

**Virology Live Fall 2021**  
**Vincent Racaniello**  
**Study Questions for session 21 – Evolution**

*These questions are intended to summarize key points from this session and prepare you for the exams.*

1. What are the four main drivers of virus evolution?
  
  
  
  
  
  
  
  
  
  
2. What is a quasispecies and why is it so important in virology? Use it to explain Muller's ratchet.
  
  
  
  
  
  
  
  
  
  
3. How do we know that RNA and DNA viruses exist at different error thresholds? How could an antiviral drug be based on the concept of the error threshold?
  
  
  
  
  
  
  
  
  
  
4. Explain antigenic drift and antigenic shift in the context of mutation and selection.
  
  
  
  
  
  
  
  
  
  
5. What are host-virus arms races and how are they studied?
  
  
  
  
  
  
  
  
  
  
6. Is viral virulence positively or negatively selected? Would transmission be positively or negatively selected?
  
  
  
  
  
  
  
  
  
  
7. How do we know that viruses might have been around millions of years ago? What is an hypothesis for the origins of viruses?