Hox genes and axial patterning

Learning objectives:

1. Explain what is meant by homeosis, serial homology, Hox gene.
2. Be able to describe the role of Hox genes in axial patterning and limb development using specific examples.
3. Explain the similarities and differences in Hox function in flies and vertebrates.
4. Discuss evidence for and against the existence of a 'Hox code'.

Reading Assignment:

Read about Hox genes in Larsen:

pp. 67-69; 102-106; 335-340; 405-411

Additional, non required reading:

Evolution:

1. Burke, A.C., C.E. Nelson, B.A. Morgan, and C. Tabin, Hox genes and the evolution of vertebrate axial morphology. Development, 1995. **121**(2): p. 333-46.
2. Carroll, S.B., Homeotic genes and the evolution of arthropods and chordates. Nature, 1995. **376**(6540): p. 479-85.

Disease:

3. Grier, D.G., et al., The pathophysiology of HOX genes and their role in cancer. J Pathol, 2005. **205**(2): p. 154-71.
4. Goodman, F.R., Limb malformations and the human HOX genes. Am J Med Genet, 2002. **112**(3): p. 256-65.
5. Abramovich, C. and R.K. Humphries, Hox regulation of normal and leukemic hematopoietic stem cells. Curr Opin Hematol, 2005. **12**(3): p. 210-6.

Axial:

6. Dubrulle, J. and O. Pourquie, Coupling segmentation to axis formation. Development. **131**): p. 5783
7. Krumlauf, R. Hox genes in vertebrate development. Cell. 1994 Jul 29;78(2):191-201.