CECB Members

Steering Committee Members:

Mirit Aladjem, Ph.D.
Dr. Aladjem investigates genetic and epigenetic regulation of DNA replication in mammalian cells. Her laboratory examines mechanisms that transmit signals from the cell cycle regulatory network to chromatin to determine where and when DNA replication initiates during normal cell cycle progression and after exposure to anti-cancer drugs.

Munira Basrai, Ph.D.
Dr. Basrai has two research projects: 1) Molecular mechanisms of faithful chromosome transmission and cell cycle checkpoint control in S. cerevisiae and humans and 2) Functional genomics of previously unidentified small open reading frames (sORFs). Her current research efforts are focused on the structure of specialized centromeric chromatin and how it influences genome stability.

Michael Bustin, Ph.D.
Dr. Bustin's research focuses on the role of chromosomal proteins in chromatin function, gene expression, development and cancer. The current focus is on the cellular function of HMGN proteins.

David Clark, Ph.D. (ex officio)
Dr. Clark's current work focuses on the roles of chromatin-remodeling machines in nucleosome positioning and gene activation.

Shiv Grewal, Ph.D.
Dr. Grewal investigates the epigenetic control of higher-order chromatin assembly in the S. pombe model system. He has shown that RNA interference (RNAi), whereby double-stranded RNAs silence cognate genes, plays a critical role in targeting of heterochromatin complexes to specific locations in the genome. Steering committee member's home page.

Gordon Hager, Ph.D. (Head)
Dr. Hager's interests lie in the role of chromatin structure in gene regulation, the mechanism of steroid receptor function, and the architecture of active genes in the interphase nucleus. His lab examines nuclear receptors as important models in understanding chromatin modification and restructuring. Steering committee member's home page.

Ashish Lal, Ph.D.
Dr. Lal’s current research is focused on investigating the function of specific cancer-associated microRNAs. He has developed a biochemical approach to identify microRNA targets and combines this strategy with systems biology to identify the pathways regulated by a miRNA. Parallel to studies on microRNA function, Dr. Lal’s lab is also investigating the role of tumor suppressor proteins in microRNA biogenesis with special emphasis on P53.

David Levens, M.D., Ph.D.
Dr. Levens' lab studies the interrelationship between DNA topology, DNA conformation and gene expression. In particular we are focusing on a class of sequence specific, super-coil sensitive, single strand DNA binding transcription factors (FBP1, FBP2, FBP3, and F1R) that impose real-time regulation on c-myc and other genes. The supercoiling forces required for binding are generated by ongoing transcription and dynamically transmitted to susceptible sites within the genome.

Michael Lichten, Ph.D.
Dr. Lichten studies the genetic recombination, DNA damage repair, and chromosome structure in S. cerevisiae, with a focus on events that occur during meiosis.

Kathrin Muegge, M.D.
Dr. Muegge investigates the role of DNA methylation in gene regulation during mammalian development. She currently examines the role of the chromatin remodeling protein Lsh in genome wide distribution of cytosine methylation during stem cell differentiation.

Andre Nussenzweig, Ph.D.
Dr. Nussenzweig examines the mechanisms by which cells monitor and repair DNA double-strand breaks. His research goals are to: 1) elucidate the mechanisms by which oncogenic translocations form, 2) determine the influence of chromatin structure on the maintenance of genomic stability, and 3) decipher the complex interplay between DNA damage detection, signaling, and repair.

Shalini Oberdoerffer, Ph.D.
Alternative pre-mRNA splicing is a major mechanism of transcriptome diversification in cells of the immune system. The goal of Dr. Oberdoerffer’s laboratory is to study the extent and mechanism by which trans-factor mediated global shifts in alternative pre-mRNA splicing occur. The lab is centered on induction of the heterogeneous ribonucleoprotein LL (hnRNPLL), during the process of lymphocyte activation.

Thomas Ried, M.D.
Dr. Ried investigates the role of genomic instability and associated gene expression changes during cancer development. He is analyzing aneuploidy as a molecular marker for cancer diagnostics and identifying gene expression signatures that assist in disease prognosis and therapy.
Carl Wu, Ph.D. (Scientist Emeritus, ex officio)
Dr. Wu studies chromatin regulation of eukaryotic gene expression in the yeast, fly, and mouse model systems. His research focuses on how genes are dynamically unmasked by ATP-driven, multi-component chromatin remodeling enzymes, and the physiological significance of this process.

Members:

Sankar Adhya, Ph.D.
Dr. Adhya research interests include regulation of gene transcription, regulatory biology of bacteriophage ?, bacterial nucleoid and bacteriophage applications.

Peter Aplan, M.D.
Dr. Aplan studies the mechanisms that lead to recurrent, non-random chromosomal translocations associated with hematologic malignancies in mouse and human cells.

Yawen Bai, Ph.D.
Dr. Bai's research uses biophysical techniques including NMR and amide hydrogen exchange to investigate the dynamic processes of nucleosome assembly/disassembly and structures of histone chaperones complexed with histones.

Dhruba Chattoraj, Ph.D.
Dr. Chattoraj studies DNA replication and segregation with a focus to understand how these processes are coordinated with the cell cycle in a multi-chromosome bacterium Vibrio cholerae.

Sheue-yann Cheng, Ph.D.
Dr. Cheng's work focuses on the understanding of molecular mechanisms of thyroid hormone receptor (TR) action. TRs are ligand-dependent transcription factors. She is interested in understanding how the gene regulating activity of TRs is modulated by nuclear coregulator proteins via modifying the chromatin structure.

Julie Cooper, Ph.D.
Dr. Cooper studies mechanisms by which chromosome integrity is maintained starting at the telomere, the end of the chromosome. She focuses on how telomeres protect chromosomes from degradation and fusion, as well as alternative strategies for chromosome end protection in the absence of canonical telomeres. She also studies newly emerging roles of telomeres in controlling both spindle and centromere assembly during meiosis. Most of her studies utilize fission yeast, a versatile model system with telomeres and other heterochromatic regions that are highly conserved with those of human.

Yamini Dalal, Ph.D.
Dr. Yamini Dalal studied DNA sequence effects on nucleosome positioning and linker histone H1 modulation of chromatin structure in vitro and in vivo in mouse during her graduate years at Purdue University in the laboratory of Dr. Arnold Stein. She then moved to the Fred Hutchinson Cancer Research Center to work with Dr. Steven Henikoff on the centromere-specific histone variant CenH3 and studied its influence on nucleosome and chromatin structure using Drosophila as a system. Her laboratory interests focus on understanding how chromatin structure influences epigenetic mechanisms involved in important biological functions.

Susan Gottesman, Ph.D.
Dr. Gottesman studies novel mechanisms for gene regulation and how these mechanisms contribute to global control circuits in the E. coli model system. Her current investigations focus on small regulatory RNAs and energy-dependent proteolysis. Steering committee member's home page.

Jing Huang, Ph.D.
Dr. Huang's laboratory focuses on studying how epigenetic events, in particular, methylation and demethylation, are involved in cancer and stem cell differentiation. They use histones, estrogen receptor and p53 as model proteins to study this question. The long-term goal is to identify therapeutic targets and to develop novel approaches to treat cancer stem cells, which are believed to confer chemo-and radio-therapy resistance for certain types of cancer.

Alexander Kelly, Ph.D.
The Kelly lab combines biochemical, biophysical and cell biological approaches to understand the signaling and feedback mechanisms that control chromosome function and segregation during mitosis.

Mikhail Kashlev, Ph.D.
Dr. Kashlev's research interests include: 1) identification of protein factors and mechanisms leading to establishment and maintenance of epigenetic modifications of genes in eukaryotes, 2) the study of TCR and transcription fidelity toward mammalian RNA polymerase II, and 3) understanding the basic mechanism of transcriptional pausing, arrest and termination using RNA polymerase from E. coli.

Vladimir Larionov, Ph.D.
Dr. Larionov's research interests focus on the structure and function of the human centromere. They exploit Human Artificial Chromosomes HACs with synthetic alpheid DNA as a tool for functional and structural analyses of the human kinetochore.

Dan Larson, Ph.D.
Dr. Larson's laboratory investigates the mechanisms of gene regulation, starting from the behavior of individual macromolecules and proceeding to their regulation in cells and tissue. The laboratory utilizes a battery of biophysical and molecular approaches, including single-molecule microscopy, fluorescence fluctuation analysis, RNA visualization in fixed and living cells, and computational modeling of dynamic gene regulation. Currently, the lab focuses on the regulation and function of RNA in a cell-biological context, including transcription, splicing, and post-transcriptional processing.

Maxwell Lee, Ph.D.
Dr. Lee's research focuses on understanding the genetic and epigenetic mechanisms of cancer etiology using an integrative systems biology approach - "cancer genomics and epigenomics". We have been using gene chips to study genome-wide chromatin modification (ChIP-on-chip), human methylome characterization, and gene expression in both normal and cancer cells.

Jordan Meier, Ph.D.
Dr. Meier's research focuses on the development of new inhibitors and profiling agents for studying the activity of chromatin-modifying enzymes, with a special interest in metabolic mechanisms of epigenetic regulation.

Paul Meltzer, M.D., Ph.D.
Dr. Meltzer's research interests are focused on the characterization of genetic alterations in cancer cells, the mechanisms that lead to their development and their effects on gene expression. To address these issues, Dr. Meltzer and colleagues utilize several genomic technologies, especially DNA microarray hybridization.

Tom Misteli, Ph.D.
Dr. Misteli uses molecular techniques in combination with live-cell microscopy to study gene expression in the intact nucleus of living cells. He has developed novel imaging techniques to explore gene and protein function at the molecular level in living cells and his laboratory is applying these methods to understand the contribution of genome organization to differentiation and disease.

Sharan Savage, M.D.
Dr. Savage studies the role of telomere biology in cancer etiology, including telomere length as a biomarker and genetic variation in telomere biology genes. Her research on dyskeratosis congenita, a telomere biology disorder, focuses on identifying mutations in the causative genes, clinical characterization, and genetic modifiers.

David Schrump, M.D.
Dr. Schrump's work focuses on epigenetic mechanism of gene expression in lung cancer cells, and the utilization of DNA demethylating agents and histone deacetylase inhibitors for lung cancer therapy. Additional laboratory efforts pertain to the characterization of epigenetic alterations in normal respiratory epithelia mediated by tobacco smoke.

Shyam Sharan, Ph.D.
Dr. Sharan research is directed towards understanding the role of breast cancer susceptibility genes BRCA1 and BRCA2 in maintaining the genomic integrity using mouse models.

Dinah Singer, Ph.D.
Dr. Singer studies the multiple molecular mechanisms that regulate the tissue-specific and dynamic patterns of MHC class I gene expression in vivo, focusing on transcriptional mechanisms, chromatin structure and boundary elements and their relationship to the biological function of the class I molecule in providing immune surveillance.

Victor Zhurkin, Ph.D.
Dr. Zhurkin uses computer techniques to study the sequence-dependent DNA deformability and its role in nucleosome positioning and formation of the higher-order chromatin structure.