Name: _____

Some comments

This is obviously quite different. For this exam, **due via email May 6th**, you have access to all of your notes, my recorded lectures, your textbook, and the entirety of Google.

You also have unfettered access to one another. Use everything at your disposal, especially your fellow students. I expect lively discussion on the forum regarding these questions! Indeed, your final participation grade will be based on your discussion of this exam!

There five papers references below (accessible on the forum). Each one has three questions associated with it. Each question is worth 1 point. You will **email me your answers in a less-than-3-page word document**

Questions

Paper **1.** Gould & Lewontin 1979.

a) Explain what a *spandrel* in the context of this paper is. That is, not the architectural term, but what the authors mean by spandrel here.

b) Tell me which of their arguments against adaptationism do you find the **strongest**, and *briefly* explain why.

c) Tell me which of their arguments against adaptationism do you find the **weakest**, and *briefly* explain why.

Paper **2.** Gendreau et al. 2020.

a) Why did the authors choose specifically to study a sodium channel protein in snakes?

b) How does the proposed location of this gene impact the rate it evolves relative to expectation from prior work?

c) This species of snake has a continuous range across North America, and genes from California may flow (albeit slowly) into West Virginia and vice versa, and thus have a large effective population size. The *Taricha* newts, however, do not occur east of the Rocky Mountains. On balance, how should these natural history facts impact the efficiency of selection?

Paper **3.** Church & Extavour 2020.

a) In their figure one, shouldn't the ancestral function of the gene be the function observed in the fish?

b) Imagine they collected data on a third developmental model organism, the chicken, and found that the gene has the same function in the chick as in the mouse. What would we then infer about the ancestral function of the gene?

c) *Briefly* describe how these arguments *challenge* the criteria for homology we discussed at the start of the semester.

Paper **4.** Patton et al. 2020.

a) What data, specifically, are used to calculate the speciation rate?

b) Why would you trust their estimates of speciation more than their estimates of extinction?

c) Why, even before reading this study, might you expect hybridization rates and diversification rates to be correlated?

Paper **5.** Zhang et al. 2017.

a) Why do the authors argue that maximal dosing fails to kill the largest number of cancer cells in the long run?

b) What is troubling in Figure 2d?

c) Please *briefly* summarize the findings shown in Fig. 5.