

IMCB Invited Speaker



Speaker : Prof. Susan Gasser
Director, Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland

Date : 18 April 2013 (Thursday)

Time : 11:00AM - 12:00PM

Venue : Breakthrough Theatrette, Level 4, Matrix, Biopolis

Host : Dr. Frederic Bard

Seminar :

**Nuclear organization through development:
histone methylation and a novel chromodomain protein anchor heterochromatin**

Heterochromatin comes in several forms and becomes the dominant form of chromatin as cells terminally differentiate. At least one class of heterochromatin is positioned adjacent to the nuclear lamina. We have created a system in which we can track gene position in developing *C. elegans* by live fluorescence microscopy. We have found that in differentiated cells, developmentally regulated promoters are at the nuclear periphery when repressed, and shift inwards when active. In early embryonic cells gene positions are not fixed. Using an in vivo model of fluorescently tagged heterochromatin, we have screened for factors that are necessary for anchoring heterochromatin to the nuclear lamina. We find that its peripheral anchoring is a direct consequence of sequential methylation reactions by two enzymes that modify histone H3 lysine 9. Mono- and di-methylation of H3K9 mediates anchoring, while silencing of the array requires H3K9 trimethylation. A further screen has identified a novel chromodomain protein that mediates perinuclear anchorage by binding H3K9me, to link chromatin bearing this mark to the nuclear envelope. The physiological effects of disrupting the spatial organization of chromatin through loss of the anchoring machinery will be presented.

About the Speaker :

Susan Gasser's research interests focus on how nuclear organization impinges on mechanisms of repair and replication fork stability and on epigenetic inheritance of cell fate decisions. Her laboratory combines genome-wide mapping, synthetic lethal screens, quantitative live fluorescence imaging, biochemical reconstitution and standard yeast molecular genetics to address these questions at the molecular and cellular levels. In questions of stem cell determination and epigenetic inheritance, the Gasser group works with *C. elegans*, to study the effects of nuclear organization on gene expression during well-characterized cell differentiation events. She has authored more than 250 primary articles and reviews over the last 30 years. She has received a number of awards for her work, including election to the Académie de France, the Swiss Medical Academy and Academia Europaea. She received the FEBS | EMBO Women in Science Award 2012, the Inserm International Prize in 2011, and both the Otto Naegeli Award and the Gregor Mendel Medal in 2006. Susan serves on numerous review boards and advisory councils throughout Switzerland and Europe including the European Union FP7 Health Sciences Advisory Board, the Nestle Nutrition Council and from 2001 -2004, as chairman of the EMBO Council.