cancer Research. Dr. Amon is also an investigator of the Howard Hughes Medical Institute.

At MIT Dr. Amon studies the mechanisms that govern chromosome segregation. She also strives to understand what happens when this processes fails and cells receive the wrong number of chromosomes – a condition known as aneuploidy. Amon discovered that aneuploidy, a hallmark of cancer, elicits a systemic stress response characterized by proliferation defects, as well as proteotoxic and energy stress. Amon also identified genetic and chemical interventions that enhance or suppress the aneuploidy-associated stresses providing insights into tumorigenesis and identifying aneuploidy as a therapeutic target in cancer.
