



functions. In other words, we can eliminate chance as a reasonable explanation for the unguided origin of just one protein that is 150 amino acids long, given all the time (15 billion years, say most scientists) and material interactions possible within the known universe.

5. Using the points below, discuss how common (or rare) functional sequences (i.e. proteins that could do something useful in a living system) are among all the possible combinations of amino acids (the building blocks of proteins).
  - Molecular biologist Doug Axe estimates that the ratio of functional to non-functional amino acid sequences is about 1 to  $10^{74}$ .
  - This estimate is based on his studies of functional folds among sequences that are 150 amino acids long.
  
6. Using the points below, discuss how likely is it that life—or even a single protein—came into existence by mere chance.
  - Based on Axe’s work and several other considerations that offer additional probabilistic hurdles, the chance of getting just one protein without intelligent guidance is far beyond the probabilistic resources of the entire known universe.
  - The leap from just one protein to life is even greater. Scientists have estimated that it takes at least 250 proteins (and much else) to construct a minimally complex single-celled organism.
  - Virtually all origin-of-life specialists have given up on “chance alone” explanations for life’s origin.
  
7. What is wrong with using “prebiotic natural selection” to overcome the great odds against the origin of life? Use these points below in your answer:
  - “Prebiotic” means before life began.
  - “Natural selection” means organisms that have favorable traits in a certain environment will tend to survive better than other competing organisms.
  - “Begging the question” is a logical mistake that is illustrated by the story of “going home to get a ladder to get out of a whole.”
  
8. What is the point of Dr. Meyer’s illustration of spelling words using magnetic letters on a refrigerator? Does magnetic attraction cause a particular sentence to appear on the refrigerator? What is the “medium” and what is the “message” in this case?
  
9. How is DNA’s genetic code (similar to refrigerator sentences) “spelled out” by a sequence of molecules whose arrangement is not determined by the forces of chemical attraction? What serious flaw in the self-organization theory of life’s origin does this identify?