Sarah Houlton

3. The colors represent various properties of the amino acids. Blue is hydrophobic, red is positive charge, magenta is negative charge, polar is green, pink is cysteines, orange is glycines, yellow is prolines, cyan is aromatic, and white is unconserved.

4. The residue number of the S in the first column of the P53\_human is 99.

5. Column 64 is an example of a column that completely conserves an amino acid property while still having containing various amino acids. Column 118 is an example of a column that completely conserves a single amino acid residue.

6.

176 – F in human, not completely conserved or almost completely conserved

179 – S in human, not very conserved in the context of the samples.

238 – M in human, not completely conserved or almost completely conserved

242 – P in human, almost completely conserved except for the Asian swallowtail butterfly, Danaus plexippus plexippus, the mountain pine beetle, the starlet sea anemone, the deer tick, the amphioxus, the choanoflagellate, Onchocerca volvulus, the eye worm, the green bottle fly, the fruit fly, the African malaria mosquito, the mosquito, the Southern house mosquito, and the leafcutter ant.

7.

82 (P -> L) – The mosquito demonstrates this missense mutation.

105 (G -> C) – None of the species demonstrated this particular missense mutation.

132 (K -> E) – None of the species demonstrated this particular missense mutation.

133 (M -> R) – None of the species demonstrated this particular missense mutation.

138 (A -> P) – The water flea, starlet sea anemone, deer tick, choanoflagellate, Salpingoeca rosetta, and mosquito demonstrate this missense mutation.

8a1.The closest related P53 protein to human is the zebrafish (P53-DANRE).

8a2. P73\_human is farther from P53\_human than P53\_DANRE is because it is not a P53 protein, it is a P73 protein. Despite being a zebrafish protein, a P53 protein is closer to another P53 protein than a different protein is.

8a4. The furthest species that harbors a P53-like protein is the Japanese killifish.

8b. Based on PCA, there are 4 PCA clades in this alignment.