Announcements 10/12

- Today:
  - finish multiple alignment
  - begin phylogenetic trees
- HW1 solutions posted
- Reminder: homework policy
  - homework should be completed individually
- HW2 due Thursday
- HW3 to be assigned Thursday, due the following Thursday
  - written problems only
  - may not be turned in late

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A single mutation in the prM protein of Zika virus contributes to fetal microcephaly

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Zika virus (ZIKV) has evolved into a global health threat due to its unexpected causal link to microcephaly. Phylogenetic analysis reveals that contemporary epidemic strains have accumulated multiple substitutions from their Asian ancestor. Here, we show that a single serine to asparagine substitution (S139N) in the viral polyprotein substantially increased ZIKV infectivity in both human and mouse neural progenitor cells (NPCs), led to more significant microcephaly in the mouse fetus, and higher mortality in neonatal mice. Evolutionary analysis indicates that the S139N substitution arose before the 2013 outbreak in French Polynesia and has been stably maintained during subsequent spread to the Americas. This functional adaption makes ZIKV more virulent to human NPCs, thus contributing to the increased incidence of microcephaly in recent ZIKV epidemics.