BIOL 415: Key questions for quiz 6

Paleopolyploidy (Garsmeur et al. 2014)

- What is paleopolyploidy? *slide 3*
  - How can we detect paleopolyploidy? *slide 7*
    - Morphologically *slides 8-10*
    - How do we tell gene duplication from paleopolyploidy? *slides* 11-14
    - From synteny *slides 15-17*
    - Age distributions of duplicate genes (paralogs) *slides 19-20*
  - How widespread is paleopolyploidy? *slides 21-23*

- Is polyploidy an evolutionary dead-end? *slides 4 & 25, 27*

- How can we reconcile the data on short-term outcomes of polyploidy with rampant multiple ancient polyploidization events? *slide 25*
  - Are paleopolyploid events associated with increases in diversification? *slide 24*

- What is diploidization? example *slides 5-6*

Plant nuclear evolution (Naito *et al.* 2009)

- What is the C-value paradox and why does it exist? *slide 7*
  - Variation in genome size and complexity *slides 4–6*
  - Is Ne likely the explanatory factor? *slides 8–10*
  - Within plants, how variable is genome size and structure? *slide 11*
    - What factors could explain this variation and what is the evidence for them? *slides 12–19*
    - What factor is the most likely explanation for variation in plant genome size?
  - What explains patterns in chromosome number? *slide 13*

- What is the function and evolutionary role of repetitive elements (REs)?
  - What are transposable elements? *slide 20, classes slides 21–23*
  - How important can REs be in plant genome size and structure? *slides 24–27, 29*
  - Is there a fitness cost to RE proliferation? *slide 28*
  - What keeps REs in check? How do they evolve over time? *slides 29 & 30*
  - How do REs complicate genome assemblies? *slides 31 & 32*

Organelle evolution (Bock *et al.* 2014)

- What are the origins of organelles and their genomes? *slides 5–8*

- What were the major steps in organelle genome evolution?
  - What is the evidence for organelle gene transfer? *slides 10–12*

    - When and how does it occur?
        - What characterizes recent transfers? *slides 13–15*
        - How do we identify ancient transfers? *slides 16 & 17*
        - What is the fate of transferred genes? *slide 18*
        - At what rate are genes transferred? *slides 19 & 20*
        - What are two hypothesis to explain how gene transfer occurs? *slides 21–24*

- Why are organelle genomes maintained? *slides 26–28*

- Can organelle genome variation be adaptive?
    - Structure of organelle genomes *slides 30 & 31*
    - Why do we expect most organellar genomic variation to be neutral? *slides 32–34*
    - What kinds of evidence are there for adaptive variation? *slide 35 & 39, examples 36–38*