

What is the formula for:

Free energy:

Entropy:

Number of combinations of k objects out of N:

Boltzmann distribution:

- including degeneracy:

Random polymer:  $\langle R \rangle = ?$   $\langle R^2 \rangle = ?$

Draw all the structures that the following sequence can form  
(only consider stacks) GCCGGCC

Which structure has the lowest energy?

How would you evaluate the probability of each structure at a given T?

In theoretical studies of protein folding, what is meant by designability?

What are some properties that real proteins have that were also found in studies of lattice models for protein folding?

We showed that the probability distribution of end-to-end displacements for a random polymer in 1D was a Gaussian

$$P(R) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{R^2}{2\sigma^2}\right)$$

where  $\sigma^2 = N a^2$ . What is the probability of the polymer forming a loop where the end-to-end distance falls within a distance of  $R \leq \delta$ ? Use the approximation that  $\delta \ll 1$ .