## Dr. Carol W. Greider Telomeres and Telomerase: Past, Present and Future

## Howard Hughes Medical Institute Lecture For Undergraduates

Friday4-5 pm, 76-156Koch Auditorium

Telomeres are essential functional components of chromosomes; they protect chromosome ends from recombination and from being recognized as DNA damage. Telomeres shorten with each cell division due to the end replication problem, but are then elongated by the unique DNA polymerase called telomerase. This shortening and lengthening establishes a telomere length equilibrium that is essential for cells to maintain. All cells that undergo many cell divisions have to solve the telomere shortening problem, thus telomerase is required for the extensive cell divisions that occur in cancer cells and in tissue-specific stem cells. Mice that are null for telomerase are initially viable yet they show progressive telomere shortening with progressive generations of inter-breeding. These mice are excellent models to understand human diseases caused by telomere shortening. To fully understand and potentially treat telomere shortening in disease, it will be essential to dissect the mechanism of telomere length equilibrium maintanance.



Dr. Greider received her Ph.D. in 1987 from the UC Berkeley. In 1984, working together with Dr.

Reception to Follow. Open to undergraduates. Others welcome.

> Event sponsored by the Howard Hughes Medical Institute

Elizabeth Blackburn, she discovered telomerase, an enzyme that maintains telomeres, which she first isolated and characterized from the ciliate Tetrahymena. In 1988, Dr. Greider went to Cold Spring Harbor Laboratory where she cloned and characterized the RNA component of telomerase. There, she expanded the focus of her telomere research to include the role of telomere length in cell senescence, cell death and in cancer. In 1997, she moved her laboratory to the Dept. of Molecular Biology and Genetics at The Johns Hopkins University School of Medicine. In 2004 she was appointed as the Daniel Nathans Professor and Director of the Department of Molecular Biology and Genetics. At JHU, Dr. Greider's group continued to study the biochemistry of telomerase and determined the secondary structure of the human telomerase RNA. She has won a number of awards for the work on telomerase, and she shared the Nobel Prize in Physiology or Medicine with Drs. Elizabeth Blackburn and Jack Szostak in 2009.