December 6, 2021
MSE 2101 topics

- The transition from chemistry to biology
  - chicken or egg?
  - ribozymes
  - mineral clay
  - vesicles

- The RNA world
  - transition to DNA?
  - The rate of replication → path to natural selection

- 4+ billion years ago: early microbial evolution
  - anaerobic chemoautotrophs

- 3.5+ billion years ago: rapid diversification
  - evolution of photosynthesis in steps

- 2.5 billion years ago: initial oxygen buildup
  - everything balances everything, adaptation rules!

- 2.1 billion years ago: first cell nuclei; symbiotic relationships
  - complex structures → more diversity
  - compartmentalized structure, mitochondria, chloroplasts

- 1.2 billion years ago: first multi-cellular eukarya

- 542 million years ago: the Cambrian explosion
  - 30 phyla within ~40 million years
  - clues for sudden, unrepeated diversification?