Epigenetics

Biology 695 / Biosciences 704 Fall, 2011

Monday, August 29 – Introduction & topic assignments

Monday, September 12 – DNA methylation and epigenetic reprogramming

Afshin Sohrabi will present - Feng, S., Jacobsen, S.E., and Reik, W. (2010b). Epigenetic reprogramming in plant and animal development. Science (New York, NY *330*, 622-627.

Kenan Ozcan will present - Jacobsen, S.E., and Meyerowitz, E.M. (1997). Hypermethylated SUPERMAN epigenetic alleles in Arabidopsis. Science (New York, NY *277*, 1100-1103.

Monday, September 26 – genome-wide distribution of DNA methylation

Sarah T. will present - Lister, R., Pelizzola, M., Dowen, R.H., Hawkins, R.D., Hon, G., Tonti-Filippini, J., Nery, J.R., Lee, L., Ye, Z., Ngo, Q.M., *et al*. (2009). Human DNA methylomes at base resolution show widespread epigenomic differences. Nature *462*, 315-322.

Jennifer Frost will present - Wu, H., D'Alessio, A.C., Ito, S., Wang, Z., Cui, K., Zhao, K., Sun, Y.E., and Zhang, Y. (2011). Genome-wide analysis of 5-hydroxymethylcytosine distribution reveals its dual function in transcriptional regulation in mouse embryonic stem cells. Genes & Development *25*, 679-684.

Tuesday, October 11 – DNA de novo methylation and demethylation
(on Tuesday because of Columbus Day)

Steve St. John will present - Popp, C., Dean, W., Feng, S., Cokus, S.J., Andrews, S., Pellegrini, M., Jacobsen, S.E., and Reik, W. (2010). Genome-wide erasure of DNA methylation in mouse primordial germ cells is affected by AID deficiency. Nature *463*, 1101-1105.

Elizabeth Jaworski will present - Bhutani, N., Brady, J.J., Damian, M., Sacco, A., Corbel, S.Y., and Blau, H.M. (2010). Reprogramming towards pluripotency requires AID-dependent DNA demethylation. Nature *463*, 1042-1047.

Brian Kang will present - Feng, J., Zhou, Y., Campbell, S.L., Le, T., Li, E., Sweatt, J.D., Silva, A.J., and Fan, G. (2010a). Dnmt1 and Dnmt3a maintain DNA methylation and regulate synaptic function in adult forebrain neurons. Nat Neurosci *13*, 423-430.

Monday, October 24 – Histone acetylation vs. histone methylation

Ashwini Benedict will present - Wang, Z., Zang, C., Cui, K., Schones, D.E., Barski, A., Peng, W., and Zhao, K. (2009). Genome-wide mapping of HATs and HDACs reveals distinct functions in active and inactive genes. Cell *138*, 1019-1031.

Shuo Yang will present - Araki, Y., Wang, Z., Zang, C., Wood, W.H., 3rd, Schones, D., Cui, K., Roh, T.Y., Lhotsky, B., Wersto, R.P., Peng, W., *et al*. (2009). Genome-wide analysis of histone methylation reveals chromatin state-based regulation of gene transcription and function of memory CD8+ T cells. Immunity *30*, 912-925.

Monday, November 7 – nucleosome-free regions vs. heterochromatin assembly

Dominique Finneran will present - Jin, C., Zang, C., Wei, G., Cui, K., Peng, W., Zhao, K., and Felsenfeld, G. (2009). H3.3/H2A.Z double variant-containing nucleosomes mark 'nucleosome-free regions' of active promoters and other regulatory regions. Nature Genetics *41*, 941-945.

Kellie Perry will present - Soppe, W.J., Jasencakova, Z., Houben, A., Kakutani, T., Meister, A., Huang, M.S., Jacobsen, S.E., Schubert, I., and Fransz, P.F. (2002). DNA methylation controls histone H3 lysine 9 methylation and heterochromatin assembly in Arabidopsis. EMBO J *21*, 6549-6559.

Monday, November 21 – microRNAs and chromatin remodeling in development

Massih Abawi will present - Bourc'his, D., and Voinnet, O. (2010). A small-RNA perspective on gametogenesis, fertilization, and early zygotic development. Science (New York, NY *330*, 617-622.

Virginia Espina will present - Ho, L., and Crabtree, G.R. (2010). Chromatin remodelling during development. Nature *463*, 474-484.

Monday, December 5 – developmental switches in chromatin remodeling complexes

Idris Hooper will present - Lessard, J., Wu, J.I., Ranish, J.A., Wan, M., Winslow, M.M., Staahl, B.T., Wu, H., Aebersold, R., Graef, I.A., and Crabtree, G.R. (2007). An essential switch in subunit composition of a chromatin remodeling complex during neural development. Neuron *55*, 201-215.

Irene Guendel Sanchez will present - Yoo, A.S., Staahl, B.T., Chen, L., and Crabtree, G.R. (2009). MicroRNA-mediated switching of chromatin-remodelling complexes in neural development. Nature *460*, 642-646.